Government of India
Dedicated Freight Corridor Corporation India Ltd.

Final Environment and Social Impact Assessment (ESIA) Report For Dedicated Freight Corridor (Western: Wamaj to Iqbalgarh Section)

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In association with Oriental Consultants Company Ltd.

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List of Abbreviation

ADB	:	Asian Development Bank
AIDS	:	Acquired Immunodeficiency Syndrome
APM	:	Acting Project Manager
ASI	:	Archaeological Survey of India
BAWS	:	Balaram-Ambaji Wildlife Sanctuary
BIS	:	Bureau of Indian Standard
BOD	:	Biochemical Oxygen Demand
BPL	:	Below Poverty Line
BSR	:	Basic Schedule of Rates
CA	:	Competent Authority
CEC		Central Empowered Committee
CF	:	Conservator of Forest
Cl	:	Chlorine
COD	:	Chemical Oxygen Demand
CPCB	:	Central Pollution Control Board
CPM	:	Chief Project Manager
CPR	:	Common Property Resources
CSO	:	Civil Society Organisation
CSR	:	Common Schedule of Rates
CS	:	Construction Supervision
CWC	:	Central Water Commission, India
CWLW		Chief Wildlife Warden
DC	:	District Collector
DCF		Deputy Conservator of Forest
DFC	:	Dedicated Freight Corridor
DFCCIL	:	Dedicated Freight Corridor Corporation of India Limited
DFO	:	Divisional Forest Offices
DO	:	Dissolved Oxygen
DPR	:	Detailed Project Report
DSP	:	Density of the Species
EC	:	Environmental Clearance
EIA	:	Environmental Impact Assessment
EMU	:	Environmental Management Unit
EPA	:	The Environment (Protection) Act
ERF	:	Environment Relief Fund
ESIA	:	Environment and Social Impact Assessment
ESMoP	:	Environment and Social Monitoring Plan
ESMP	:	Environment and Social Management Plan
EP	:	Entitled Person
ESCS	:	Environmental and Social Considerations Study
ESIMMS	:	Environmental and Social Impact Mitigation Measure Study
FRA		Forest Rights Act
GBH	:	Girth at Breast Height
GHG	:	Greenhouse Gas
GIDC		Gujarat Industrial Development Corporation
GOI	:	Government of India
GPCB		Gujarat Pollution Control Board
GRC	:	Grievance Redressal Committee
GRM	:	Grievance Redress Mechanism
GSFC	:	Gujarat State Fertilizer Company

HIV	:	Human Immunodeficiency Virus
Hg	:	Mercury (Hydrargyrum)
IBG	:	Important Broad Gauge
ICD	:	Inland Container Depot
ILO	:	International Labour Organisation
IMD	:	Indian Meteorological Department
IS	:	Indian Standard
IST	:	Indian Standard Time
ISO	:	International Organization for Standardization
IUCN	:	International Union for Conservation of Nature
JARTS	:	Japan Railway Technical Services
JBIC	:	Japan Bank for International Cooperation
JTCA	:	Japan Transport Cooperation Association
JICA	:	Japan International Corporation Agency
JIS	:	Japan Industrial Standard
JNPT	:	Jawaharlal Nehru Port
JSBA	:	Jessore Sloth Bear Sanctuary
LA	:	Land Acquisition
L_{AE}	:	Exposure Noise Level
L_{Aeq}	:	Equivalent Noise Level
MMD		Maximum Moving Dimensions
MoEF	:	Ministry of Environment and Forests
MOR	:	Ministry of Railways
NBWL	:	National Board for Wildlife
NEP	:	National Environmental Policy
NGO	:	Non Government Organization
NH	:	National Highway
NHA	:	National Highway Authority
NMA	:	National Monument Authority
NOC	:	No-Objection of Certificate
NRRP	:	National Resettlement and Rehabilitation Policy
NRCP	:	National River Conservation Plan
NRP	:	National Rehabilitation Policy
NTH	:	Non Titleholder
OBC	:	Other Backward Classes
OHS	:	Occupational Health and Safety
ONGC	:	Oil and Natural Gas Corporation
PAF	:	Project Affected Family
PAH	:	Project Affected Household
PAP	:	Project Affected Person
PCM	:	Public Consultation Meeting
PCCF	:	Principal Conservator of Forest
PI	:	Performance Indicator
PIAW	:	Potential Impact Area of Wildlife
PMC	:	Project Management Consultant
POL	:	Petroleum, Oil and Lubricant
PVAC	:	Property Valuation Assessment Committee
RAA	:	The Railways (Amendment) Act
RCCF	:	Regional Chief Conservator of Forest
RF	:	Reserved Forest
RFM	:	River Flow Measurement
ROB	:	Road Over Bridge

RoW	:	Right of Way
RRP	:	Rehabilitation and Resettlement Plan
RSPM	:	Respirable Suspended Particulate Matter
RUB	:	Road Under Bridge
SACD	:	State Agriculture and Co-operation Department
SC	:	Scheduled Caste
SEMU	:	Social and Environmental Management Unit
S-ESIMMS	:	Supplemental Environmental and Social Impact Mitigation Measure Study
SFED	:	State Forests and Environment Department
SHE	:	Safety, Health and Environment
SHFWD	:	State Health and Family Welfare Department
SIA	:	Social Impact Assessment
SIL	:	Sighting of Individuals
SIMD	:	State Industries and Mines Department
SLED	:	State Labour and Employment Department
SOD	:	Schedule of Dimensions
SPCB	:	State Pollution Control Board
SPV	:	Special Purpose Vehicle
SR	:	Sensitive Receptor
SSP	:	Sub-sectioning Post
ST	:	Scheduled Tribe
STD	:	Sexually Transmitted Disease
STI	:	Sexually Transmitted Infection
TH	:	Title Holder
TLBS	:	Thol Lake Bird Sanctuary
TDS	:	Total Dissolved Solid
TSS (water quality)	:	Traction Sub-station
TSS	:	Traction Sub-station
TOR	:	Term of Reference
VRC	:	Village Rehabilitation Committee
WB	:	World Bank
WHH	:	Women Headed Households
WHO	:	World Health Organization
WII	:	Wildlife Institute of India
WLS	:	Wildlife Sanctuary
WPA	:	Wildlife Protection Act

EXECUTIVE SUMMARY

S.1 BACKGROUND

The Dedicated Freight Corridor Corporation of India Limited (DFCCIL) undertaking the Dedicated Freight Corridor (DFC) project from Ministry of Railways (MOR) conducted Environmental and Social Impact Assessment (ESIA) for the Phase 1 of the Western corridor between Vadodara and Rewari approximately 918km in 2009. However, for one section of Phase 1 Western corridor from Banaskantha to Gandhinagar districts, approximately 140km alignment was revised after the ESIA study was approved by MOR due to policy change of MOR/DFCCIL and to minimize potential impacts on natural and social environment at maximum level. Thus, fresh ESIA for the revised alignment at the Wamaj - Iqbalgarh section was requested.

S.2 OUTLINE OF ESIA

S.2.1 Objective of ESIA

A detailed ESIA study, including preparation of an Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP), has been conducted in order to mitigate potential negative environmental and social impacts of the Wamaj-Iqbalgarh section. The specific objectives of the ESIA study are to:

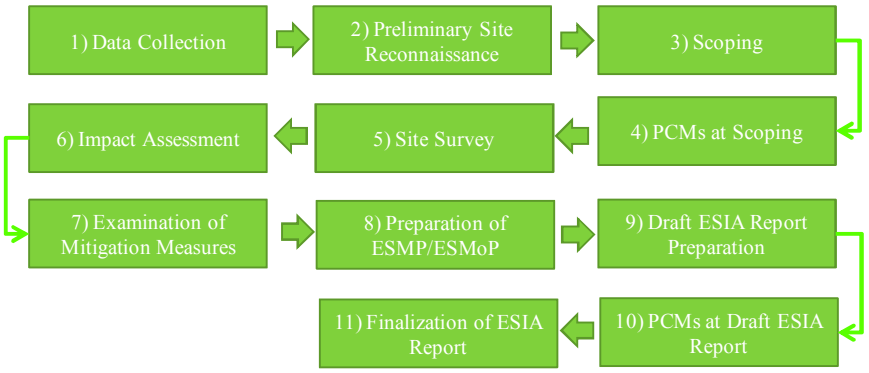
i) Identify and assess potential environmental and social impacts and recommend specific mitigation, management, and monitoring measures to avoid, offset or minimize the impacts, and

ii) Formulate an implementable ESMP and ESMoP integrating technically and economically feasible measures to avoid the identified impacts and an appropriate monitoring and supervision mechanism to ensure its implementation.

S.2.2 Component of ESIA

The ESIA report has covered detailed analysis of project alternative alignments, analysis of environmental legislations applicable to the project, necessary statutory clearances likely to be obtained by the executing agencies, highlighting the clearance procedures involved in the execution of the project and overview of the existing environmental conditions along the project corridor.

The process of ESIA study constitutes a systematic approach to evaluate a project comprehensively in the context of pollution control and natural and social environment of the project area. Basically, the ESIA study follows the steps as shown in Figure S.2.1, i.e. 1) data collection from desk study, 2) preliminary site reconnaissance, 3) scoping for preliminary identification of potential impacts due to the project implementation, 4) Public Consultation Meeting (PCM) for sharing initial findings of potential impacts and receiving feedbacks on the proposed study scope, 5) detailed field survey on the preliminary identified impacts at scoping, 6) assessment of potential impacts, 7) examination of mitigation measures of the potential impacts, 8) preparation of ESMP and ESMoP, 9) preparation of Draft ESIA report, 10) PCMs for sharing study results and proposed mitigation measures, and 11) preparation of Final ESIA report by incorporating received comments and suggestions.



Source: NKC

Figure S.2.1 ESIA Study Flow

S.3 OUTLINE OF THE PROJECT

S.3.1 Project Scope

The ESIA study area is along the Wamaj-Iqbalgarh section (approximately 140km: approx. 115km of parallel to the existing lines and approx. 25km of the detour section) stretching over 4 districts in Gujarat, namely Gandhinagar, Mehsana, Patan and Banaskantha. The study area is shown in Table S.3.1 and Figure S.3.1.

Table S.3.1 General Features along the Wamaj-Iqbalgarh Section

Items	Wamaj-Iqbalgarh Section
Affected Areas (No. of Affected Villages)	- Affected districts : Banaskantha, Patan, Mehsana, Gandhinagar in Gujarat - Total affective villages: 68 villages
Recorded Forest Area and Protected Area	- No recorded forest in the alignment - Passing through approximately 2.4 km of Balaram Ambaji Wildlife Sanctuary
Important Rivers	- 4 major rivers: Khari, Saraswati, Umardashi and Balaram

Source: NKC

The project scope considered in the ESIA study is shown in Table S.3.2.

Table S.3.2 Project Scope for the ESIA Study

Component	Project Scope
Length of Alignment	Approx. 140 km (Detour:25 km and Parallel:115 km)
Tunnel	0
Junction Station	2
Crossing Station	2
Important Bridge	1
Major Bridge	36
Minor Bridge	79
Railway Flyover	4
RUB >12m	32
RUB <12m	120
ROB	1
Traction Sub-station (TSS)	2
Sub-sectioning Post (SSP)	3

Source: DFCCIL

Figure S.3.1 Wamaj-Iqbalgarh Section of Phase 1 of Western Corridor

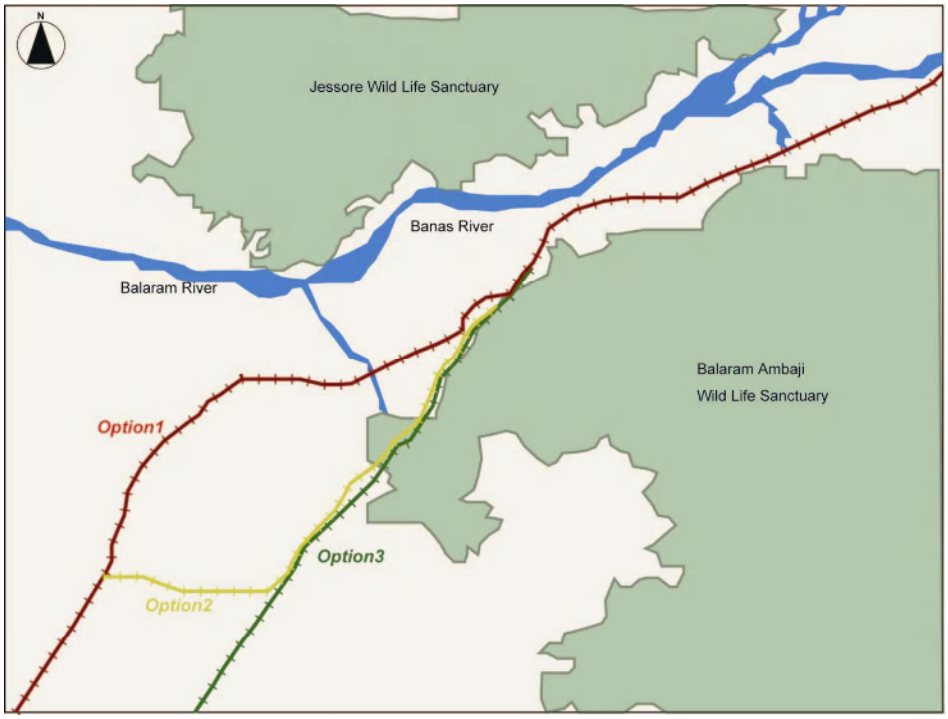
S.3.2 Examination of Alternatives

Three alternatives were examined for the Wamaj - Iqbalgarh section from the aspects of natural environment and social environment, engineering and project cost especially in Banaskantha Disctirct.

a) Option 1: The alignment is the detour which is assessed in the Supplemental ESIMMS at the time of JBIC SAPROF in 2009

b) Option 2: The alignment of the parallel to the existing DFC track up to Jaspuriya village and returned to the detour alignment

c) Option 3: The alignment of parallel to the existing DFC track



Source: The Report on Resuvey of Palanpur – Iqbalgarh DFC Alignment prepared by CPM Ajmer

Figure S.3.2 Alternatives Considered in Banaskantha District

Option 1 requires the largest land acquisition area since the proposed alignment is newly constructed though there would not be direct impact to BAWS. Improvement of soil condition would be required since the proposed alignment would pass close to the rivers. In addition, large amount of soil would also be required for construction of new tracks and slope. The expected construction cost would be the highest.

Option 2 is the longest alignment though necessary land acquisition area would be less than Option 1. The proposed alignment would pass through BAWS approximately 2.4km, and therefore direct impact to fauna and flora in BAWS would be expected. However, amount of soil for construction would be less than Option 1 due to levee widening of the existing DFC track. The expected construction cost would be the middle.

Option 3 is the shortest alignment with the least land acquisition area. The proposed alignment would pass through BAWS approximately 2.4 km, and therefore direct impact to fauna and flora in BAWS would be expected. However, amount of soil for construction would be less than Option 1 due to levee widening of the existing DFC track. The expected construction cost would be the smallest.

Considering the engineering, cost, natural and social environmental consideration aspects, Option 3 is considered as optimum.

S.4 EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS OF THE STUDY AREA

The existing environmental and social conditions of the study area are summarized in Table S.4.1.

Table S.4.1 Summary of the Existing Environmental and Social Conditions

Item	Summary of the Existing Conditions
1. Physiography	The state of Gujarat is situated on the west coast and is divided into three parts - the coastal, the plains, and the eastern highlands. The study area is in the plain part, and the Aravalli range stretches over from Banaskantha to Mehsana and Gandhinagar districts. The Aravalli range consists of organic and volcanic action and presently it is undergoing weathering and denudation. The transitional area between the plain and the highland (Chitrasani to Sidhhpur in the alignment) is marked by a pediment zone of undulating topography, characterized by low altitude mounds and hillocks of stabalised Aeolian sands dunes. There are also small alluvial fans and cones of fluvial material brought by the rivers coming from the neighbouring highland.
2. Climate	The climate is moderate and tropically characterized into four seasons; i) a hot summer from March to Mid June, ii) a humid monsoon or rainy season stretching from Mid June to September, iii) a short pleasant post-monsoon during October and November, and iv) a cool winter spanning between December and February.
3. Geology and Hydrogeology	The landscape is characterized by subdued topography comprising a variety of depositional landforms. The transitional area between the plain and the highland (Banaskantha and Patan) is marked by pediment zone of undulating topography, characterized by low altitude mounds and hillocks of stabalised Aeolian sands dunes. There are also small alluvial fans and cones of fluvial material brought by the rivers coming from the neighbouring highland. The central part of the plain shows mix topography of fluvial plains marked by subdued fossil dunes. The western part is almost a level ground of saline waste land with a thin veneer of sand and silt.
4. Soil	The soil in Banaskantha District is deficient in organic matter and nitrogen, and the sub-soil with well-water is highly saline and is not normally useful for irrigation. The soil in Patan and Mehsana in general is very deep (>150 cm) somewhat excessively to well drained and sandy to fine loamy in texture. They are slightly to moderately alkaline and moderately to strongly calcareous; slightly eroded and saline. Salinity and sodicity increases in this area. Gandhinagar District has sandy loam soil locally known as *goradu* which owes its origin to the Indo-Gangetic alluvium. This is one of the most fertile parts of the state and agriculturally much advanced. Although the soil fertility indices are average from the point of view of agriculture, it is vulnerable to erosion and desertification due to a poor sandy/ fine loamy nature.
5. Legally Protected Area	The proposed DFC alignment passes through a part of the western area of the Balaram Ambaji Wildlife Sanctuary (BAWS) in Banaskantha district, approximately 2.4km length. Except the BAWS, there is neither protected area nor recorded forest in the study area.
6. Flora, Fauna & Biodiversity	Natural environment conditions vary along the proposed DFC alignment due to different ecological and agro-climatic variation. Nearly 44% of the alignment passes through the cultivated agricultural area, barren land and wasteland. Besides this, the alignment crosses over number of rivers and streams, and protected forest namely BAWS. The condition of BAWS where the proposed alignment passes was observed as degraded, but it was used for wildlife movement. Flora along the proposed alignment belongs to arid to semi-arid. Forest type comprising of mainly tropical dry deciduous, and contain several tree species of great commercial significance. The BAWS possesses *483* species of plants including *107* trees, *219* herbs, *58* shrubs, *49* climbers, *40* grasses and *10* species of lower plants. Significant fauna is found in the BAWS. Sloth Bear, *Melursus ursinus* is the

Item	Summary of the Existing Conditions
	flagship species of the BAWS. Leopard (*Panthera pardus*) is one of the top predators inhabiting the sanctuary area. Other major vertebrate species of the area include striped hyena, jungle cat, jackal , Indian fox, common langur, nilgai, rats, hedgehog, Indian pangolin, bats, star tortoise, porcupine etc. Reptiles include the snakes, tortoises and lizards of various types. Lizards including monitor lizard, Indian chameleon, chandan gho, etc. are also commonly observed.
7. Air Pollution	SO_2 and NO_x values at all locations are below the standards of 80 µg/m^3. However, the values of PM_{10} (RSPM) exceeds at Mehsana (Modhera Char Rasta) and Palanpur (Vishram Griha) as compared to National Ambient Air Quality Standards, 2009 of 100 µg/m^3. The main reason for high values of RSPM is heavy traffic on the National Highway at both places. These two monitoring stations are close to National Highway connecting Ahmedabad from Abu Road and traffic volume is very high on the road.
8. Water Pollution	The proposed DFC alignment passes through four prominent rivers (in respect of breadth of river bed) - Khari (near Mehsana), Umardashi (near Chhapi), Saraswati (near Sidhhpur) and Balaram (near Chitrasani). Except the Balaram River, three rivers are not perennial rivers but become dry at the dry season. As for the Balaram River, it is ephemeral in nature and flows only in response to precipitation in catchments area.
9. Land Use	Land use classification survey for acquired land reveals that the agricultural area is 44%, following 40% of public land/infrastructure, 14% of residential area, 2% of common resource area and less than 1% of forest area. Ganshinagar is the largest acquisition area of the agriculture area, accounting 74% to the total acquisition area in this district. This is mainly due to the fact that the entire alignment in Gandhinagar is the detour passing through the agriculture area.
10. Socio-economic conditions	1) Demographic profile: Banaskantha is the most populous district in the study area followed by Mehsana, Gandhinagar and Patan. As for the district-wise project affected population, Mehsana has the highest population followed by Gandhinagar, Banaskantha and Patan since Mehsana has the longest alignment in the project area. 2) Economic profile: Major occupation of people in the proposed alignment area is agriculture. A diverse variety of crops (both traditional and cash-crops) are grown in the area. In addition mineral based industries are located in Banaskantha and Patan. Mehsana and Gandhinagar districts have a variety of industries. 3) Health status There are a lot of primary healthcare centers, community healthcare centers and sub centers in each project-affected district. 4) Education status The district-wise literacy rate as per census of India 2001 ranges from 51.0% in Banaskantha district to 76.6% in Gandhinagar district. 5) Heritage There are 28 world heritage properties in India, out of which 23 are cultural properties and 5 are natural properties. All properties are out of the ESIA study area. There are 5 properties of national importance in districts covered by the ESIA, but none of them falls within one kilometer radius of the alignment.

Source: NKC

S.5 ENVIRONMENTAL SCOPING

Impact assessment was conducted based on the result of scoping which was made through analysis of the project scope and baseline information of the current natural and social environment conditions collected by literature reviews. As the result of the scoping, the following impacts were selected to be examined in detail at the ESIA study.

Pollution Control:
(1) Air pollution, (2) Water pollution, (3) Noise and vibration, and (4) Waste

Natural Environment:
(1) Soil erosion, (2) Flora, fauna and biodiversity, (3) Disaster, and (4) Global warming

Social Environment:
(1) Involuntary Resettlement including social impacts due to land acquisition without resettlement, (2) Local economy such as employment and livelihood, (3) Land use and utilization of local resources, (4) Social institutions (including regional severance), (5) Social infrastructure and services, (6) Socially vulnerable groups, (7) Inequitable or unfair distribution of benefits and damages, (8) Local conflict of interests (9) Water usage or water rights and rights of common, (10) Historical and cultural heritage, (11) Sanitation, (12) Hazardous (risk) infectious diseases such as HIV/AIDS, (13) Occupational health and safety, and (14) Accident and public safety.

S.6 IMPACT ASSESSMENT AND MITIGATION MEASURES

S.6.1 Field Survey

A series of field surveys on pollution control, natural environment and social environment was conducted based on the initially identified impacts in the scoping excise. Methodology and location of the field survey are outlined in Table S.6.1.

Table S.6.1 Methodology and Location of Field Survey

Item	Survey Methodology	Survey Location
Pollution Control		
Noise & Vibration	[Noise] - Measuring noise level applying international standards. [Vibration] - Measuring vibration level applying international standards.	[Noise and Vibration] 2 points at 3 locations: Palanpur, Sidhpur, and Mehsana locations considering population density and sensitivity such as facilities requiring silent.
Water Quality	- Sampling surface water from the important river in the study area. - Analyzing samples of selected parameters.	3 locations (i.e. upstream, proposed alignment and downstream) in the Balaram River. *There was no water flow in other 3 important rivers (Khari. Umardashi and Saraswati Rivers)
Natural Environment		
Fauna, Flora and Biodiversity	[BAWS] - Visual check of fauna and flora, and its habitats conditions in two seasons, i.e. pre-monsoon season and monsoon season. - Conducting interview with academic persons on the fauna and flora situation in the survey area. [Tree Census Survey] - Conducting census survey of trees to be felled along the	- Along the proposed DFC alignment in the BAWS where the exact location was selected based on interviews with the State forest authorities and other relevant maps. - The number of trees was counted at the area where the extra land acquisition would be necessary within the RoW.

Item	Survey Methodology	Survey Location
	alignment.	
Social Environment		
Baseline Survey & Census	- Collecting socio-economic information from project affected persons (PAPs) through questionnaire.	68 villages in 4 districts (Gandhinagar, Mehsana, Patan and Banaskantha).

Source: NKC

S.6.2 Impact Assessment and Proposed Mitigation Measures

Based on the survey results and subsequent analysis, various potential environmental and social impacts of the DFC project have been identified. Specific mitigation measures are proposed to minimize all such impacts in planning/design, construction and operation phases. Such measures for major items of the environmental and social impacts are summarised in Table S.6.2.

Table S.6.2 Major Potential Impacts and Proposed Mitigation Measures

Item	Phase	Major Potential Impacts	Proposed Mitigation Measures
Pollution Control			
Noise & Vibration	C	- Increasing noise & vibration levels due to operation of construction equipments.	- Advance notice of construction activities to neighbours. - Provision of enough distance between construction yards and residential areas. - Development of a green belt. - Provision of noise barriers at sensitive areas, if necessary.
	O	- Increasing noise & vibration levels due to train operation.	
Air Quality	C	- Generating dust from earthmoving and construction activities. - Emission from vehicles and machineries.	- Sprinkling of water. - Using low emission construction vehicles and machineries, and conducting regular maintenance of them.
Water Quality	C&O	- Deterioration of water quality such as turbidity by the earthworks. - Increase of spillage risks of petroleum, oil and lubricant (POL) products etc. into the surrounding water bodies.	- Appropriate treatment of wastewater from construction site and depo. - Appropriate management of stockpiled soil and loose materials. - Provision of oil catch/trap along the drainage channel. - Provision of emergency measures such as floating oil booms.
Natural Environment			
Fauna, Flora and Biodiversity	C&O	- Increasing risks of i) distraction/loss of habitat and wildlife, and ii) disturbance of wildlife movement.	- Compensatory plantation with local species. - Creation of a green belt. - Provision of underpasses and culverts/pipes to facilitate wildlife movement.
Social Environment			
Involuntary Resettlement	P	- Land acquisition of private land and involuntary resettlement.	- Providing compensation for the affected land and structures as per the policy established in the Resettlement and Rehabilitation

Item	Phase	Major Potential Impacts	Proposed Mitigation Measures
			Plan (RRP).
Local Economy	P& C	- Affecting sources of income at some extent due to land acquisition and involuntary resettlement. - Increasing local business opportunities due to construction activities.	- Awarding appropriate rehabilitation programs. - Providing job opportunities related to the project to local people to the extent possible.
Social Infrastructure	C	- Disturbed accessibility to local social infrastructure such as religious places, water pipelines for domestic water supply and irrigation system to some extent.	- Securing a temporary passage to local infrastructure and religious places during construction.
	O		- Securing access to local infrastructure including religious places by providing a road, bridge and/or underpass. - Arrangement of cross drainage works such as bridges and culverts.

Note P stands for Preconstruction, C stands for Construction, O stands for Operation
Source: NKC

S.6.3 Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan (ESMP) envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts caused by the project activities during planning/design, construction and operation phases. The ESMP has been prepared based on the above-mentioned mitigation measures consisting of the following components.

(1) Specific Management Plans

a) Noise and Vibration Control;
b) Waste Management including construction waste and hazardous waste/materials;
c) Greenbelt Creation;
d) Wildlife Habitat Restoration and Biodiversity Protection;
e) Soil Erosion Control;
f) Land Acquisition and Resettlement Management (see RRP report);
g) Occupational Health and Safety (OHS) Management;
h) Construction Camp Management for its Development, Operation and Demobilization; and
i) Borrow Area (and Quarry Site) Management.

(2) Phase-wise ESMP

a) Planning/Design Phase

1) Land acquisition and resettlement management, 2) Tree cutting control and green belt development, 3) Construction yard and camp management, 4) Construction vehicle, equipment and machinery management, 5) Borrow area and quarry site management, 6) Labor management, and 7) Disaster management.

b) Construction Phase

1) Tree cutting control and green belt development, 2) Noise and vibration control,

3) Air pollution control, 4) Siltation control, 5) Petroleum, Oil and Lubricant (PLO) management, 6) Waste management, 7) Construction yard and camp management, 8) Sloe protection, 9) Stock pile management, 10) Borrow area and quarry site management, 11) Public health and safety risks management, and 12) Occupational health and safety (OHS) management.

c) Operation Phase

1) Supervision of operational performance, 2) Noise control, 3) Green belt management, 4) Construction yard and camp management, 5) Borrow area and quarry site rehabilitation (post-closure management), and 6) Disaster management.

S.6.4 Environmental and Social Monitoring Plan (ESMoP)

The purpose of the Environmental and Social Monitoring Plan (ESMoP) is to ensure the effective implementation of ESMP in order to achieve overall objective of the Project in a more sustainable and effective manner. The ESMoP monitors the results and effectiveness mitigation measures and suggests additional measures, if required, to enhance the project's benefits. In addition, ESMoP includes parameters to be monitored, monitoring methods, location of the monitoring areas/sites, frequency and duration of monitoring, institutional responsibilities for implementation and supervision, and estimated cost. The ESMoP consists of routine supervision of the work and environmental and social impact/mitigation monitoring as summarized below:

(1) Supervision Work

Observation of the construction and operation performance to ensure mitigation activities as follows:

- Mitigation measures on pollution control (noise and vibration, air pollution, water pollution, oil spills and hazardous materials, and construction waste)
- Mitigation measures on impacts on natural environment (tree cutting and green belt development (plantation), landslide and soil erosion, disturbance to flora and fauna, plantation)
- Mitigation measures on impacts on social environment (social impact such as land acquisition and resettlement, social infrastructure, crops and vegetation, public health and safety including traffic safety, construction labour force management)
- Other mitigation measures (construction yard and camp, and earthwork operation)

(2) Environmental and Social Impact/Mitigation Monitoring

Observation of the actual environmental and social parameters as follows:

- Pollution (Noise and vibration, air quality, water quality)
- Natural environment (fauna and flora, soil erosion)
- Social environment (socio-economic conditions, public health and safety)
- Others (impacts by borrow areas and quarry sites)

S.7 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

S.7.1 Public Consultation Meeting (PCM)

Public Consultation Meetings (PCMs) primarily aim at providing a platform for the PAPs and different stakeholders to express their views on possible impacts. The PCMs for ESIA were held at two different stages in order to receive opinions and feedback of the public

and to disseminate information on the project and ESIA study. The PCMs were conducted district-wise in all four districts.

- The first stage of the PCM for ESIA was conducted in September, 2011 (and supplemental PCM for two villages in Mehsana in October, 2011) at the time of environmental scoping as the initial stage of the ESIA study. Information on the Project and scope of the ESIA study was disseminated to the public, and their comments and opinions were collected to be incorporated in the study scope of the ESIA.

- The second stage of the PCM for ESIA was conducted in November 2011 for Banaskantha, Mehsana and Patan districts and in July 2012 for Gandhinagar district at the time of preparation of draft ESIA report as the final stage of the ESIA study. Information on findings of draft ESIA study including proposed mitigation measures was disseminated to the public, and their comments and opinions were collected to incorporated in the environment and social mitigation measures, and management and monitoring plans in the Final ESIA report.

The first and second stage PCMs were attended by mainly PAPs and other villagers, representatives from Gram Sarpanch, Village Patwari, administrative officers and DFCCIL officers etc. Major opinions and issues raised in the first and second stage PCMs were - mainly compensation issues such as compensation by market rates or land for land, and employment opportunities. Other issues were clarification on the proposed alignment such as discrepancy in land records, width of the RoW, impacts on domestic water pipeline and irrigation system, provision of accessibility to service roads, drainage, water resources and community facilities; and potential impacts related to noise and vibration due to train operation.

S.7.2 Information Disclosure

The ESIA study findings were disseminated to the PAPs and relevant stakeholders so that preventative measures can be taken for the successful implementation of the Project. The information disclosure is implemented at two stages for the ESIA study.

- The first stage of information dissemination was conducted when the draft ESIA was prepared. The full sets of draft ESIA (main report and appendices) in English were delivered and placed at DFCCIL Head office, CPM Ahmedabad office, CPM Ajmer office, major existing railway stations and 4 district authority offices along the proposed DFC alignment for Wamaj - Iqbalgarh section. Additionally, the summary of the draft ESIA report was prepared in English and Gujarati and delivered to all the project affected villages along the proposed DFC alignment. No comments or opinions on the draft ESIA were received through post, fax, email or hand delivery at DFCCIL Head office and CPM offices.

- The second stage of information dissemination is conducted at final ESIA study stage. The full sets of final ESIA (main report and appendices) in English is delivered and placed at DFCCIL Head office, CPM Ahmedabad office, CPM Ajmer office, major existing railway stations and 4 district authority offices along the proposed DFC alignment for Wamaj - Iqbalgarh section. Additionally, the summary of the final ESIA report (this report) is prepared in English and Gujarati and is delivered to all the project affected villages along the proposed DFC alignment.

S.8 CONCLUSION

S.8.1 Pollution Control

There would be some residential areas and sensitive receptors falling near the proposed alignment, and impact of noise and vibration is predicted at some decree in construction and operation phases. By adopting preventive measures such as planting trees as a greenbelt and setting soundproof walls in the sensitive areas, noise and vibration level could be mitigated at the certain decree.

The freight corridor would improve the air quality along the proposed project areas by reducing the emissions from the vehicular traffic and traffic congestions. Although long term negative impact to air quality would not be anticipated, there would be temporal disturbance of air quality during construction phase due to excavation and movement of dumpers. Thus, regular monitoring of air quality in the area by respective State Pollution Control Boards would be indispensable to confirm any changes of air quality.

With respect to water quality, there would be temporal impact during the construction phase due to increase of silt, oil and grease generated by construction activities and organics from construction camp though their amount might not be significant level. These impacts would be mitigated by arrangement of appropriate drainage/sanitation facilities.

S.8.2 Natural Environment

The proposed alignment passes through the BAWS with approximately 2.4km though there would not be new land acquisition since it would be within the ROW of the existing railway tracks. Flora condition at the area where the proposed alignment passes is already degraded as open scrub forest on the Chitrasani side of the Balaram River and denser forest of the exotic *Prosopis juliflora* on the Jethi side. Therefore, the construction of DFC tracks would not disturb or remove any threatened, important species and/or migratory birds. As for the fauna condition, however, it was observed that the area along the proposed alignment was used by key wildlife for movement between the BAWS and the outside protected area namely Jessore Sloth Bear Sanctuary. Thus, there is a possibility that wildlife movement would be disturbed temporally by cutting trees along the proposed alignment during the construction phase and permanently due to setting up of the new tracks. The impact of tree removal would be mitigated through compensatory planting of native trees or indigenous tree species, and disturbance of wildlife movement would be mitigated by preparing underpasses if any.

S.8.3 Social Environment

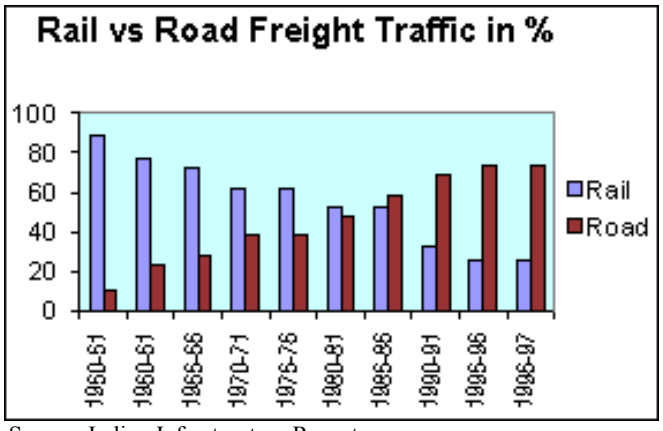
The RoW of the proposed alignment has been arranged within the RoW of the existing railway tracks to minimize impacts caused by land acquisition and demolishment of private structures though land acquisition is still required. Land acquisition and resettlement bring long-term hardship for project affected persons (PAPs), and therefore appropriate compensation and rehabilitation measures are considered in the Rehabilitation and Resettlement Plan (RRP).

In addition to provision of appropriate compensation, monitoring of livelihood of the PAPs after land acquisition/ resettlement is also important to confirm whether their livelihood is stabilized or they do not have any hardships related to the land acquisition. Thus, continuous monitoring is recommended to be conducted by DFCCIL as a project proponent and independent organization(s) from the third party view.

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND TO THE PROJECT

The Indian Railways constitute a critical component of the nation's transport network, both for passenger as well as freight services. It is the fourth busiest rail network in the world in terms of total traffic unit kilometres carried.[1] Though railways are a cost-effective and relatively environmentally friendly mode of transport, capacity and efficiency constraints in the freight segment have, over the years, led to a significant shift from railway to road transport. The annual report of the Comptroller and Auditor General of India on Indian Railways for the year 2010-11 states that "freight is a profit making business segment of Indian Railways and it is the backbone of railways revenue". It further states that Indian Railways is one of the largest and busiest rail networks in the world spread over a network of 64,015 route kilometres and is a chief carrier of bulk freight. Revenue from freight transport services (Rs. 46,425 Crore) accounts for almost two-thirds of the gross railways revenue (Rs. 71,720 Crore).



Source: Indian Infrastructure Report

Figure 1.1.1 Railway and Road Utilisation Trend for Freight Transport

The road transport sector which saw an increase in investments since the late 1990s, advanced more rapidly than railways, and now accounts for about 65% of the freight market and 90% of the passenger market in India, and those shares are growing. However, increases in the price of oil, with its associated energy security issues and escalating concerns about greenhouse gas (GHG) emissions has emphasized the need for developing low carbon infrastructure and an energy efficient transport system. Considering the ever increasing volume of freight traffic movement between the metros and their respective hinterlands, Indian Railways has initiated the development of Dedicated Freight Corridors (DFC). The creation of the DFC network is expected to generate two major impacts on freight movement within the country: 1) the shift of freight from road back to the less carbon intensive rail transport and; 2) an inherent improvement in energy efficiency of freight rail through the adoption of improved technologies. At the same time, this will restore the railways' competitive edge in the market.

Four routes form a Golden Quadrilateral connecting Delhi, Mumbai, Chennai and Kolkata and account for around 16% of the railway network's route length. However, they carry more than 60% of India's total rail freight. The existing trunk routes of Mumbai-Delhi on the Western Corridor and Kolkata-Delhi on the Eastern Corridor are highly saturated with

[1] Traffic-km are passengers-km plus freight ton-km.

capacity utilization varying between 115 to 150%. The surging power needs required for heavy coal movement, booming infrastructure construction and growing international trade has initially led to the approval of the DFC along the Western and Eastern Routes by the Government of India (GOI) to fulfill the demand of additional capacity of rail freight transportation. In the Twelfth Five Year Plan (2013-2018), the GOI's Planning Commission, has set an infrastructure investment target of USD 1 trillion, approximately 9 - 10% of expected GDP. Augmentation of transport systems, particularly of the rail network, will play a crucial role in this infrastructure development and hence, support India's burgeoning economy which is at present considered to be the second fastest growing economy in the world.

Under these circumstances, the Ministry of Railways (MOR) established the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a Special Purpose Vehicle (SPV), to undertake planning and development, mobilization of financial resources, and construction, maintenance and operation of the DFC. DFCCIL was incorporated as a company under the Companies Act 1956 on 30 October 2006. This company is now actively engaged in the implementation of Computerized Multi Modal High Axle Load Dedicated Freight Corridor Project between Delhi-Mumbai under the Western DFC Corridor and Ludhiana-Delhi-Kolkata under the Eastern DFC Corridor.

The Western DFC is designed to carry a planned total freight line of 37.7 million tonnes in fiscal year 2013-2014, which would increase to 140.4 million tonnes in 2033-34. The Western DFC has two broad streams of traffic, one, between the terminal nodes at either end, Jawaharlal Nehru Port Trust in Mumbai and Dadri in Uttar Pradesh including Tuglakabad in Delhi, and the other, the traffic entering from branch line feeder routes at the various junction points en route. The creation of rail infrastructure on such a scale, unprecedented in independent India, is also expected to drive the establishment of industrial corridors and logistics parks along its alignment. The Western DFC will mainly cater to containers, fertilizer, coal, salt and cement. The corridors have been planned with an axle load of 32.5 tonnes for bridges and sub-structures and 25 tonnes for track structure with a design speed of 100 km/h. For the majority of the routes, a double line corridor is planned (except where a single line is justified on traffic considerations) with electrification and an advanced signaling system. Implementation of the DFC projects will result in reducing the carbon intensity of India's transport sector. The GHG emissions with the DFC project will primarily come from electricity consumption in locomotives during freight movement and fossil fuel and electricity usage in the support infrastructure of the DFC.

The Western Corridor has been divided into 2 phases, in which Phase 1 covers the sections between Vadodara and Rewari, while Phase 2 includes Jawaharlal Nehru Port (JNPT) in Mumbai - Vadodara and Rewari - Dadri as well as a single line from the DFC mainline near Faridabad to Tuglakabad (Figure 1.1.2). The Western Corridor is being funded by JICA for a total length of approximately 1,483 km. It is planned that construction work will be completed in 4-5 years.

The proposed alignment between Wamaj (Gandhinagar District, Gujarat) and Iqbalgarh (Banaskantha District, Gujarat) was changed after the Environmental and Social Impact Assessment (ESIA) study for Phase 1 section was completed in 2009, which required a fresh ESIA study to be conducted.

Figure 1.1.2 Phase wise Map of Western Corridor and Wamaj to Iqbalgarh Section

1.2 OBJECTIVE OF ESIA STUDY

According to the GOI's Environmental Impact Assessment Notification issued by the Ministry of Environment and Forests (MOEF), New Delhi on 14th September, 2006 under the Environment (Protection) Act, 1986, railway and bridge construction projects do not require the conduct of Environmental Impact Assessment (EIA) studies and

Environmental Clearance (EC) from the MOEF. However, considering the scale, nature and extent of activities envisaged as part of the DFC Project, a detailed Environment and Social Impact Assessment (ESIA) Study, including preparation of an Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP), was conducted in order to mitigate potential negative environmental and social impacts for the Wamaj - Iqbalgarh section of Phase 1 of the Western Corridor.

The overall objective of the ESIA study for the DFC Project is to ensure that all potential environmental and social issues or concerns associated with various project components are addressed and integrated into the project's planning and design at an early stage in order that they may be avoided, minimized, mitigated and/or compensated for accordingly. The results of due diligence investigations and in assessing environmental and social considerations will inform the DFC Project decision-making and so that downstream costs and delays may be minimized.

The specific objectives of the ESIA study are:

- To identify, assess, and evaluate potential environmental and social impacts to be considered in the Wamaj-Iqbalgarh section of Phase 1 of the Western Corridor.
- To recommend specific mitigation, management, and monitoring measures to avoid, offset or minimize the impacts.
- To formulate an ESMP and ESMoP integrating the technically and economically feasible measures to minimize and avoid the identified adverse impacts.
- To recommend suitable institutional mechanisms to monitor and supervise effective implementation of ESMP and ESMoP.

The ESIA study consists of a pollution control study, a natural environment study, a social impact study including impact identification and assessment, public consultation, preparation of mitigation measures, preparation of ESMP and ESMoP.

1.3 ESIA STUDY AREA

The study area of ESIA is along the Wamaj-Iqbalgarh section of Phase 1 of the Western Corridor which consists of 4 districts of Gujarat - Gandhinagar, Mehsana, Patan and Banaskantha. The Wamaj-Iqbalgarh section has both parallel and detour sections with total length of the section is approximately 140km. The number of affected villages are 68 including 1,540 private land plots coming under land acquisition and around 6,026 title holders (THs). Some areas are densely populated, and there are instances of populations encroaching on to the railway land (i.e. along the existing ROW) owned by Ministry of Railways (MOR). Basic information on key parameters pertaining to the natural and social environment of the ESIA study are is shown in Table 1.3.1.

Table 1.3.1 General Features along Wamaj-Iqbalgarh Section

Items	Wamaj-Iqbalgarh Section
Affected States (No. of Affected Villages by District)	4 districts of Gujarat State – Banaskantha, Patan, Mehsana, Gandhinagar Total afafcted villages – 68
Recorded Forest Area and Protected Area	No recorded forest in the alignment 2.4 km of Balaram Ambaji Wildlife Sanctuary
Important Rivers	4 major rivers – Khari, Saraswati, Umardashi and Balaram

Source: DFC and NKC

1.4 ESIA STUDY REPORT STRUCTURE

This ESIA study report comprises of 12 chapters as follows:

Chapter 1 briefly presents project background, objectives of the ESIA study and provides an overview of the study area. Chapter 2 describes the project description, salient features of the proposed project and proposed alternative alignments. Chapter 3 focuses on the Indian environmental legislations applicable to the project along the proposed corridor and the necessary statutory clearances likely to be obtained by the executing agencies. It also highlights the clearance procedures involved for the execution of the project. Chapter 4 outlines an overview of the existing environmental conditions along the project corridor.4 (covering the physical, natural environment and socio-economic context). Chapter 5 presents scoping results of the ESIA study.

Chapters 6, 7 and 8 explain the pollution control aspects, natural environment and social considerations respectively together with the various environmental parameters along the corridor with the relevant primary data generated during two different seasons on the river water quality, natural environment, and data independent of seasonal variation on the land use, sensitive receptors, and baseline surveys along with the secondary information collected from various statutory agencies of state governments. Chapter 9 describes results and findings of public consultations conducted at four districts The proceeding of the public consultation meeting and the brochures prepared and the presentation made are also discussed in this chapter. Chapter 10 presents mitigation measures for identified environmental impacts due to the proposed project activities and its components.

Chapter 11 describes ESMP and ESMoP focusing on the implementation of mitigation measures at various stages of the project to curtail adverse impacts including a detailed monitoring plan for a safeguard of the environment with a time frame for the monitoring activities. Chapter 12 summarises project impacts and suggested mitigation measures in terms of pollution control, natural environment, and social aspects as a conclusion.

1.5 CONTACT DETAILS

(1) Project Proponent

Ministry of Railways (MOR)
(Railway Board)
Government of India (GOI)

(2) Project Implementing Agency

Dedicated Freight Corridor Corporation of India Limited (DFCCIL)
(Under Ministry of Railways)
Fifth Floor, Pragati Maidan, Metro Station Building Complex, New Delhi – 110 001
(Tel: 91-11-23454700, Fax: 91-11-23454701)

(3) CPM Offices of the DFCCIL

1) CPM Office Ahmedabad

First Floor, Old DRM Office Building, Kalupur
Ahmedabad – 380 002, Gujarat

Tel: 91-079-22163101

2) CPM Office Ajmer

42, A/3 Civil Lines
Ajmer – 305 001, Rajasthan
Tel: 91-145-2630360

CHAPTER 2 OUTLINE OF THE PROJECT

2.1 LOCATION OF THE PROJECT

The Wamaj - Iqbalgarh section of Phase 1 of the DFC Western Corridor runs from Gandhinagar to Banaskantha districts in Gujarat. The corridor passes through four districts namely Gandhinagar, Mehsana, Patan and Banaskantha. Figure 2.1.1 shows the location of the proposed DFC alignment of the Wamaj - Iqbalgarh section.

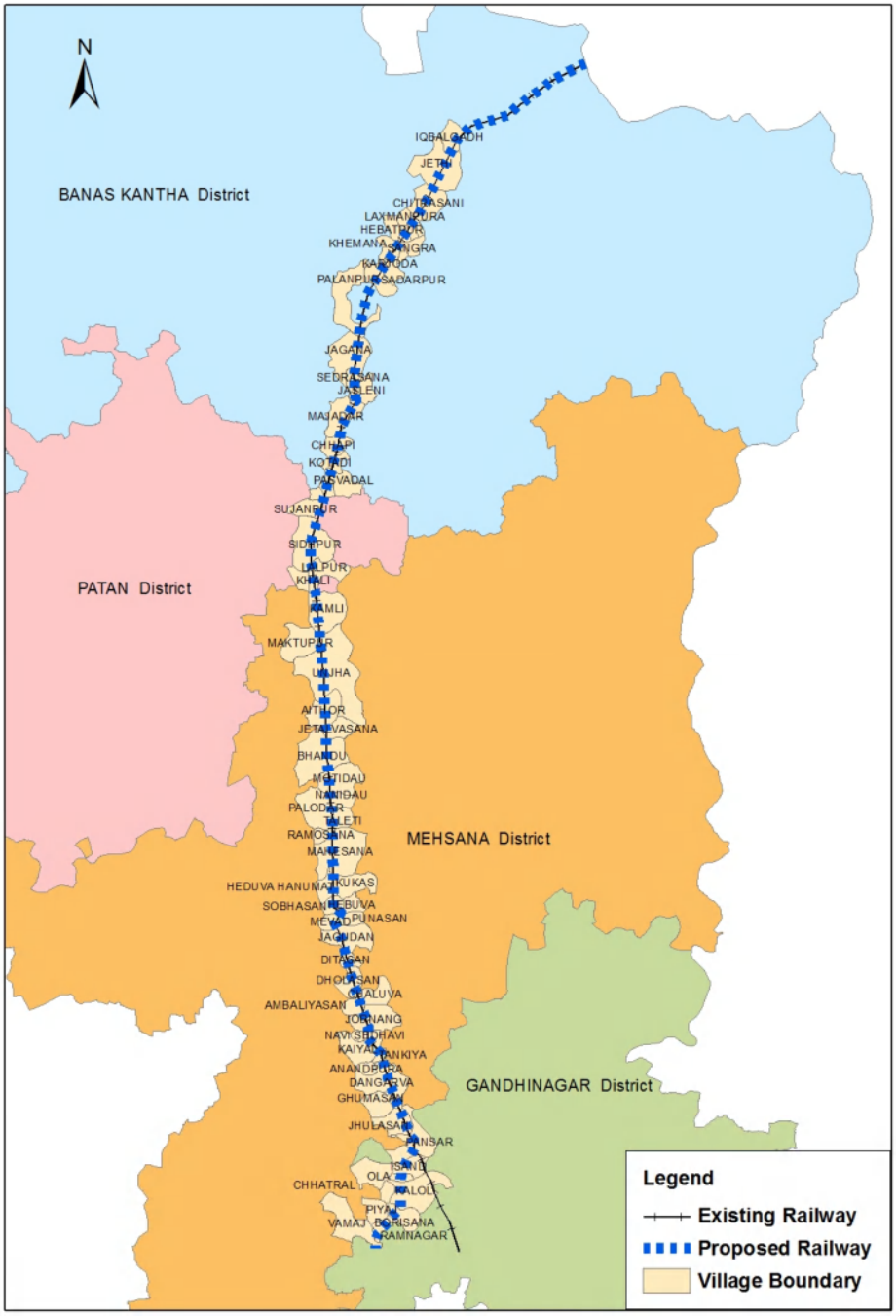


Figure 2.1.1 Proposed Alignment of Wamaj – Iqbalgarh Section

2.2 SCOPE OF THE PROJECT

The Wamaj-Iqbalgarh section of the Phase 1 of the DFC Western Corridor is planned to run from Wamaj in Gandhinagar district to Iqbalgarh in Banaskantha district of Gujarat. The corridor will predominantly consist of double lines with electrification and advanced signaling system facilitating running of freight trains at higher speeds of up to 100 km/hour. The track sub structures such as formations and bridges shall be fit for 32.5 tonnes axle loads whereas the track structures shall be fit for 25 tonnes axle load to provide infrastructure for heavy/long haul operations with trailing loads of up to 13,000 tonnes and train lengths of up to 1,500 meters. Any detention to either road or rail traffic might be avoided by introducing grade separators i.e. road over bridge (ROB) or road under bridge (RUB) at existing rail/road infrastructures at important level crossing gates. Higher schedule of dimensions (SODs) and maximum moving dimensions (MMDs) are included in the design in order to run wider stock, double-stack containers and newly designed wagons so as to have improved payload to tare ratio.

The DFC project will restore the Indian Railways' competitive strength in the freight transportation market and emerge as the major low carbon and energy efficient transport system in the country. It will drive the establishment of industrial corridors and logistic parks along its alignment and play a crucial role in supporting India's growing economy.

The project scope assessed in this ESIA study is shown in Table 2.2.1.

Table 2.2.1 Project Scope for the ESIA Study

Component	Project Scope
Length of Alignment	Approx. 140 km
Tunnel	0
Junction Station	2
Crossing Station	2
Important Bridge	1
Major Bridge	36
Rail Flyover	4
Minor Bridge	79
RUB > 12m	32
RUB < 12m	120
ROB	1
Traction Sub-station (TSS)	2
Sub-sectioning Post (SSP)	3

Source: DFCCIL

2.3 DESIGN CONSIDERATIONS FOR ALIGNMENT PLANNING

Two of the most important considerations in selecting the route for the proposed freight corridor are the physical features of the area and how these features relate to the geometric design controls. Physical features that affect route selection include topography, ground (soil) conditions, and the surrounding land use. Potential environmental impacts resulting from construction of a new corridor are considered. Initially, topographic, geologic and soil maps as well as available photographs of the areas were reviewed.

Typically, several preliminary maps are drawn and show various potential alignments. The selection of an alignment takes a trial and error approach, as the proposed alignments are checked for compliance with the horizontal and vertical control criteria. The selection of the final alignment is based on a comparison of various factors such as costs, and environmental and social aspects. For selecting an optimal alignment, the following major factors were considered.

Obligatory Points: The obligatory or controlling points dictate the alignment of a railway track. The following obligatory points force the railway track to deviate from its shortest route.

- ***Important cities and towns:*** Whenever a railway track is constructed, it is desirable to set up the places of social and commercial importance. The deviation of the alignment from its shortest route depends upon the importance of the town, its commercial importance and physical features of the area.
- ***River crossings:*** Construction of bridges over river involves heavy expenditures. The alignment is decided in such a way that it crosses the rivers at suitable sites where the costs of bridge construction are minimised.

Compromises may be made between the costs of construction and savings obtained by shortening the route.

Traffic: Before deciding the track alignment, the traffic growth, its position, nature and amount were estimated, and then space for future extension was considered.

Gauge: As the width of the gauge increases the initial cost of construction, the load carrying capacity of the track, the speed of the goods train, the alignment of the track and the gauge were selected with due consideration.

Geometric Standards: To achieve profit in construction and maintenance costs, the following points need special consideration for finalizing the alignment.

- ***Gradients:*** General gradient should be provided for attaining economic efficiency in operation costs. As far as possible, it should not exceed the ruling gradient. A steep gradient increases the costs of operation considerably. Gradients of less than 3% are for normal railways and greater than 3% for mountain railways.
- ***Radii of Curves*****:** The cost of operation due to curve resistance increases inversely with the radii of the curve i.e. for a small curve, the cost of operation is more and vice versa. For this reason, the curves with maximum radii needs to be provided while finalizing the alignment. Curves near railway stations and bridges should also be avoided. Use of reverse curves was avoided. If reverse curves need to be introduced, then a minimum of 35 m straight portion of the track must be inserted in between the two arcs of opposite contra flexure so that sudden changes of super elevation from one side of the rail to the other is avoided.
- ***Bridge Sites*****:** As far as possible large bridges were provided at right angles to the river flow.
- ***Hauling capacity of locomotives*****:** The alignment should be decided keeping in mind that hauling capacity depends upon gradient, speed, loading and method of operation.
- ***Freight charges*****:** The distance between two stations should be kept to a bare minimum since operation cost increases with distance.

Topography of the areas: The designer considers conditions that may require a sudden change in alignment. For example, areas that would necessitate connecting long straight sections with sharp curves should be avoided. Areas that are subject to floods or avalanches make the construction difficult, expensive and/or unsafe.

The alignment is influenced by terrain. In general, the terrain or topography of an area is classified as level, rolling or mountainous land. On level terrain, selection of the alignment is influenced by factors such as the cost of right-of-way, land use, waterways that may require expensive bridging, existing roads, railroads, and sub-grade conditions. In rolling

terrain, a number of factors need to be considered, including: grade, curvature, depths of cut and heights of fill, drainage structures, and number of bridges.

2.4 ALIGNMENT DETAILS

The proposed DFC alignment of the Wamaj - Iqbalgarh section has been largely designed to avoid adverse impacts on the environment and social aspects as much as possible. There are other factors based on site conditions such as topography and design criteria. Tables 2.4.1 and 2.4.2 show the major design considerations for detour and parallel alignment respectively.

Table 2.4.1 Detour Alignment of Wamaj – Iqbalgarh Section

No.	Parameters	Details
1	Approximate Length	Banaskantha: 0 km Patan: 0 km Mehsana: 12.8 km Gandhinagar: 12.1 km
2	Ruling Gradient	1 in 200 (5/1000)
3	Steepest Gradient in Yards	1 in 1200 (0.83/1000) 1 in 400 (2.5/1000) exceptional case
4	Gauge	1,676 mm
5	Max Speed	100 km/hr
6	Bank width for double line	13.5 m
7	Slope Embankment	2H: 1V
8	Cutting width for double line	20.9 m
9	Slope of cutting	1:1 | 0.25:1 to 1:1
10	Blanketing	0.60 m depth
11	Max degree of curvature	2.5 degree curve (700 m radius)
12	Distance between two tacks of DFC	6.0 m (TKD line is single line)
13	Distance between existing track and DFC	7.0 - 8.0 m (6.0 m in exceptional cases)
14	RoW	65 – 90.5 m

Source: DFCCIL

Table 2.4.2 Parallel Alignment of Wamaj – Iqbalgarh Section

No.	Parameters	Details
1	Approximate Length	Banaskantha: 45.9 km Patan: 11.5 km Mehsana: 55.6 km Gandhinagar: 1.8 km
2	Ruling Gradient	1 in 200 (5/1000)
3	Steepest Gradient in Yards	1 in 1,200 (0.83/1000)
4	Gauge	1,676 mm
5	Max Speed	100 km/hr
6	Max degree of curvature	2.5 degree curve (700 m radius)
7	Distance between two tacks of DFC	6.0 m | Single line
8	Distance between existing track and DFC	7.0 - 8.0 m (6.0 m in exceptional cases)
9	RoW	Min: 16.0 m Max: 74.5 m

Source: DFCCIL

2.5 PROJECT PLANNING

2.5.1 Summary of Alternative Examination in Previous Studies

Two studies have been conducted so far for the DFC Project: i) JICA Feasibility Study (F/S) from 2006 to 2008, and ii) JBIC Special Assistance for Project Formation (SAPROF) in 2009. Several alternatives were examined and the optimum transportation mode and route was selected through these studies.

(1) Overall Examination of Alternatives on Transportation Modes

1) Outline of Alternatives

In the course of two studies, the following transportation modes were comparatively examined:

a) Construction of New Dedicated Freight Corridor (DFC);

b) Construction of New Dedicated Passenger Corridor (DPC);

c) Improvement of existing lines (IEL); and

d) Zero option

The route and outline of each transportation mode are outlined in Table 2.5.1.

Table 2.5.1 Outline of Alternative Transportation Modes in Western Corridor

Transportation Modes	Proposed Route	Features
DFC	Munbai-Ahmedabad-Ajmer-Phulera-Rewar-Delhi (North Route)	- There is a large volume of cargo transported from JNP and Gujarat ports to Delhi. - The route is expected to contribute to the improvement of port connectivity and cargo transportation. - There is the South route as an alternative, but the North Route is superior from the view of construction and economical costs.
DPC	Mumbai-Vadodara-Kota-Delhi (South Route)	- The route is used both for passenger as well as cargo transportation. - There are South and North routes, but the South route is superior to the North route since the North route does not include large cities. There are several large cities along the South route.
IEL	a) Munbai-Vadodara-Kota-Muthura-Delhi b) Vadodara-Ahmedabad-Ajmer-Jaipur-Bandikuni-Rewari-Delhi	- These two routes (a and b) are currently being used for long-distance freight transportation. - The route a) is the main and busiest route connecting Mumbai and Delhi. - Traffic demand ion route a) is expected to increase substantially. - Route b) is the main route to transport cargo from ports in Gujarat to Delhi and the northern region of India.
Zero Option	Without Project	- If DFC or DPC was not projected, construction of a 4-lane road is inevitable to meet the potential demand of cargo and passenger transportation. - Construction of a 4-lane road is likely to aggravate traffic congestion and might result in stagnant logistic movement. - Zero option is concluded as an unrealistic option.

Source: Final Report of Supplemental ESIMMS for Western Corridor of the DFC Project Vadodara and Rewari (August, 2009)

2) Result of Alternative Examinations

Alternatives were examined from the environment and social aspects and project cost

as shown in Table 2.5.2.

Table 2.5.2 Outline of Alternative Transportation Modes in Western Corridor

Items	DFC	DPC	IEL
Environment	- Resettlement and land acquisition in the detour section might be required. - Land acquisition at two areas of protection forests might be required.	Large number of resettlement in urbanized sections "Keoladeo Ghna Lake Bird Sanctuary" might be required.	Serious direct impact might not be expected.
Project Cost	10,928 Cr. Rs.	15,373 Cr. Rs.	6,125 Cr. Rp.(*1)

Source: Final Report of Supplemental ESIMMS for Western Corridor of the DFC Project Vadodara and Rewari (August, 2009)

Table 2.5.3 Outline of Alternative Transportation Modes in Western Corridor

Line Capacity

Existing Line	Single Track	20 trains/day
	Double Track	50 trains/day
	Double Track with Auto Signal	110 trains/day

DFC	140 trains/day
DPC	140 trains/day

(Number shows the Demand)

Item			Existing Track	2004-05	2011-12	2016-17	2021-22	2026-27	2031-32
Improvement of Existing Line									
Route W1	Udhna-Surat		Double	86	119	145	171	212	255
	Ratlam-Nagda		Double	65	93	115	137	167	199
Route W2	Mahesana-Palanpur		Single	26	45	58	71	85	99
DPC									
Route W1	Udhna-Surat	DPC	Double		54	59	65	74	85
	(Mumbai - Vadodara)	Existing Line	Double	86	65	86	106	138	170
	Ratlam-Nagda	DPC	Double		24	26	29	33	38
	(Vadodara - Kota)	Existing Line	Double	65	69	89	108	134	161
Route W2	Mahesana-Palanpur	Existing Line	Single	26	45	58	71	85	99
	(Ahmedabad - Delhi)								
DFC									
Route W1	Udhna-Surat	DFC	Double		33	49	64	89	114
	(Mumbai - Vadodara)	Existing Line	Double	86	86	96	107	123	141
	Ratlam-Nagda	Existing Line	Double	65	73	86	98	114	131
	(Vadodara - Kota)								
Route W2	Mahesana-Palanpur	DFC	Double		43	62	82	112	142
	(Ahmedabad - Delhi)	Existing Line	Single	26	23	25	28	32	36

Capacity Saturation of Single Track

Capacity Saturation of Double Track (DT)

Capacity Saturation of DT with Auto Signal

Improvement of Single Track: i) Double Tracking, ii) Auto Signallization

Improvement of Double Track: i) Auto Signallization

Source: Final Report of Supplemental ESIMMS for Western Corridor of the DFC Project Vadodara and Rewari (August, 2009)

On the basis of alternative examinations on the transportation modes, the DFC was regarded as the optimal option among the three alternatives.

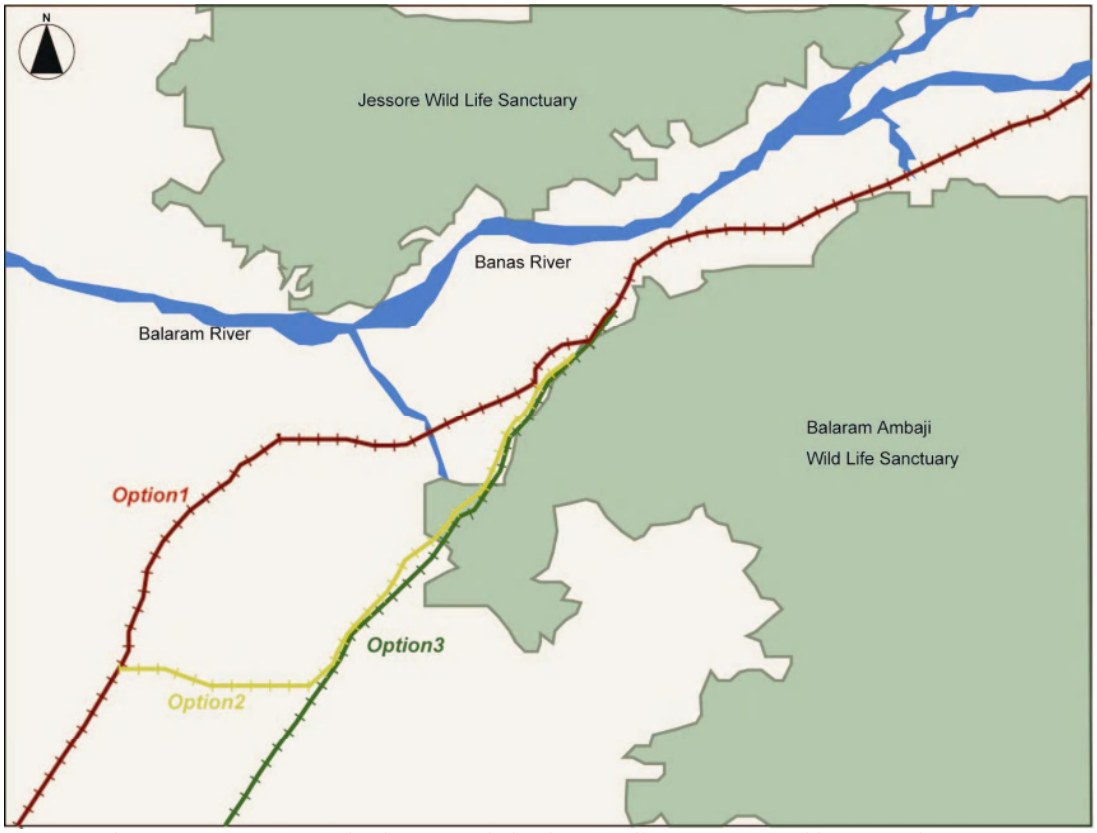
2.5.2 Examination of Alternatives in the Wamaj – Iqbalgarh Section

The following three alternatives were examined for the Wamaj - Iqbalgarh section considering natural environment and social environment, engineering and project cost factors especially in Banaskantha District:

a) Option 1: The alignment is the detour which is assessed in the Supplemental ESIMMS (S-ESIMMS) at the time of JBIC SAPROF in 2009

b) Option 2: The alignment is parallel to the existing track up to Jaspuriya village before returning to the detour alignment

c) Option 3: The alignment is parallel to the existing track



Source: The Report on Resuvey of Palanpur – Iqbalgarh DFC Alignment prepared by CPM Ajmer

Figure 2.5.1 Options Considered in Banaskantha District

Option 1 was covered in the S-ESIMMS which was conducted for the whole alignment of the Western Corridor of DFC Phase 1. However, recently MOR/DFCCIL has changed their policy and strategy considering social situations and are proposing the parallel alignment to the existing track for the Wamaj - Iqbalgarh section. During the planning phase of the new alignment, it has been designed to avoid adverse social impacts and to improve technical and operational efficiency arranging the RoW within the MOR land to the maximum extent possible which was not considered in the previous studies. Therefore, this parallel alignment is considered as Option 3. Option 2 is the alignment of the RoW, parallel to the existing DFC track up to Jaspuriya village before returning to the detour alignment.

The comparison of three options are summarized in Table 2.5.4. Social impacts namely magnitude of land acquisition and number of affected villages of Option 3 could be minimized in comparison with the other options. The project cost of Option 3 would be also less than Options 1 and 2 since the total length is shorter and the necessary amount of soil for the embankment construction would be less. Hence, Option 3 is considered as the optimal alignment by preparing appropriate mitigation measures on the natural environment, especially for the BAWS.

Table 2.5.4 Comparison of Alternatives in the Wamaj-Iqbalgarh Section

Items	Option 1	Option 2	Option 3
Description	- This route has a partial large detour - Total length is approximately 147km	- This alignment is parallel to the existing railway up to Jaspuriya village in Banaskantha district and curving to connect to Option 1. - Total length is approximately 148km.	- This alignment is parallel to the existing railway though there are small detours. - Total length is approximately 136km.
Natural Environment	- No direct impacts to the BAWS.	- The proposed alignment passes through a short section of the BAWS (approximately 2.4km).	- The proposed alignment passes through a short section of the BAWS (approximately 2.4km).
Social Environment	- Necessary area to be acquired is approximately 1,072ha. - Number of affected villages is 75. - Number of affected plots is 2,895.	- Necessary area to be acquired is approximately 986 ha. - Number of affected villages is 73. - Number of affected plots is 2,459.	- Necessary area to be acquired is approximately 396ha. - Number of affected villages is 68. - Number of affected plots is 1,867.
Engineering	- Soil improvement might be required since the proposed alignment is close to rivers. - Necessary amount of soil might be larger since new track and slope construction is required.	- Necessary amount of soil might be less than Option 1 since it is levee widening of the existing railway.	- Necessary amount of soil might be less than Option 1 since it is levee widening of the existing railway.
Project Cost	- Approximately 10,928 Cr. Rs.	- Project cost might be less than Option 1 since necessary amount of soil for embankment construction might be less (total length is almost same as Option 1).	- Project cost might be less than Option 1 since the total length is shorter and necessary amount of soil for embankment construction might be less.

Source: JICA F/S from 2006 to 2008, JBIC SAPROF in 2009, 20E for Patan issued on 18 and 24 February, 2011, Banaskantha issued on 24 February, 2011 Mehsana issued on 3 and 4 March 2011, Report on Resurvey of Palanpur – Iqbalgarh DFC alignment prepared by CPM Ajmer, Progress on Land Acquisition as of 10 September 2010 prepared by CPM Ahmedabad, Position of Land Acquisition for August 2011 prepared by DFCCIL Headquarters, Land Plan of the original alignment prepared by CPM Ahmedabad, 20A Notification issued on 10 February 2009 and RRP of Rewari Vadodara prepared by DFCCIL in December 2009.

CHAPTER 3 APPLICABLE ENVIRONMENTAL LAWS, POLICIES AND GUIDELINES

Environmental protection cannot be isolated from and must be regarded as synonymous with societal development. Therefore environmental conservation and protection should be an integral in all spheres of human and socio-economic development (especially including the development of industry and infrastructure). Over the years, together with spreading of environmental consciousness, there has been a change in the traditionally held perception that there is a trade-off between maintaining environmental quality and achieving economic growth as people have come to believe that the two should be regarded as necessary and complimentary objectives.

Environmental legislation has developed considerably in India since 1970. and plays an important role in ensuring that environment protection measures are incorporated in the plans, programmes and projects advancing the socio-economic development of the nation. The implementation of such laws assists in promotes sustainable development as well as protecting human health and property. The Ministry of Environment and Forests (MoEF) and the State and Central Pollution Control Boards represent the principal administrative and regulatory bodies responsible for ensuring environmentally sustainable development in the country.

There are numerous important pieces of environmental legislations which are relevant to the Wamaj-Iqbalgarh section of Western Corridor. Some legislation is applicable before the execution of the project in terms of getting clearances/permissions from the statutory authorities before the implementation of the project meanwhile other legislation needs to be followed at the time of implementation of the project.

3.1 APPLICABLE NATIONAL POLICIES AND REGULATIONS

3.1.1 The Environment (Protection) Act, 1986

This act was enacted with the objective of providing for the protection and improvement of the environment. It empowers the Central Government to establish authorities [under section 3(3)] charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems relevant to different parts of the country. Under this Act, the Central Government is empowered to take measures necessary to protect and improve the quality of the environment by setting standards for emissions and discharges; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare. From time to time, the Central Government issues notifications under the EPA for the protection of ecologically-sensitive areas or issues guidelines for matters under the EPA. The Act was last amended in 1991.

3.1.2 EIA Notification, 2006 and Amendments

The Environmental Impact Assessment (EIA) Notification issued by the MoEF governs all developmental interventions taking place in the country. This notification was initially issued by the MoEF in 1994 and later replaced in 2006 based on revisions to the procedure and process. The purpose of this notification is to specify procedures for imposing certain restrictions and prohibitions on the new project activities or expansion and modernization of existing projects or activities based on their potential environmental impacts as indicated in Schedule [list of project activities with threshold limit requiring environmental clearance] to the notification, being undertaken in any part of India, unless

environmental clearance has been issued by the Central Government or State Government in accordance with the objectives of National Environmental Policy 2006 and procedures in the notification.

According to the latest EIA Notification, railway and bridge construction projects do not appear in the list of Schedule to the notification and as such, are exempted from the environmental clearance process.

3.1.3 The Indian Forest Act, 1927

The Indian Forest Act, 1927 was enacted after repealing the Indian Forest Act, 1878 for the purpose of consolidating the law relating to forests, the transit of forest produce and the duty levied on timber and other forest produce. The Act makes various provisions for the conservation of forests and also provides for the State Government to constitute any forest land or waste land as reserved forest which is the property of Government or over which the Government has proprietary rights, or the whole or any part of the forest produce of which the Government is entitled. The preamble and other provisions of the Forest Act are wide enough to cover all categories of forests including reserved forests, village forests, protected forests, etc.

3.1.4 Forest Conservation Act, 1980 and its Amendments

This Act provides for the conservation of forests and regulates the diversion of forest lands for non-forest purposes. When any project falls within forestlands, prior clearance is required from the relevant authorities under the Forest (Conservation) Act, 1980. The respective State Governments cannot de-reserve any forestland or authorize its use for any non-forest purposes without approval from the Central Government.

The forest authorities conduct a cost-benefit analysis to assess the loss of forest produce, loss to environment vis-à-vis benefits of project. Compensatory afforestation schemes are prepared to compensate any loss of vegetation. The forest authorities identify the degraded forestland of twice the area of the affected land to develop compensatory forest. Once the submitted proposals are reviewed, they forward the proposals to the Principal Chief Conservator of Forests and to the State Secretariat. The State Government recommends the proposals for further processing and approval to the concerned Regional Offices of the MoEF. In case the total forest area affected is less than 40 ha, otherwise the proposals go to the MoEF at the Central level.

3.1.5 Forest Conservation Rules, 2003 and its Amendments

According to the Forest (Conservation) Rules, 2003 as amended up to February 2004, the project requires forestry clearance if forest land acquisition is involved. In case of forest land, if acquisition is less than 40 ha (other than mining project), decision will be taken by Regional Chief Conservator of Forest (RCCF), and if acquisition is more than 40 ha, the proposal will be sent to MoEF for their approval.

3.1.6 Supreme Court Orders on Forest Conservation and Protected Areas (in the Thirumulpad Forest Case), 1996 and 2000

The Supreme Court began by reinterpreting the meaning of "forest" as defined in the Forest Conservation Act, 1980. The Act essentially requires the Central Government approval for conversion of forest land to non-forest purposes. Until 1996, the Forest Conservation Act was assumed to apply only to reserved forests. The Supreme Court said the Act applied to all forests regardless of their legal status or ownership. It also redefined

what constituted "non-forest purposes" to include not just mining but also operation of sawmills. But it did not stop at reinterpreting the law for the cases at hand. The Supreme Court ordered all such non-forestry activities anywhere in the country that had not received explicit approval from the Central Government to cease immediately. It also suspended tree felling everywhere, except in accordance with working plans approved by the Central Government.

By virtue of the Supreme Court's order dated on 13th of November, 2000, no Forest, National Park or Sanctuary can be de-reserved without the approval of the Supreme Court. No non-forest activity is permitted in any National Park or Sanctuary even if prior approval under the Forest (Conservation) Act, 1980 has been obtained.

The interim order dated on 14th of February, 2000 prohibited the removal of any dead or decaying trees, grasses, drift wood etc. from any area comprising a National Park or a Sanctuary notified under Section 18 or 35 of the Wildlife (Protection) Act, 1972.

It was also directed that if any order to the contrary has been passed by any State Government or other authorities, the operation of the same shall be stayed. In order to advise the Supreme Court on the various issues concerning forest and wildlife conservation, the Central Empowered Committee was set up as an authority under Section 3 (3) of the Environment (Protection) Act, 1986 to adjudicate on forest and wildlife related issues.

3.1.7 The Biological Diversity Act, 2002 and its Rules, 2007

This Act was born out of India's attempt to realise the objectives enshrined in the United Nations Convention on Biological Diversity, 1992 which recognizes the sovereign rights of states to use their own Biological Resources. This Act provides for the conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto. As per the provision of Act, certain areas which are rich in biodiversity and encompass unique and representative ecosystems are identified and designated as biosphere reserve to facilitate its conservation. All restrictions applicable to protected areas such as National Park and Sanctuaries are also applicable to the reserves.

3.1.8 The Wildlife (Protection) Act, 1972 and its Amendment, 2002

The Act was enacted with the objective of effectively protecting the wildlife of the country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. The Act provides for protection to the listed endangered flora and fauna and ecologically important protected areas. It empowers the Central and State Governments to declare any area as a wildlife sanctuary, national park or closed area. It provides for authorities to administer and implement the Act; regulate the hunting of wild animals; protect specified plants, sanctuaries, national parks and closed areas; restrict trade or commerce in wild animals or animal articles; and miscellaneous matters.

The portion of the alignment passing through Balaram Ambaji Wildlife Sanctuary at Banaskantha district comes under the purview of this Act and the State Committee has cleared the project and forwarded it to National Wildlife Board for approval.

3.1.9 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and its Rules, 2007

This Act recognises the rights of forest-dwelling Scheduled Tribes and other traditional forest dwellers over the forest areas inhabited and provides a framework for their rights. This Act became effective from 1st January, 2008. According to this Act, the proposals submitted under the Forest (Conservation) Act, 1980 for diversion of forest land for non-forest purposes are required to enclose evidence from the respective State Government or the concerned Gram Panchayat. It supports that settlement of rights (if any) under Forest Rights Act (FRA), 2006 will be initiated and completed or bearing on operationalization of the FRA before the proposals are granted for the final approval. No-Objection of Certificate (NOC) under FRA is required by Deputy Conservator of Forest (DCF) before forwarding the submitted application to the Nodal Officer.

3.1.10 Noise Pollution Regulation and Control Rules, 2000

As a result of considering the deleterious and psychological effects of noise pollution on human being, the rules for noise pollution came into force in 2000. According to the provisions of the Rules, a person could make a complaint to the designated authority in the event that the actual noise levels exceed the ambient noise standards by 10 dB (A) or more as compared to the standards prescribed in the Schedule of the Rules. The designated authority will take action against violator in accordance with the provisions of these rules or other laws in force. The above rules are applicable at the time of the execution of the project.

3.1.11 Air (Prevention and Control of Pollution) Act, 1981

This Act provides for the prevention, control and abatement of air pollution. It is applied when air polluting activity in an air pollution control area or when emissions of any air pollutants into the atmosphere exceed the standards set by the Central and State Boards.

3.1.12 Water (Prevention and Control of Pollution) Act, 1974

The Water (Prevention and Control of Pollution) Act, 1974 resulted in the establishment of the Central and State level Pollution Control Boards which responsibilities include managing water quality and effluent standards, as well as monitoring water quality, prosecuting offenders and issuing licenses for construction and operation of certain facilities.

3.1.13 Railways (Amendment) Act, 2008

The Railways Act, 1989 was amended in 2008, which is called the Railways (Amendment) Act, 2008 (RAA 2008). The RAA 2008 provides land acquisition process and procedures for special railway projects such as the DFC, including valuation methodologies for land compensation. The amendments include insertion of following clauses:

- 7A (competent authority) means any person authorized by the central Government by notification, to perform the functions of the competent authority for such area as may be specified in the notification;
- 29A (person interested) – (i) all persons claiming an interest in compensation to be made on account of the acquisition of land under this Act; (ii) tribals and other traditional forest dwellers, who have lost any traditional rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest

Rights) Act, 2006; (iii) a person interested in an easement affecting the land; and (iv) persons having tenancy rights under the relevant State laws;

- 37A (special railway project) – means a project, notified as such by the Central Government from time to time, for providing national infrastructure for a public purpose in a specified timeframe, covering one or more States or the Union territories;
- Chapter IVA – Land Acquisition for a Special Railway Project.

The main elements of Chapter IVA are shown below:

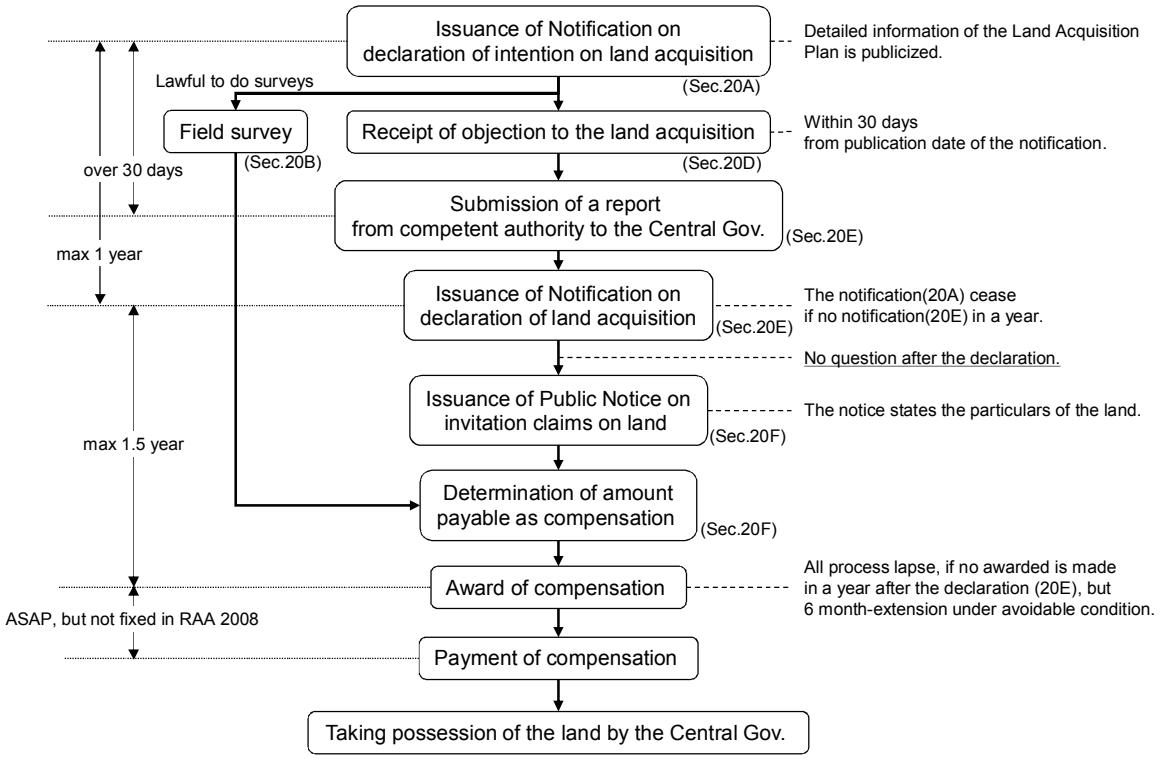
Table 3.1.1 Main Elements of Land Acquisition of Railways (Amendment) Act, 2008

Section		Description
20A	Power to acquire land, etc.	Declaration of intention to acquire land which is required for execution of a special railway project. This is the first notification and empowers the competent authority to effect the substance of the notification.
20D	Hearing of objections, etc.	Objections must be made by interested persons within 30 days from the date of publication of the notification under sub-section (1) of section 20A.
20E	Declaration of acquisition	On publication of the declaration under sub-section (1), the land shall vest absolutely in the Central Government.
20F	Determination of amount payable as compensation	Amount to be paid as compensation shall be determined by an order of the competent authority. The competent authority shall make an award under this section within a period of one year from the date of publication of the declaration.
20G	Criterion for determination of market value of land	• The competent authority shall adopt the following criteria in assessing and determining the market-value of the land - (i) the minimum land value, if any, specified in the Indian Stamp Act, 1899, for the registration of sale deeds in the area, where the land is situated; or (ii) the average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than fifty per cent of the sale deeds registered during the preceding three years, where higher price has been paid, whichever is higher. • The competent authority shall, before assessing and determining the market value of the land being acquired under this Act - (a) ascertain the intended land use category of such land; and (b) take into account the value of the land of the intended category in the adjoining areas or vicinity, for the purpose of determination of the market-value of the land being acquired. • In determining the market-value of the building and other immovable property or assets attached to the land or buildings which are to be acquired, the competent authority may use the services of a competent engineer or any other specialist in the relevant field, as may be considered necessary by the competent authority. • The competent authority may, for the purpose of determining the value of trees and plants, use the services of experienced persons in the field of agriculture, forestry, horticulture, sericulture, or any other field, as may be considered necessary by him. • For the purpose of assessing the value of the standing crops damaged during the process of land acquisition proceedings, the competent authority may utilize the services of experienced persons in the field of agriculture as he considers necessary.
20I	Power to take possession	To surrender or deliver possession thereof to the competent authority or any person duly authorized by it in this behalf within a period of 60 days of the service of the notice.
20N	Land Acquisition Act 1 of 1894 not to apply	Nothing in the LA Act, 1894 shall apply to an acquisition under this Act.

Section		Description
20O	Application of the National Rehabilitation and Resettlement Policy (NRRP), 2007 to persons affected due to land acquisition	The Provisions of The NRRP, 2007 For The Project Affected Families, Notified By The Government of India In The Ministry of Rural Development vide number F.26011/4/2007-LRD, dated the 31st October, 2007, shall apply in respect of acquisition of land by the Central Government under this Act.

Source: The Railways (Amendment) Act, 2008 (RAA 2008)

Flow of the land acquisition process under the RAA 2008 is shown in Figure 3.1.1.



Source: Prepared based on the RAA 2008

Figure 3.1.1 Flow of Land Acquisition Process under the Railways (Amendment) Act, 2008

3.1.14 Land Acquisition Act, 1984 and its Amendment

In India, land may be acquired by the Government for a public purpose under the principles of eminent domain, that is, the Government has the first right for land. Land is acquired by the Government most commonly under the Land Acquisition Act of 1894 modified in 1984. The amendment of 1984 extended the scope of the definition of public purpose and some of its norms related to time, amount and procedures of compensation. However, the Act in essence remains unchanged. The Act is applicable to the whole of country except the State of Jammu and Kashmir. The land needed for the DFC project will be acquired under the Act of 1894 and compensated as per the provisions of Act unless decided otherwise by the Government. Land acquisition under the Act on average takes two or three years. However, there is provision of an emergency clause under the Land Acquisition Act. This clause is not invoked to acquire land. The compensation as per the Land Acquisition Act includes the award amount, 30% solatium and interest of 12% from

the date of issue of the notification under Section 4 of the Act. The valuation of trees and other immovable properties on the land is compensated based on the rates decided by the competent authority in consultation with concerned departments for the purpose of payment of compensation.

3.1.15 Other Relevant Acts

(1) Ancient Monuments & Archaeological Sites & Remains Act, 1958

The Archaeological Survey of India administers the Ancient Monuments and Archaeological Sites and Remains Act, 1958 and subsequent amendments to provide for prohibited and regulated areas around monuments of national importance. According to this act, the area falling within 100 m radius from the peripheries of the protected monument is declared as prohibited area and to the extent of 200 m as a regulated area. No development activity is permitted within a 100 m radius and for the radius between 100 to 200 m; construction could be made only in accordance with the terms and conditions of the licence granted by the Director General of the Archaeological Survey of India. Conservation for the designated protected monuments/sites/remains is addressed by the existing legislation. (However, there are several cultural properties in the project area that are not "protected", but are of significant cultural or religious value to the community. No procedure exists at present for conservation of these "smaller" cultural properties.)

(2) Ancient Monuments & Archaeological Sites & Remains (Amendment and Validation) Act, 2010

This act has been enacted to amend the Ancient Monuments and Archaeological Sites and Remains Act, 1958 to make provision for validation of certain actions taken by the Government under the principal act and came into force on January 23, 2010. The limits of prohibited area and regulated area around the monuments, archaeological sites and remains as 100 m and 200 m, respectively, may be further extended on the basis of gradation and classification of the monuments, archaeological sites and remains by the National Monument Authority (NMA) to be constituted by the Government under this amended act.

As per the provisions of this act, no permission for construction of any public projects or any other nature shall be granted in the prohibited area of the protected monument and protected area. However, permission for repair and renovation could be granted on the recommendation of the NMA, subject to the condition that the building or structure is pre-1992 or permission for construction or reconstruction of such building or structure was granted by the Archaeological Survey of India. In respect of regulated area, permission may be granted for construction, reconstruction, repair and renovation on the basis of recommendation of the NMA duly taking into account heritage bye-laws which shall be prepared in respect of each protected monument and protected area.

(3) Cultural Environment Related Act, 1958

As a result of growing interest in cultural heritage in the nation, both government agencies and NGOs concerned with the preservation and conservation of this heritage. The Archaeological Survey of India under the Ministry of Culture is the primary organization for the archaeological researches and protection of the cultural heritage of the nation. Maintenance of ancient monuments and archaeological sites and remains of national importance is a principal concern of the organization. It regulates all archaeological

activities in the country as per the provisions of the Ancient Monuments and Archaeological Sites and Remains Act, 1958 as well as Antiquities and Art Treasure Act, 1972.

(4) Regulation / Act governing Vibration

There is no prevailing regulation/standard in India governing train induced ground vibrations. Regulations/standards prevailing in other countries such as USA, Japan, and Sweden, etc. have been reviewed and compared with the findings of vibration monitoring in its respective chapter. Vibration Regulation Law in Japan issued by Ministry of the Environment, Government of Japan stipulates to preserve the living environment and contribute to the protection of the people's health by regulating vibration. As per this law, standards for vibration emitted from specified construction works and limits for motor vehicle vibration have been provided for different land use patterns. As per USA Federal Transit Administration, the criteria for environment impact from ground-borne vibration are based on the maximum root-mean- square vibration levels for repeated events from the same source. Experience based on international standards provides a good foundation for predicting and controlling annoyance from ground-borne vibrations in residential areas as well as interference with vibration- sensitive activities.

(5) Public Liability Insurance Act, 1991 and its Amendment, 1992

This act imposes on the owner the liability to provide immediate relief in respect of death or injury to any person or damage to any property resulting from an accident while handling any of notified hazardous chemicals. This relief has to be provided on a "no fault" basis. Owner handling hazardous chemicals has to take an insurance policy of an amount equal to its "paid up capital" or up to Indian Rupees 500 million, whichever is less. The policy has to be renewed every year. New undertakings have to take this policy before the commencement of the activity. The owner also has to pay an amount equal to its annual premium to the Central Government's Environment Relief Fund (ERF). The payment under the Act is only for the immediate relief; owners shall have to provide the final compensation, if any, arising out of the legal proceedings.

(6) National Green Tribunal Act, 2010

The National Green Tribunal has been established on October 18, 2010 under the National Green Tribunal Act, 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The Tribunal is not bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by the principles of natural justice. The Tribunal's dedicated jurisdiction in environmental matters shall provide speedy environmental justice and help reduce the burden of litigation in the higher courts. The Tribunal is mandated to make and endeavor for disposal of applications or appeals finally within 6 months of filing of the same.

(7) National Green Tribunal Rules, 2011

National Green Tribunal (Practices and Procedure) Rules, 2011 have been notified by the Ministry of Environment and Forests on 4th April, 2011 through GSR No. 296 (E). These Rules describe the procedure in detail to follow the National Green Tribunal Act, 2010. As

per the Rules, an application or appeal where compensation has been claimed shall be accompanied by a fee of equivalent to one percent of the amount of compensation claimed and an application or appeal where no compensation has been claimed shall be accompanied by a fee of one thousand Rupees. The Chairperson may constitute a bench of two or more members consisting of at least one Judicial Member and one Expert Member. Apart from procedure for application, hearing, filing of reply and Inspection of records, the Rules describes the details of compensation process. Form II of the Rules is for application of relief and compensation and Form I is for Memorandum of Application/Appeal.

(8) Applicable Cross-Sectoral Laws

There are a number of laws that cut across all sectors and relate to development processes in the country. Some of these are directly relevant especially during the construction stage and are listed in Table 3.1.2

Table 3.1.2 Applicable Cross Sectoral Laws

Applicable Acts	Year	Objective
Minimum Wages Act	1948	As per this act, the employer is supposed to pay not less than the minimum wages fixed by appropriate Government.
Child Labor (Prohibition and Regulation) Act	1986	This Act prohibits employment of children below 14 years of age in building and construction industry covering Railway.
The Labors Act	1988	The health and safety of workers employed in construction work etc.
The Factories Act	1948	Health and safety considerations for workers
Workmen's Compensation Act	1923	This act provides for compensation in case of injury by accidents arising out of and during the course of employment.
Contract Labor (Regulation and Abolition) Act	1970	This act provides for certain welfare measures to be provided by the contractor to contract labor.
The Building and other Construction Workers Act	1996	All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. The employer is required to provide safety measures at construction work site and other welfare measures such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace etc.

Source: Above each law.

3.2 APPLICABLE GUIDELINES AND POLICIES/STRATEGIES

3.2.1 JICA Guidelines for Environmental and Social Considerations, April 2010

JICA enforced the new guidelines on environmental and social considerations in April 2010. As per this guideline, JICA supports the recipient governments by offering cooperation projects into which JICA incorporates appropriate environmental and social considerations so as to avoid or minimize development projects' adverse impacts on the environment and local communities. JICA thus promotes sustainable development in developing countries. JICA recognizes the following seven principles to be very important under environmental and social considerations of a project.

- Coverage of a wide range of environmental and social impacts to be addressed.
- Implementation of measures for environmental and social considerations at an early

stage in project cycle based on analysis of alternatives.

- Incorporation of the outcome of environmental and social considerations in the implementation of projects after cooperation projects is terminated.
- Paying attention to accountability and transparency when implementing cooperation projects.
- Ensuring the meaningful participation of stakeholders in order to take consideration of environmental and social factors and to reach consensus accordingly.
- Disclosing information on environmental and social considerations in order to ensure accountability and to promote participation of various stakeholders.
- Capacity building of organizations to consider environmental and social factors appropriately and effectively at all times.

JICA classifies projects under three categories (A, B and C) according to extent of environmental and social impacts similar to the funding agencies categorization like World Bank (WB), Asian Development Bank (ADB) and Japan Bank for International Cooperation (JBIC). To make this classification, JICA takes into account an outline of the project, the scale, site condition, and environmental and social consideration study scheme in host countries.

As per JICA guidelines, the impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety as well as the natural environment. Impacts on the natural environment include trans-boundary or global-scale impacts through air, water, soil, waste, accidents, water usage, climate change, ecosystems and biodiversity. The impacts to be assessed also include social impacts, which include the migration of populations and involuntary resettlement; local economy such as employment and livelihood; utilization of land and local resources; social institutions such as social infrastructure and local decision-making institutions; existing social infrastructures and services; vulnerable social groups such as the poverty level and indigenous peoples; equality of benefits and losses and equality in development process; gender; children's rights; cultural heritage; local conflict of interests and infectious diseases such as HIV/AIDS.

In addition to the direct and immediate impacts of projects, derivative, secondary and cumulative impacts are also to be assessed in regard to environmental and social considerations within the extent possible. JICA takes into account the importance of good governance surrounding projects so that measures for appropriate environmental and social considerations are implemented. JICA respects the principles of internationally established human rights standards like the International Convention on Human Rights, and gives special attention to the human rights of vulnerable social groups – including women, peoples, persons with disabilities, and minorities – when implementing cooperation projects. JICA obtains country reports and information issued by related institutions about human rights, and JICA understands local human rights situations by disclosing information about cooperation projects.

JICA discloses the information after making inquiries to the recipient governments and related organizations.

3.2.2 JBIC Guidelines for Confirmation of Environmental and Social Considerations, 2002

JBIC established "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" on 1 April, 2002. The Guidelines has been implemented from 1 October, 2003.

JBIC Guidelines provide guiding principles related to environmental consideration by JBIC in its appraisal of a project. They also give the environmental matters to be considered and environmental measures to be prepared by the recipient country in the planning and preparation stages of a project. Projects have been categorized into three basic categories A, B and C depending upon extent of involvement of significant environmental and social issues similar to other funding agencies such as WB and ADB.

As per JBIC guidelines, projects must, in principle, be undertaken outside protected areas that are specifically designated by laws or ordinances of the government for the conservation of nature or cultural heritage (excluding projects whose primary objectives are to promote the protection or restoration of such designated areas). Projects are also not to impose significant adverse impact on designated conservation areas.

JBIC guidelines focus on participation by stakeholders as local community inhabitants who will be affected by the project. They require the project executor to solicit stakeholders' participation from the project planning stage. The checklist to be confirmed by JBIC now includes social considerations pertaining to resettlement, indigenous people and women. Also more strengthened than in the previous guidelines is a provision on information disclosure. JBIC is required to make public such items as the category classification of the project prior to loan approval.

Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which the project is planned. For projects with a potentially large environmental impact, sufficient consultations with stakeholders, such as local residents, must be conducted via disclosure of information from an early stage where alternative proposals for the project plans may be examined. The outcome of such consultations must be incorporated into the contents of the project plan. Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor and ethnic minorities, all of whom are susceptible to environmental and social impact and who may have little access to the decision-making process within society.

Involuntary resettlement and loss of means of livelihood are to be avoided where feasible, exploring all viable alternatives. When, after such examination, it is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected.

People to be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by the project proponents, etc. in timely manner. The project proponents, etc. must make efforts to enable the people affected by the project, to improve their standard of living, income opportunities and production levels, or at least to restore them to pre-project levels.

Appropriate participation by the people affected and their communities must be promoted in planning, implementation and monitoring of involuntary resettlement plans and against the loss of their means of livelihood.

The present study integrated the basic concerns on environmental and social considerations as per the JBIC guidelines.

3.2.3 Other Donors' Guidelines for Environmental and Social Considerations

In addition to JICA, other international donors such as WB and ADB are planning to fund the DFC Project for the other sections in the Eastern Corridor. While each donor applies their own environmental policy for the project, environmental and social considerations should be well harmonized in order not to cause deviation among the railway sections under the same project on the environmental and social considerations.

Major safeguard policies and environmental guidelines for those donors are shown below:

1) WB
   - Operational Policy 4.01 and Bank Procedure 4.01 (OP/BP 4.01): Environmental Assessment, 1999
   - OP/BP 4.04: Natural Habitats, 2001
   - OP/BP 4.36: Forests, 2002
   - OP/BP 4.11: Physical Cultural Resources, 2006
   - OP/BP 4.12: Involuntary Resettlement, December 2001
   - OP/BP 4.10: Indigenous Peoples, July 2005
   - Environmental Assessment Sourcebook, 1991 (updated chapter by chapter)

2) ADB
   - The Bank's Policy on Environment, November 2002
   - The Bank's Policy on Involuntary Resettlement, August 1995
   - The Bank's Policy on Indigenous Peoples, April 1998
   - Operations Manual on BP: Environment Considerations, September 2006
   - Operations Manual on BP: Involuntary Resettlement, September 2006
   - Operations Manual on BP: Indigenous Peoples, September 2006
   - ADB Environmental Assessment Guidelines, 2003
   - Handbook on Resettlement: A Guide to Good Practice, 1998

3.2.4 The National Environmental Policy (NEP), 2006

The National Environmental Policy (NEP), 2006 is a response to a national commitment to a clean environment mandated in the Indian Constitution and is intended to mainstream environmental concerns in all development activities. NEP recognizes environmental degradation as a major causal factor in enhancing and perpetuating poverty particularly among the rural poor. One of the key objectives of NEP is to integrate environmental concerns into policies, plans, programmes and projects for economic and social development. This policy has evolved from the recognition that only development which respects environmental concerns and ecological processes is sustainable. In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

3.2.5 National Forest Policies, 1952

The Ministry of Food and Agriculture formulated the National Forest Policy to be followed in the management of State Forests in 1952. However, forests in the country have been seriously degraded over time. As a result, the Forest Policy was revised in 1988 to review the situation and to evolve a new strategy of forest conservation. The principal aim of new Forest Policy is to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic impact must be subordinated to this principal aim. The policy aims at restoring forest coverage to 33% of the total geographical area of the country.

3.2.6 National Rehabilitation and Resettlement Policy, 2007

There is no comprehensive legislation, as yet, at the National or State level that governs the resettlement and rehabilitation of Project Affected Persons (PAPs). Ministry of Rural Development (Department of Land Resources) approved a National Resettlement and Rehabilitation Policy (NRRP for PAFs, 2003, published in the Gazette of India on 17th February 2004. It recognizes the following essential features:

- That PAPs not only lose their lands, other assets and livelihoods, they also experience adverse psychological and social/cultural consequences;
- The need to minimize large-scale displacement and where displacement is inevitable, resettlement and rehabilitation has to be handled with utmost care. This is especially necessary for tribal, small and marginal farmers and women;
- That cash compensation alone is often inadequate to replace lost agricultural land, homesteads and other resources. Landless laborers, forest dwellers, tenants, artisans are not eligible for cash compensation;
- The need to provide relief especially to the rural poor (with no assets), small and marginal farmers, SCs/ STs and women;
- The importance of dialogue between PAPs and the administration responsible for resettlement for smoother implementation of projects and R &R;
- The policy is in the form of broad guidelines and executive instructions and will be applicable to projects displacing 500 families or more in plain areas and 250 families or more in hilly areas.

The NRRP does not meet some of the International Funding Agencies (World Bank, ADB etc.) resettlement policy's key requirements. Firstly, the NRRP states that in acquisitions for highways, railway lines, transmission lines and pipelines, project affected families will be offered an ex-gratia payment of Rs 10,000 and no other resettlement and rehabilitation benefits. Secondly, the cut-off numbers of affected persons for whom World Bank requires resettlement plans are much lower. Thirdly, replacement value is not clearly defined and more importantly is not taken into account in the various lump-sum compensation payments that have been decreed in the policy. Fourthly, no specific entitlements have been provided for untitled persons such as squatters and encroachers. However, the policy does recognize some significant principles. It requires projects to (a) minimize displacement and to identify non-displacing or least-displacing alternatives; (b) plan the resettlement and rehabilitation of PAPs including special needs of tribal and vulnerable

sections; (c) provide a better standard of living to PAPs; and (d) facilitate harmonious relationships between the requiring body and PAPs through mutual cooperation. A National Monitoring Committee will be set up comprising the Secretary Land Resources (Chair), Secretary Planning Commission, Secretary Social Justice and, Secretary Water Resources, Secretary Tribal Affairs, Secretary Railways, Secretary Power and Secretary Coal. In addition a National Monitoring Cell will be established in the Department of Land Resources in the Ministry of Rural Development under a Joint Secretary, assisted by zonal directors, subject matter specialists, deputy directors and other support staff.

In view of many deficiencies identified in NRRP, a new National Rehabilitation and Resettlement Policy has been formulated after reviewing the NRRP many times. The new NRRP has been cleared by the union cabinet very recently on 11th October 2007. The Government of India now plans to give the policy Statutory Status by amending Land Acquisition Act, 1894.

3.3 OTHER RELEVANT RULES, NOTIFICATIONS AND STANDARDS

3.3.1 Fly Ash Utilisation Notification, 1999 and its Amendment, 2003

As per the provisions of the Fly Ash Notification, 14th September 1999 as amended up to 17th August 2003, under the Environment (Protection) Act, 1986, it is mandatory that every agency, person or organisation shall utilise fly ash for construction of roads or flyovers or embankments or any other construction activity from the thermal power plants located within a radius of 100 kilometres of the construction site. This Notification recognizes that it is necessary to protect the environment, conserve top soil and prevent the dumping and disposal of fly ash discharged from coal or lignite based thermal power plants on land. It is envisaged that by effective implementation of the requirements of this Notification, the need for the excavation of top soil for manufacture of bricks shall be restricted and the utilisation of fly ash in the manufacture of building materials and in construction activity shall be promoted.

3.3.2 Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and its Amendments

The management of hazardous waste is a complex set of rules which together combine to form the legal regime. The objective of these rules is to ensure environmentally sound management of all hazardous materials and to enable recovery and/or use of useful materials from hazardous waste destined for final disposal. Under these rules the definition of hazardous waste is divided into two definitions: hazardous waste and hazardous material. The rules establish the responsibility for the safe and environmentally sound handling of environmental waste by any 'occupier' of hazardous waste. An occupier is a person who has under his charge, any plant or factory producing hazardous waste or who holds hazardous waste. 'Recycling' is defined as reclamation or reprocessing of hazardous waste in an environmentally sound manner for the original purpose or for other purposes. 'Reuse' means the use of a hazardous waste for a purpose of its original use or other use. Hazardous waste held by an 'occupier' must be sent or sold to a recycler or re-processor who is authorised to dispose of it in the proper manner.

Furthermore, a person engaged in the generation, processing, treatment, package, storage, transportation, use, collection and destruction, conversion, offering for sale and any occupier must obtain an authorization from the respective State Pollution Control Board.

3.3.3 MOEF Eco-sensitive Area Notifications

MOEF, from time to time, has brought out various Notifications on Eco-sensitive area across the country. These Notifications clearly mentions the prohibitive/ restricted activities and the minimum distance to be maintained for any sort of activities. These include non-establishment of any industrial unit adjacent to the eco-sensitive zone, no construction activities to be entertained in the vicinity and quarrying and mining to be strictly prohibited. In addition to the above activities tree felling, ground water extraction, increased noise levels, discharge of effluent and solid waste disposal are also strictly restricted activities in the eco-sensitive areas.

3.3.4 Office Memorandum of MoEF on Order of Hon'ble Supreme Court

According to an office memorandum of the MoEF dated 18 May 2012 in order to ensure compliance of the Hon'ble Supreme Court's order of 27 Feb 2012, it is now mandatory to seek environmental clearance under the Environmental Impact Assessment Notification 2006 for mining of minor mineral materials such as sand, ordinary earth, stone, moorum, aggregate on land parcels of any area. It means the DFC project while identifying the possible sources of 'Borrow areas and Quarry sites' should ensure that any identified agency has a valid licensed lease to extract sand, moorum and other materials as well as has also obtained environmental clearance from the concerned department for the leased area and is complying with all stipulated conditions of the clearance letter.

3.4 APPLICABLE STATE LEVEL LEGISLATIONS

In Gujarat, felling and removal of trees from private lands have been governed by the Saurashtra Felling of Trees Act (1951). There are restrictions on felling of 26 species. As shown in Table 3.4.1, these species are divided into two categories, i.e. reserved and non-reserved.

Table 3.4.1 Tree Species Listed in Saurashtra Felling of Trees (Infliction of Punishment) Act, 1951

Category	Local Name	Scientific Name
Reserved	Saag / Teak	*Tectona grandis*
	Seasam	*Dalbergis latifolia*
	Mahudo	*Madhuca latifolia*
	Chandan	*Santalum Album*
	Kahair	*Acacia catechu*
Non-Reserved	Timru	*Diospyros melanoxylon*
	Simlo / Semul	*Bombax Ceiba*
	Sadad	*Terminalia tomentosa*
	Karanj	*Pongomia pinnata*
	Kanji	*Holoptelea integrifolia*
	Sevan	*Gmelina arborea*
	Biyo	*Pterocarpus marsupium*
	Eboni	*Diospyros ebenum*
	Rohan	*Soymida febrifuga*
	Kadayo	*Sterculia urens*
	Kalam	*Mitrogynae parviflora*
	Haldarvo / Haldu	*Adina cardifolia*
	Harde	*Terminalia chebula*

	Dhavado	*Anogeissus latifolia*
	Aambo	*Mangifera indica*
	Taad	*Borassus flabelifer*
	Khajuri	*Phoenix sylvestris*
	Jambu	*Syzygium cuminii*
	Desi Baval	*Acacia nilotica*
	Limbo / Neem	*Azadirachta indica*
	Khijado	*Prosopis cineraria*

Source: Gujarat Forest Department (website)

For felling a reserved tree, prior permission of the Deputy Conservator of Forest, in writing, is mandatory. A royalty is charged for felling a reserved tree. In case of non-reserved category, written permission by the Deputy Conservator of Forest/Mamlatdar is required. However, regarding Limbo, Desi Baval, Kanji, Khijdo, Ambo and Amli found/grown on private non forest lands, the relaxation from above permission is admissible on certain conditions by the notification No.SFT-302004-393-G.1(1), 2008.

CHAPTER 4 OVERVIEW OF EXISTING ENVIRONMENTAL CONDITIONS OF THE PROJECT AREA

4.1 EXISTING NATURAL ENVIRONMENT

Gujarat has three distinct geographical regions, namely, the eastern hilly region, the plains and the peninsular region of Saurashtra and Kachchh. The hilly region is composed of the terminal parts of four mountain ranges: Sahyadri and Satpura in the South, Vindhyan range to the centre and the Aravalli range in the North. The plains extend from north-east to the south, constituting about half of the area of the state. The peninsular region of Saurashtra and Kachchh in the west is joined to the mainland by a connecting low lying land. The major soil type found is the black cotton soil that covers about 38% of the state's area, while the sandy type of soil covers about 33% of the area.

The state has about 185 rivers of various sizes, the major ones being Sabarmati, Mahi, Tapti and Narmada. The average annual precipitation is reported to be 828 mm, though there is significant variation in the geographic distribution of rainfall.

Although the forest cover in Gujarat is only 9.5%, the state has a rich and varied biodiversity. The ecosystem diversity includes inland wetlands, grasslands, forests, saline desert ecosystem, desert, mangroves and the marine ecosystem. The state's flora comprises of 4,320 species. The vertebrate fauna recorded stands at 1,318 species, representing 27% of the vertebrate fauna of the country. Southern Gujarat represents the northern extent of the Western Ghats, a global biodiversity hotspot. Meanwhile the State is also famous for being home to the last remaining wild populations of Asiatic lions in the forests of Gir, as well as for its outstanding marine biodiversity as well as being a major stop-off point on the Great Indus flyway - Gujarat's wetlands attract millions of migratory birds in the winter months. Important fauna includes the Asiatic lion, Leopard, Sloth bear, and Blackbuck.

The alignment in the Wamaj - Iqbalgarh section passes through the valley plain areas of Gandhinagar, Mehsana and then through the Aravali Range in Patan and Banaskantha; and traverses four major rivers; Khari, Umardashi, Saraswati and Balaram. In Gandhinagar, the alignment passes through the buffer zone of Thol Lake Bird Sanctuary (TLBS), famous for migratory birds. Banaskantha District is relatively rich in forest area and the alignment touches the Balaram-Ambaji Wildlife Sanctuary (BAWS), famous for its resident population of sloth bears. The river bed of the Balaram River acts as migratory corridor for animals between the BAWS and the Jessore Sloth Bear Sanctuary (JSBS).

4.1.1 Climate

In general the climate of the study area can be described as moderate tropical with four distinct seasons: a hot summer (pre-monsoon) from March to mid-June; a humid monsoon season from mid-June to September, a short, pleasant post-monsoon season between October to November and a mild/cool winter from December to February.

(1) Banaskantha District

Past meteorological data described for Banaskantha has been collected from the nearest Indian Meteorological Department (IMD) observatory located at Deesa, which is deemed to be representative of the study corridor. Available past meteorological data has been collected and is presented in Table 4.1.1.

Table 4.1.1 Mean Monthly Meteorological Record (1951 – 1980, Banaskantha District)

Month	Daily Temperature(°C)		Relative Humidity (%)		Total Rainfall	No of Rainy	Total Cloud Cover (octas)		Wind Speed
	Max	Min	0830	1730	(mm)	Days	0830	1730	(km/h)
January	27.3	9.8	59	29	2.7	0.3	1.2	1.1	7.5
February	30.2	12.0	53	24	0.9	0.1	1.3	1.1	7.4
March	35.1	17.1	48	21	4.3	0.1	1.4	1.5	7.9
April	39.0	21.9	49	20	0.1	0.0	1.2	1.4	7.8
May	41.0	25.3	63	23	1.4	0.2	1.7	1.2	10.7
June	38.5	26.7	73	40	59.2	2.6	4.5	3.4	14.3
July	33.6	25.4	84	62	215.7	9.1	6.2	6.0	11.7
August	32.2	24.5	87	67	163.2	8.0	6.1	5.8	9.4
September	33.7	23.5	81	55	102.2	4.1	3.7	3.8	7.1
October	36.1	19.7	62	32	12.6	0.6	1.1	1.5	5.8
November	33.0	15.2	54	30	10.2	0.6	1.1	1.2	6.0
December	29.3	11.2	58	31	6.3	1.2	1.2	1.3	6.7
Mean/Total	**34.1**	**19.4**	**64**	**36**	**578.8**	**26.9**	**2.6**	**2.4**	**8.5**

Source: India Meteorological Department (IMD)

In Banaskantha District, January is the coldest month with a mean daily minimum temperature of 9.8°C and a maximum of 27.3°C. From March onwards the temperature begins to rise rapidly and May is the hottest months with a mean daily maximum temperature of 41°C and a minimum of 25.3°C. Thereafter, the advent of the monsoon brings down temperatures. The monsoon typically withdraws in October but temperatures continue to fall gradually until to January, the middle of winter. The annual average maximum and minimum mean daily temperatures are 34.1°C and 19.4°C respectively.

The air is fairly humid through the major part of the year and the mean relative humidity rises during the monsoon months, particularly July to September ranging between 81-87% in the morning (08:30 IST) and 55-67% in the evening (17:30 IST). It is typically dry in the summer (pre-monsoon) months, particularly April to May, the mean relative humidity ranging between 49-63% in the morning and 20-23% in the evening. The above trend in humidity in various seasons clearly shows a discernible influence of rain on humidity. The highest mean relative humidity is recorded in August (87% in the morning and 67% in the evening), a wet monsoon month and the lowest mean relative humidity is recorded in March (48% in the morning and 21% in the evening). The annual mean relative humidity is about 64% in the morning and 36% in the evening, which correlates well with the tropical humid climate of the area. It is typically more humid in the morning (0830 IST) than in the evening (17:30 IST) throughout the year.

The total annual rainfall along the study corridor is 578.8 mm. The four monsoon months (June to September) contribute about 80% of the total annual rainfall. Lowest rainfall is observed in April (0.1 mm) while the highest rainfall is in July (215.7 mm). The total number of rainy days is on average 26.9 days per annum. Winds are generally moderate to high throughout the year. The annual mean wind speed is 8.5 km/h with the mean monthly wind speed 5.8-6.7 km/h (during October-December) and 10.7-14.3 km/h (May to July).

(2) Patan District

Past meteorological data described for Patan has been collected from the nearest IMD observatory located at Radhanpur, which is deemed to be representative. Available past meteorological data has been collected and is summarized in Table 4.1.2.

Table 4.1.2 Mean Monthly Meteorological Record (1951 – 1980, Patan District)

Month	Daily Temperature(°C)		Relative Humidity (%)		Total Rainfall	No of Rainy	Total Cloud Cover (octas)		Wind Speed
	Max	Min	0830	1730	(mm)	Days	0830	1730	(km/h)
January	27.2	10.0	60	37	2.3	0.2	0.4	0.3	6.5
February	30.4	12.5	60	34	0.7	0.1	0.2	0.3	6.3
March	35.2	17.0	58	28	5.3	0.1	0.3	0.4	6.6
April	39.3	21.9	62	30	0.1	0.0	0.3	0.4	7.4
May	41.6	24.8	70	29	1.7	0.2	0.6	0.4	11.7
June	38.6	26.6	78	46	32.3	1.5	2.4	1.4	15.3
July	34.4	25.3	85	63	152.0	6.9	4.6	3.7	13.5
August	33.1	24.2	86	65	97.2	4.8	4.1	3.7	10.8
September	34.3	23.6	82	58	105.1	3.1	2.3	2.5	7.5
October	36.3	20.7	67	39	4.7	0.3	0.3	0.6	5.0
November	32.9	15.9	56	38	1.2	0.1	0.3	0.4	5.3
December	29.1	11.7	62	40	0.1	0.0	0.5	0.4	6.1
Mean/Total	**34.4**	**19.5**	**69**	**42**	**418.9**	**17.3**	**1.4**	**1.2**	**8.5**

Source: India Meteorological Department (IMD)

In Patan District, January is the coldest month with a mean daily minimum temperature of 10.0°C and a maximum of 27.2°C. From March onwards the temperature begins to rise rapidly and May is the hottest months with the mean daily maximum temperature of 41.6°C and a minimum of 24.8°C. Thereafter, the advent of the monsoon brings down temperatures. The monsoon typically withdraws in October but temperatures continue to fall gradually until January, the middle of winter. The annual average maximum and minimum mean daily temperatures are 34.4°C and 19.5°C respectively.

The air is fairly humid through the major part of the year and mean relative humidity rises during the monsoon months, particularly July to September ranging between 82-86% in the morning (08:30 IST) and 63-65% in the evening (17:30 IST). It is typically dry in the summer (pre-monsoon) months, particularly March to April, the mean relative humidity ranging between 58-62% in the morning and 28-30% in the evening. The above trend in humidity in various seasons clearly shows a discernible influence of rain on humidity. The highest mean relative humidity is recorded in August (86% in the morning and 65% in the evening), a wet monsoon month and the lowest mean relative humidity is recorded in November (56% in the morning and 36% in the evening). The annual mean relative humidity is 69% in the morning and 42% in the evening, which correlates well with the tropical humid climate of the area. It is typically more humid in the morning (0830 IST) than in the evening (17:30 IST) throughout the year.

The total annual rainfall received along the study corridor is 418.9 mm. The four monsoon months (June to September) contribute about 80% of the total annual rainfall. Lowest rainfall is observed in April (0.1 mm) and highest rainfall is observed in July (152.0 mm). The total number of rainy days is about 17.3 days per annum. Winds are generally moderate to high throughout the year. The annual mean wind speed is 8.5 km/h with the mean monthly wind speed 5.0-6.1 km/h (during October-December) and 11.7-15.3 km/h (May to July).

(3) Mehsana District

Past meteorological data described for Mehsana have been collected from the nearest IMD observatory located at Idar, which is deemed to be representative. Available past meteorological data has been collected and is summarized in Table 4.1.3.

Table 4.1.3 Mean Monthly Meteorological Record (1951 – 1980, Mehsana District)

Month	Daily Temperature(°C)		Relative Humidity (%)		Total Rainfall	No of Rainy	Total Cloud Cover (octas)		Wind Speed
	Max	Min	0830	1730	(mm)	Days	0830	1730	(km/h)
January	27.5	14.5	39	27	1.4	0.1	1.0	1.0	7.1
February	30.1	15.8	36	21	0.9	0.0	0.8	0.8	7.2
March	34.6	19.7	34	17	3.3	0.2	1.3	1.3	7.5
April	38.8	23.4	38	15	1.1	0.0	1.2	1.4	7.8
May	40.5	25.1	56	19	5.9	0.4	1.3	0.7	9.0
June	37.7	25.5	73	41	106.5	4.4	4.9	3.5	10.3
July	32.3	24.2	87	66	308.7	12.7	6.9	6.4	7.6
August	30.5	23.6	90	72	248.9	12.5	7.1	6.6	5.9
September	32.3	22.9	81	58	147.2	5.4	4.5	4.4	5.2
October	35.0	21.6	50	33	17.8	0.8	1.3	1.2	4.9
November	32.4	19.0	37	29	2.3	0.1	1.1	1.2	5.5
December	29.1	16.2	40	30	3.7	0.2	1.4	1.5	6.4
Mean/Total	**33.4**	**21.0**	**55**	**36**	**847.7**	**36.8**	**2.7**	**2.5**	**7.0**

Source: India Meteorological Department (IMD)

In Mehsana District, January is the coldest month with a mean daily minimum temperature of 14.5°C and a maximum of 27.5°C. From March onwards the temperature begins to rise rapidly and May is the hottest months with a mean daily maximum temperature of 40.5°C and minimum of 25.1°C. Thereafter, the advent of the monsoon brings down the temperature. The monsoon typically withdraws in October but temperatures continue to fall gradually until January, the middle of winter. The annual average maximum and minimum mean daily temperatures are 33.4°C and 21.0°C respectively.

The air is fairly humid through the major part of the year and mean relative humidity rises during the monsoon months, particularly July to September ranging between 81-90% in the morning (0830 IST) and 58-72% in the evening (1730 IST). The trend in humidity in various seasons clearly shows a discernible influence of rain on humidity. The highest mean relative humidity is recorded in August (90% in the morning and 72% in the evening), a wet monsoon month and the lowest mean relative humidity is recorded in March (34% in the morning and 17% in the evening). The annual mean relative humidity is about 55% in the morning and 36% in the evening, which correlates well with the tropical humid climate of the area. It is typically more humid in the morning (0830 IST) than in the evening (1730 IST) throughout the year.

The total annual rainfall received along the study corridor is 847.7 mm. The four monsoon months (June to September) contribute about 80% of the total annual rainfall. Lowest rainfall is observed in February (0.9 mm) and highest rainfall is observed in July (308.7 mm). The total number of rainy days is about 36.8 days per annum. Winds are generally moderate to high throughout the year. The annual mean wind speed is 7.0 km/h with the mean monthly wind speed 4.9-6.4 km/h (during October-December) and 7.6-10.3 km/h (May to July).

(4) Gandinagar District

Past meteorological data described for Gandhinagar has been collected from the nearest IMD observatory located at Ahmedabad, which is deemed to be representative. Available past meteorological data has been collected and is summarized in Table 4.1.4.

In Gandhinagar District, January is the coldest month with a mean daily minimum temperature of 11.7°C and maximum of 28.4°C. From March onwards the temperature begins to rise rapidly and May is the hottest months with a mean daily maximum temperature of 41.8°C and a minimum of 26.2°C. Thereafter, the advent of the monsoon brings down the temperature. The monsoon typically withdraws in October but temperatures continue to fall gradually until January, the middle of winter. The annual average maximum and minimum mean daily temperatures are 34.4°C and 20.5°C respectively.

Table 4.1.4 Mean Monthly Meteorological Record (1951 – 1980, Gandinagar District)

Month	Daily Temperature(°C)		Relative Humidity (%)		Total Rainfall	No of Rainy	Total Cloud Cover (octas)		Wind Speed
	Max	Min	0830	1730	(mm)	Days	0830	1730	(km/h)
January	28.4	11.7	57	29	2.6	0.3	1.3	1.4	5.8
February	31.3	13.8	50	22	1.1	0.2	1.2	1.2	5.9
March	36.0	18.8	46	18	1.0	0.1	1.4	1.6	6.3
April	39.9	23.4	51	18	0.9	0.1	1.5	1.7	7.0
May	41.8	26.2	63	22	6.0	0.4	1.8	1.2	9.2
June	38.4	27.0	74	45	108.7	5.0	4.9	4.0	10.1
July	33.3	25.7	85	67	265.3	11.3	6.6	6.4	8.7
August	31.9	24.8	88	70	219.8	10.7	6.8	6.4	7.2
September	33.4	24.1	83	59	171.9	6.2	4.5	4.2	6.0
October	35.8	20.9	64	37	10.8	0.7	1.7	1.7	4.3
November	33.2	16.5	53	33	8.9	0.6	1.5	1.5	4.6
December	29.8	13.0	57	33	2.6	0.2	1.6	1.6	5.3
Mean/Total	**34.4**	**20.5**	**64**	**38**	**803.4**	**35.8**	**2.9**	**2.7**	**6.7**

Source: India Meteorological Department (IMD)

The air is fairly humid through the major part of the year and mean relative humidity rises during the monsoon months, particularly July to September ranging between 83-88% in the morning (08:30 IST) and 59-70% in the evening (17:30 IST). The trend in humidity in various seasons clearly shows a discernible influence of rain on humidity. The highest mean relative humidity is recorded in August (88% in the morning and 70% in the evening), a wet monsoon month and the lowest mean relative humidity is recorded in March (46% in the morning and 18% in the evening). The annual mean relative humidity is about 64% in the morning and 38% in the evening, which correlates well with the tropical humid climate of the area. It is typically more humid in the morning (08:30 IST) than in the evening (17:30 IST) throughout the year.

The total annual rainfall is 803.4 mm. The four monsoon months (June to September) contribute about 80% of the total annual rainfall. The lowest rainfall is observed in April (0.9 mm) and the highest is in July (265.3 mm). Total number of rainy days is 35.8 days per annum. Winds are generally moderate to low throughout the year. The annual mean wind speed is 6.7 km/h with the mean monthly wind speed 4.3-5.3 km/h (during October-December) and 8.7-10.1 km/h (May to July).

4.1.2 Geology

(1) Banaskantha District

The oldest litho units belonging to the Delhi Supergroup of rocks occupy the eastern part of the district. These rocks are represented by the metasediments of the Todgarh/Basantgarh Formations of the Kumbhalgarh Group and Jiyapura and Reodar Formations of the Sirohi Group. The metasediments of the Kumbhalgarh Group are predominantly calcareous and are intruded by the basic intrusives of the Phulad Ophiolite Suite and Sendra-Ambaji Granite and gnesises. The younger Sirohi Group is predominantly argillaceous with some calcareous bands. The Delhi Supergroup of rocks are subjected to still younger igneous activity represented in the form of Jalor Granite and rhyolite porphyry, belonging to the Malani Igneous Suite. The Mesozoic sediments are represented by the Katrol and Bhuj Formations and comprise arenaceous and argillaceous sediments in the north-western part of the district.

(2) Patan District

The sediments of the plain belong to the youngest geological formation, mostly upper Quaternary, and consist of a thick succession of sandy and clayey layers of fluvial, fluviomarine and Aeolian origin. The depositional environments provide a good example of the influence of fluctuating sea levels and climatic changes, and have been subjected to neotectonic disturbances from time to time. The deposition has taken place in the N-S trending structural depression of the Cambay basin. The maximum thickness of the deposits is more than 500 m in the central and western part. The sediments in the east are predominantly of fluvial origin. Traced west, they progressively grade into fluviomarine to marine. The western part of the region along the Rann border represents a palaeomudflat.

(3) Mehsana District

Calc-gneiss and para-gneiss belonging to the Kumbhalgarh Group of the Delhi Supergroup are the oldest rocks exposed in the north-eastern parts of the district. These are intruded by the Sendra- Amabaji and Idar (Malani) granites. The tertiary sediments are represented by the Gaj and Miliolite and the Vend Formation of the Porbandar Group. The Gaj Formation comprises a repetitive sequence of fossiliferous sandstone, limestone, calcareous siltstone and gypseous clays. The calcareous and oolitic deposits in the area containing calcareous grit, calcareous sandstone, grapestone, calcareous siltstone and polymictic conglomerate, (associated with Mililoid foraminifer) are included in the Miliolite Formation. The Vend Formation occurs as small inliers within the Holocene sediments and is represented by very finely laminated, variegated calcareous clay, siltstone and sandy gravel- pebbly marl. The Holocene sediments comprise marine, fluvial, aeoline and fluvio marine facies. The marine sediments grouped under the Rann Clay Formation include dark grey to greenish clay. The fluvial counterpart of the Rann clay Formation is the Katpur Formation comprised of flood plain and levee deposits. These unimodal to bimodal deposits of fine to medium grained sand, sand - silt granules occur as widespread sheets. The Akhaj Formation forms Aeolian sand sheets and sand dunes comprising medium to fine grained, sub-angular and subrounded silty sand. The present- day fluvial deposits confined to either side of the present day river channels of the Sabarmati, Rupen and Saraswati Rivers are grouped under the Varahi Formation, and consist of immature, unconsolidated sand and silt. The Jantral Formation represents comparatively unstablised sand sheet and sand dunes made up of unimodal fine sand.

(4) Gandhinagar District

The geological structure of this region is formed of Alluvium, blown sand, etc., formations. The sediments of the plain belong to the youngest geological formation, mostly upper Quaternary, and consist of a thick succession of sandy and clayey layers of fluvial, fluviomarine and aeolian origin. The depositional environment provides a good example of the influence of fluctuating of sea levels and climatic changes, was and has been subjected to neotectonic disturbances from time to time. The deposition has taken place in the N-S trending structural depression of the Cambay basin. The maximum thickness of the deposits is more than 500 m in the central and western part. The sediments in the east are predominantly of fluvial origin. Traced west, they progressively grade into fluviomarine to marine. The western part of the region along the Rann border represents a palaeomudflat.

4.1.3 Topography

The landscape is characterized by a subdued topography comprising a variety of depositional landforms. The transitional area between the plain and the highland is marked by a pediment zone of undulating topography, characterized by low altitude mounds and hillocks of stabalised Aeolian sands dunes. There are also small alluvial fans and cones of fluvial material brought by the rivers coming from the neighbouring highland. The central part of the plain shows a mixed topography of fluvial plains marked by subdued fossil dunes. The western part is almost a level ground of saline waste land with a thin veneer of sand and silt.

4.1.4 Geomorphology and Geohydrology

(1) Banaskantha District

Geomorphology and geohydrology of Banaskantha District is presented in Figure 4.1.1.

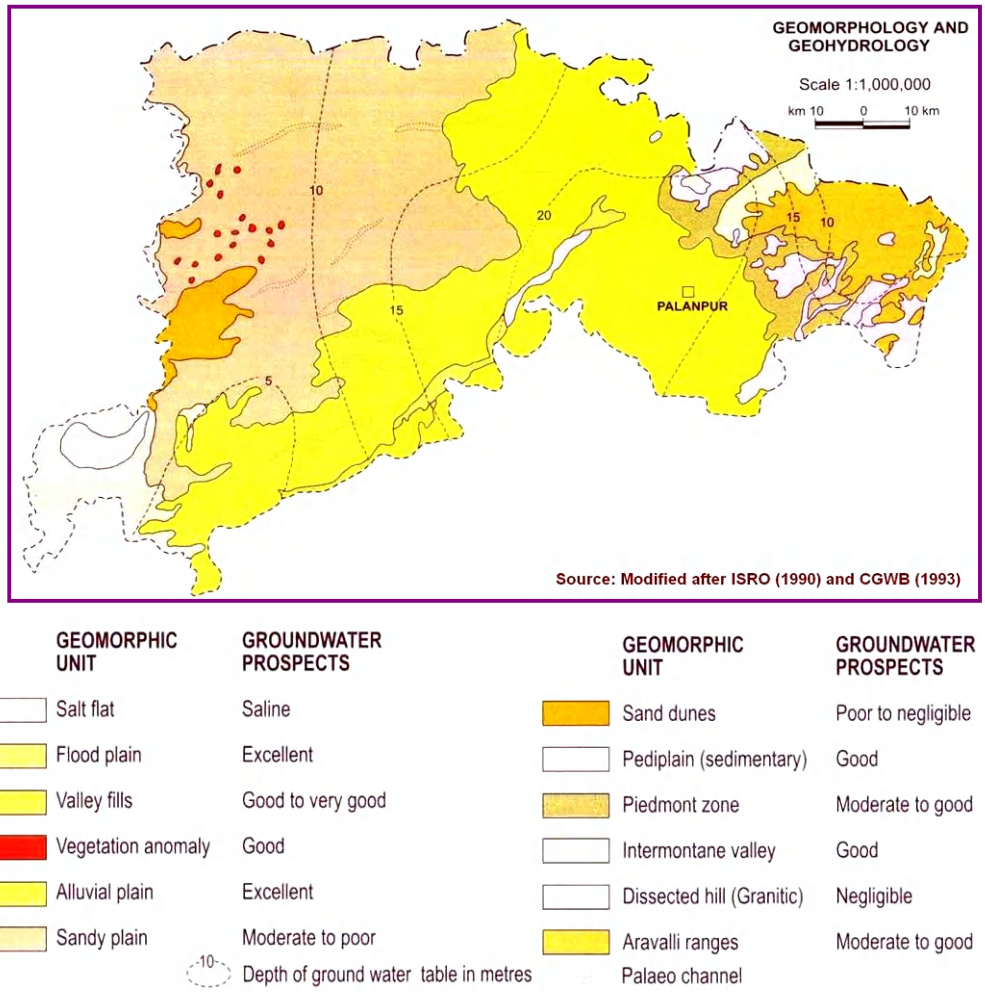


Figure 4.1.1 Geomorphology and Geohydrology of Banaskantha District

(2) Patan and Mehsana Districts

The geomorphology and geohydrology of Patan and Mehsana Districts are presented in Figure 4.1.2.

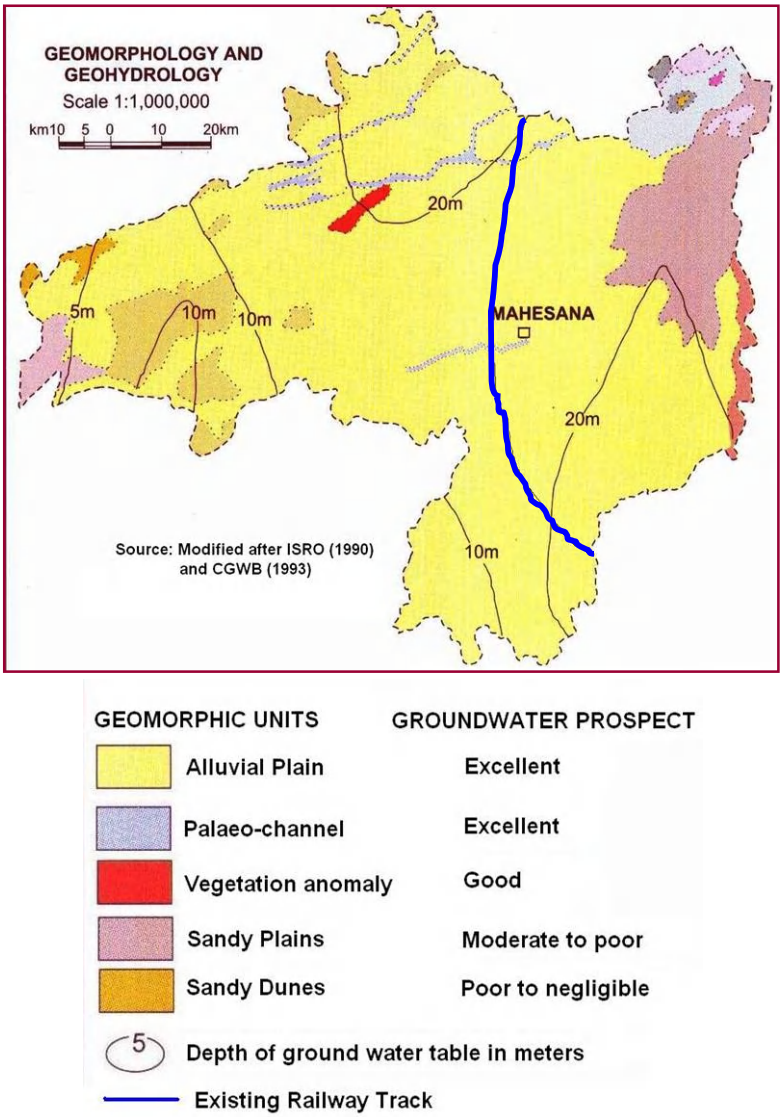


Figure 4.1.2 Geomorphology and Geohydrology of Patan and Mehsana Districts

(3) Gandhinagar District

The geomorphology and geohydrology of Gandhinagar district is presented in Figure 4.1.3

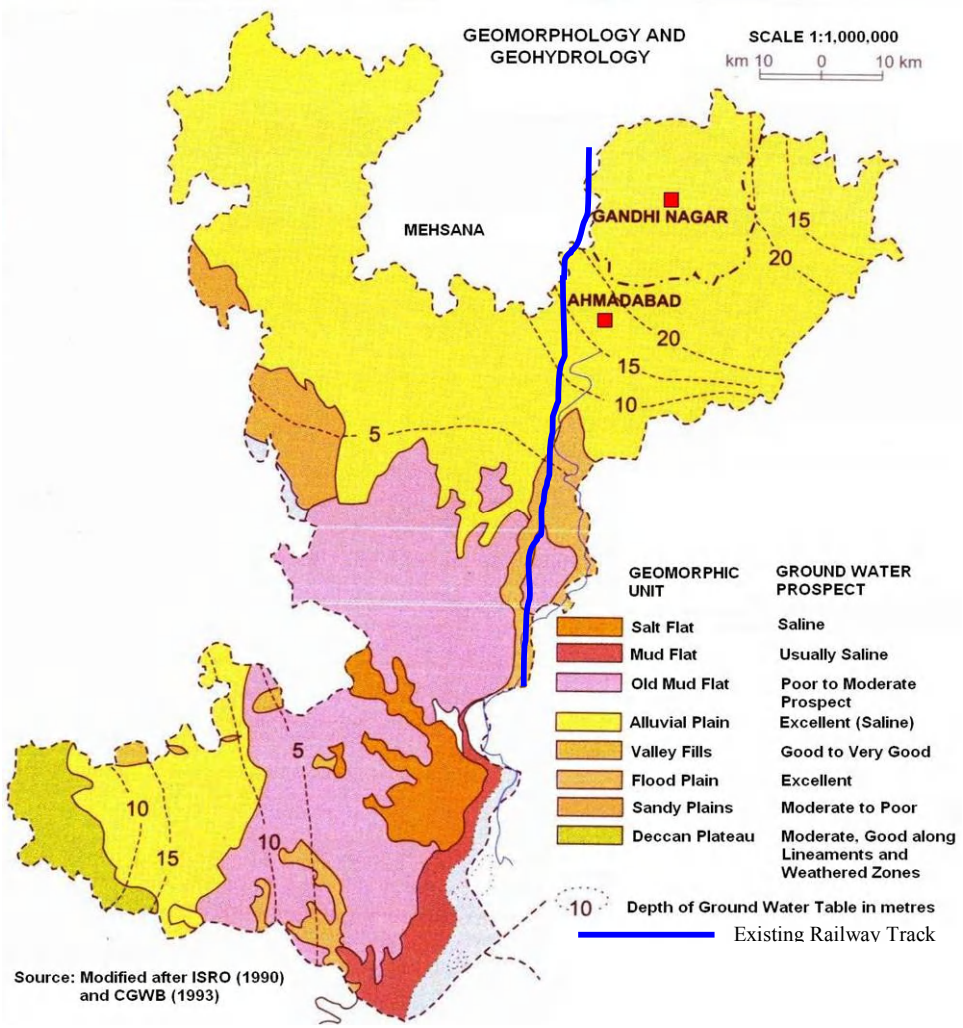


Figure 4.1.3 Geomorphology and Geohydrology of Gandhinagar District

4.1.5 Soil

(1) Banaskanatha District

The soils of Banaskantha Districts are poorest from an agricultural perspective as the soil is deficient in organic matter and nitrogen. The sub-soil well waters are highly saline and are not normally useful for irrigation. In the western part of the district, saline soil is found with saline content varying from 0.5 to 2.5%. The western part of Banaskantha District has coarse shallow soils derived from granites, known as alluvial soil. The soil type of the study corridor is mixed, calcareous, coarse, loamy soil with slight to moderate salinity. The different soil types of the district are shown in Figure 4.1.4.

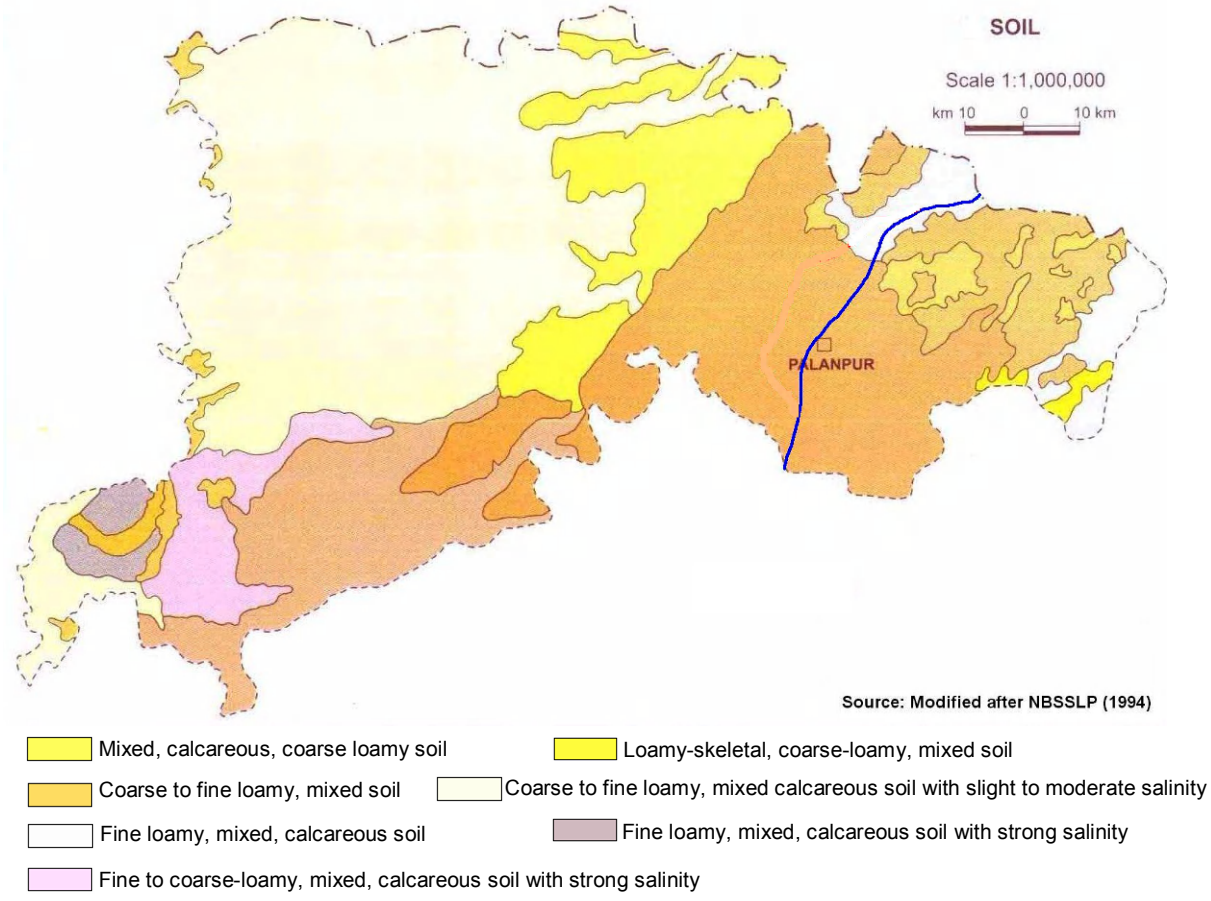


Figure 4.1.4 Soil Types of Banaskantha District

(2) Patan and Mehsana Districts

The soils of the region in general are very deep (>150 cm) somewhat excessively to well drained and sandy to fine loamy in texture. They are slightly moderately alkaline and moderately strongly calcareous; slightly eroded and saline. Salinity and sodicity increases in this area. The soil types in Patan and Mehsana District is shown in Figure 4.1.5.

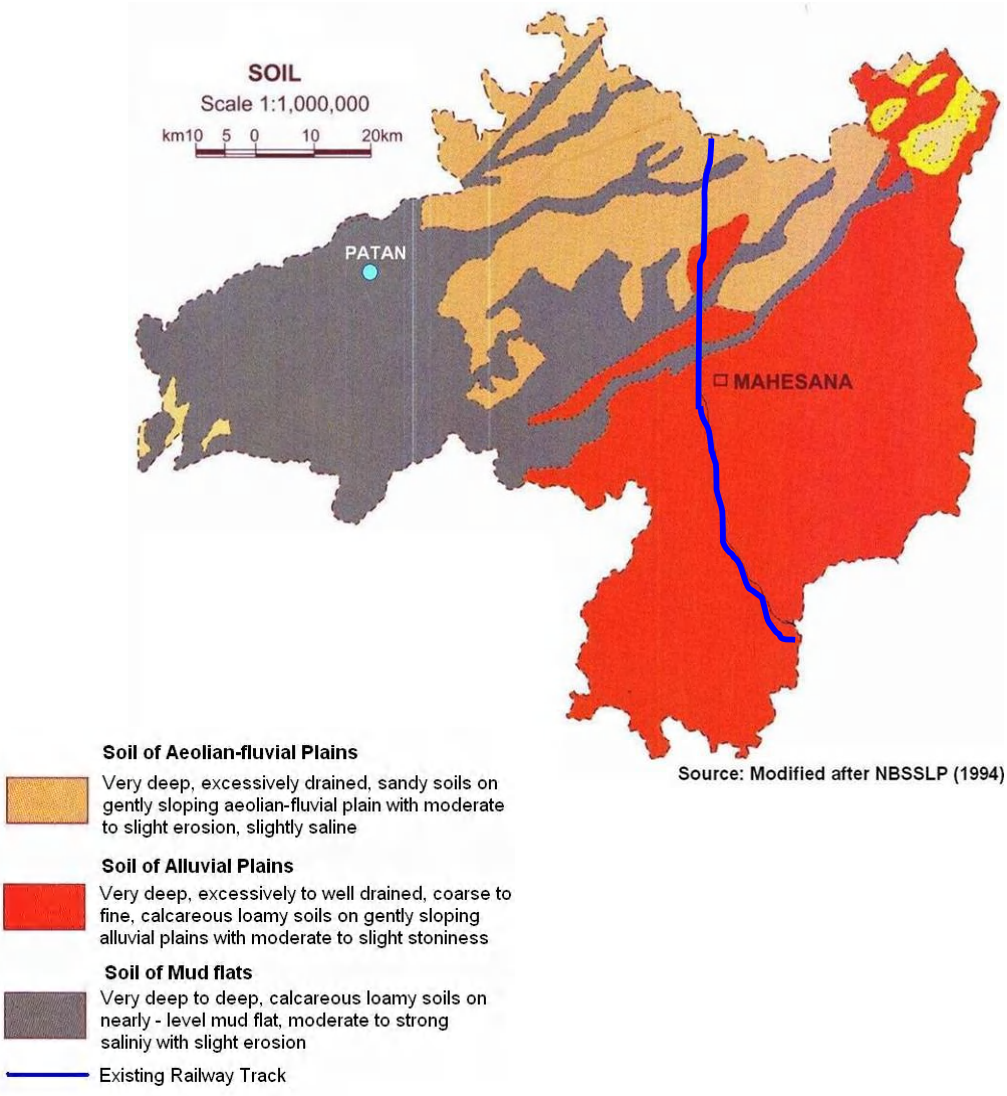


Figure 4.1.5 Soil Types of Patan and Mehsana Districts

(3) Gandhinagar District

The DFC alignment in Gandhinagar District passes through alluvial plain. Gandhinagar District has sandy loam soils locally known as *goradu* which owe their origin to the Indo-Gangetic alluvium. This is one of the most fertile parts of the state and agriculturally more developed. The soil type of the area where the DFC alignment is passing in Gandhinagar District is shown in Figure 4.1.6.

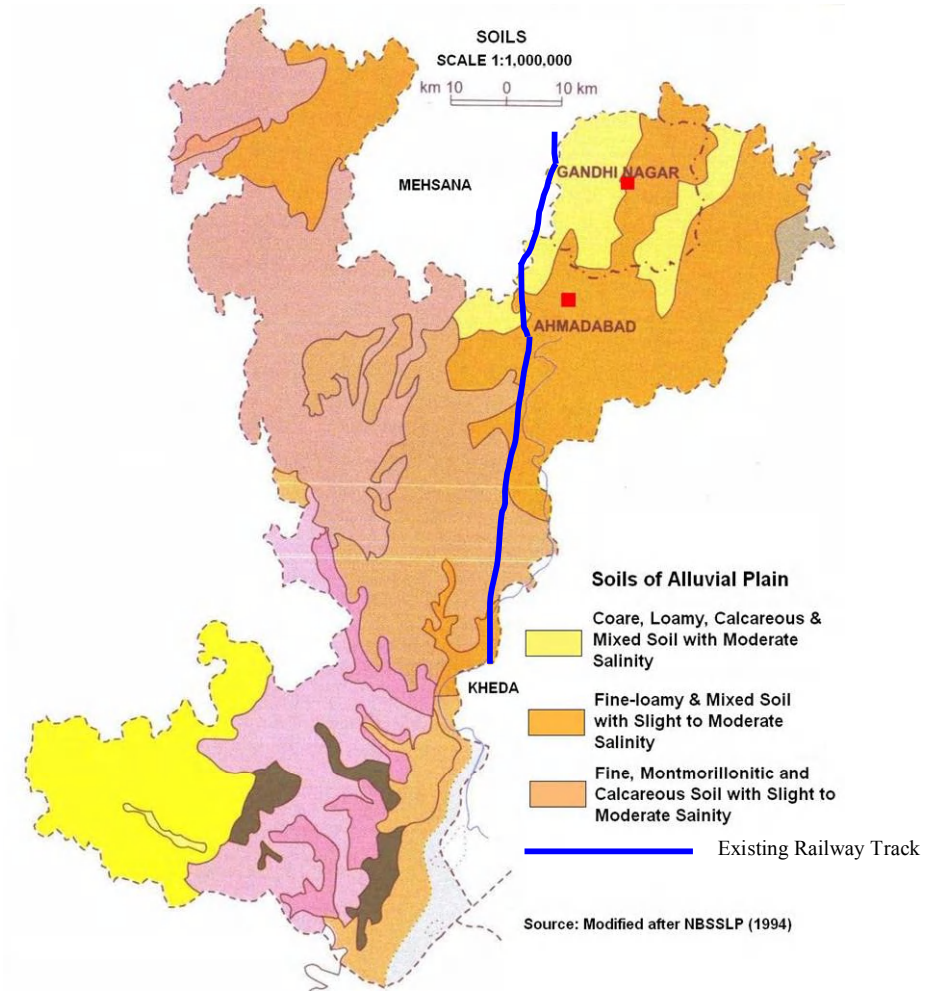


Figure 4.1.6 Soil Types of Gandhinagar District

4.1.6 Hydrological Condition

(1) Banaskantha District

1) Banas River

The Banas River is the most important river of the district, which originates from the Dhebar lake among the Udepur hills in Rajasthan State and flows westwards across Banaskantha District. The main tributary of the Banas in Banaskantha is the Balaram. The proposed alignment crosses the Balaram River between Jethi and Chitrasani Villages. The Balaram River provides a natural ecological corridor which facilitates wildlife migration and movement between JSBS and BAWS. Pictures of the Banas River are presented in Photo 4.1.1

	
Banas River (24 August, 2011)	Banas River (24 August, 2011)

Source: NKC Field Survey

Photo 4.1.1 Situation of the Banas River

2) Balaram River

The general elevation of the Balaram River is 176 m above MSL and latitude/longitude is 24°31'/72°46'. It originates from the hills in the north-east of the district and flows past the Balaram temple (from which it derives its name). It joins the Banas River near Karja Village of Palanpur Taluka. The length of this river is about 32 km. It has water during monsoon only and dries up after the monsoon as shown in Table 4.1.5. The climate of the area is semi-arid. For much of the upper course of the Balaram it flows through the BAWS and therefore a landscape of relatively intact natural vegetation. Within the sanctuary and upon exiting the sanctuary the river is also bordered by rainfed cropland. The soil of the area is sandy or loamy in texture. Pictures of the Balaram River are presented in Photo 4.1.2.

Table 4.1.5 Discharge of the Balaram River
(at Chitrasani, 0.75 km upstream of the proposed DFC Alignment)

Year	Months of flow	Days of flow	Range of Discharge (m3/s)	Number of days when discharge exceeded 100 m3/s
2000	2 (July, August)	6	0.14 - 17.12	None
2001	5 (June, July, August, September, October)	76	0.10 – 293.45	2
2002	1 (June)	3	1.2 – 212.79	2
2003	5 (February, July, August, September, October)	95	0.1 – 519.98	6
2004	3 (June, July, August)	29	0.28 – 49.88	None

Source: State Water Data Centre, Gandhinagar

Balaram River (5 August 2011)

Balaram River (25 August, 2011)

Balaram River (25 September, 2011)

Balaram River (11 October, 2011)

Source: NKC Field Survey

Photo 4.1.2 Variation of Discharges of the Balaram River

3) Umardashi River

Another river that crosses the alignment in Banaskantha district is the Umardashi River and it crosses the proposed alignment near Chhapi in Banaskantha district. It remains dry even during the monsoon period and its river bed has plenty of grass and shrubs. The discharge of the Umardashi River is shown in Table 4.1.6. Pictures of the Umardashi River are presented in Photo 4.1.3.

Table 4.1.6 Discharge of the Umardashi River (at Ziliya, 15 km upstream of the proposed DFC Alignment)

Year	Months of flow	Days of flow	Range of Discharge (m3/s)	Number of days when discharge exceeded 100 m3/s
2004	1 (August)	5	0.95 – 436.16	2
2006	3 (July, August, September)	21	10.65 – 52.70	None
2007	2 (July, August)	8	53.00 – 529.4	13
2008	1 (August)	3	18.08 – 90.49	None
2010	2 (July, August)	3	106.00 – 189.00	3

Source: State Water Data Centre, Gandhinagar

Umardashi River (4 August, 2011)

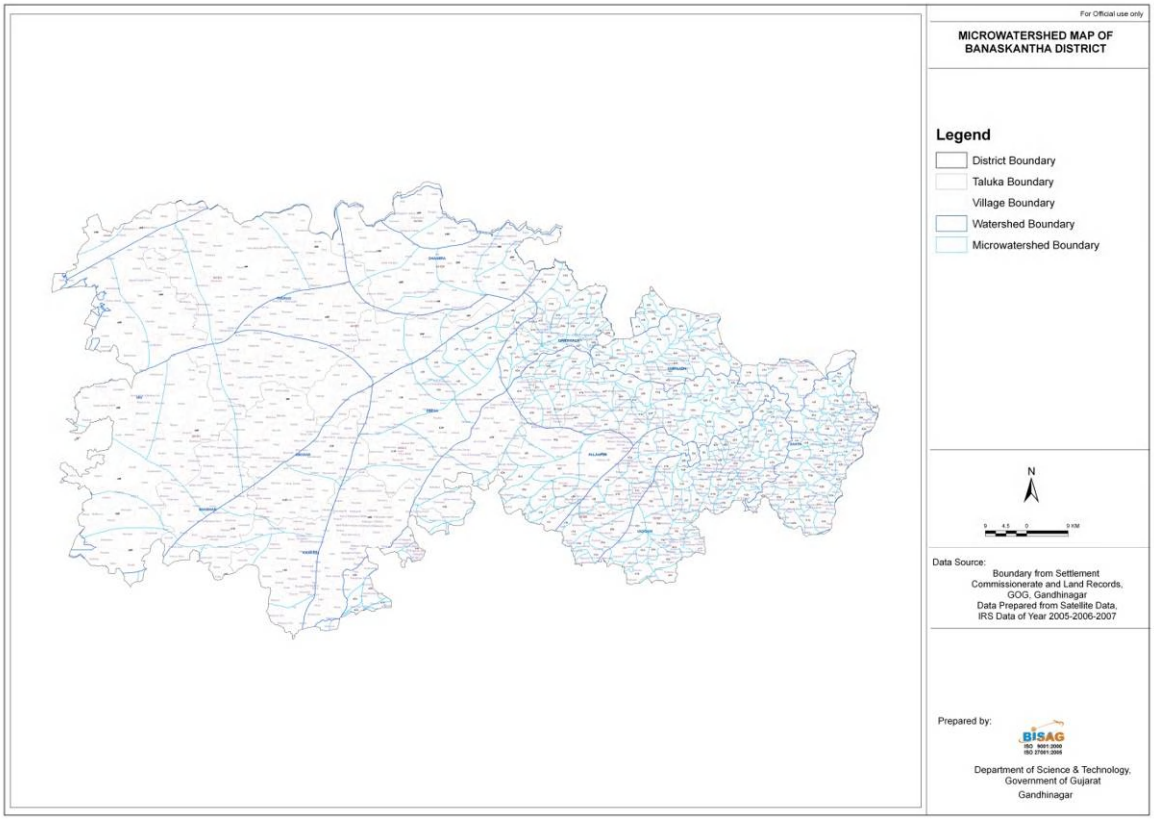
Umardashi River (14 September, 2011)

Source: NKC Field Survey

Photo 4.1.3 Situation of the Umardashi River (Full of Shrubs without Water)

4) Watershed in Banaskantha

The hills of both sanctuaries (i.e. BAWS and JSBS) are important watershed catchment areas for two of the region's major rivers, the Banas and the Sabarmati as well as the Dantiwada and Dharoi dams - extremely important for irrigation in the region. The rolling network of hills is drained by numerous temporary rivers and tributaries as shown below in Figure 4.1.7. As mentioned above however, the region is extremely dry and the water retention capacity of local soils is poor, therefore run-off and drainage occurs very quickly in this landscape and many rivers are only seasonal or temporary. Many rivers only have flowing water for an extremely limited period, often just a few weeks during the monsoon season. At other times of year, surface water can only be found at particular waterholes. Even the Balaram River, one of the largest rivers draining the hilly catchment area is dry outside of the monsoon season with the exception of certain waterholes along its course.



Source: Gujarat Forest Department

Figure 4.1.7 Drainage and Watershed in Banaskantha District

(2) Patan District

The Saraswati River is the most important river of Patan district which originates from the mountains near Koteshwar in Banaskantha District and disappears in the Rann of Kachh but does not meet the sea. The river is considered extremely sacred. The proposed alignment crosses the Saraswati River in Sidhapur Town. It does not flow even during the monsoon period. The discharge of the Saraswati River is shown in Table 4.1.7. Picture of the Sarawati River is presented in Photo 4.1.4.

Table 4.1.7 Discharge of the Saraswati River (at Sidhhpur, 2 km upstream of Alignment)

Year	Months of flow	Days of flow	Range of Discharge (m3/s)	Number of days when discharge exceeded 100 m3/s
1995	4 (January, July, August, September)	80	0.17 – 138.05	1
1997	1 (August)	2	2.68 – 4.03	None
1998	5 (June, August, September, October, November)	11	0.54 – 500.57	1
2006	1 (August)	24	0.49 – 610.25	3
2007	3 (July, August, September)	19	0.57 – 50.33	None

Source: State Water Data Centre, Gandhinagar

Source: NKC Field Survey

Photo 4.1.4 Existing River Bridge over the Saraswati River

(3) Mehsana District

The district is drained by three south westerly flowing rivers namely the Saraswati, Khari, Rupen, and their tributaries. The Khari River is a tributary of the Sabarmati River. The alignment crosses the Khari River near Mehsana town. The Khari River near the proposed alignment is a stagnant pool of effluent discharged from upstream chemical industries and also of wastewater discharged from Mehsana town. The rivers in the district do not flow throughout the year. The discharge of the Khari River is shown in Table 4.1.8. Pictures of the Sarawati River are presented in Photo 4.1.5.

Table 4.1.8 Discharge of the Saraswati River (at Kanodar, 28 km upstream of Alignment)

Year	Months of flow	Days of flow	Range of Discharge (m3/s)	Number of days when discharge exceeded 100 m3/s
2003	1 (July)	2	1.20 – 1.85	None
2005	1 (September)	1	1.00 – 1.90	None
2006	1 (August)	2	3.40 – 10.80	None
2007	1 (July)	4	2.00 – 17.21	None
2010	1 (July)	1	3.51	None

Source: State Water Data Centre, Gandhinagar

Source: NKC Field Survey

Photo 4.1.5 Stagnant Wastewater in the Khari River

(4) Gandhinagar District

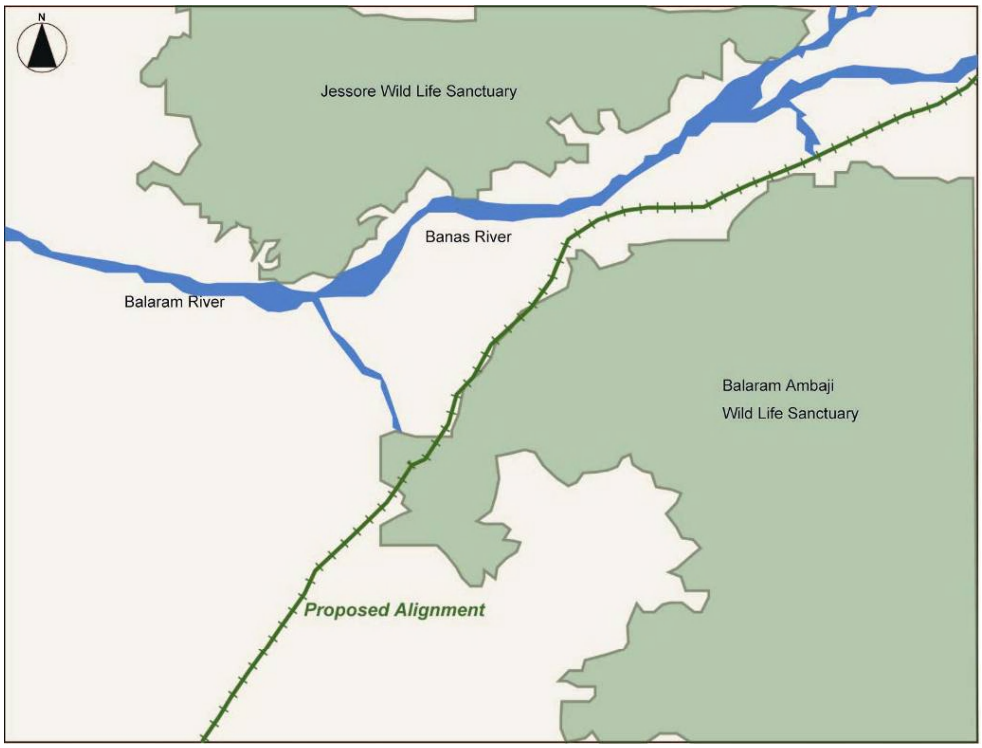
There are only two rivers flowing through the district, viz., the Sabarmati and the Khari Rivers. The Sabarmati River enters this district near Rajpur village and out of its total length of 416 km, the Sabarmati River flows for only 34 km in the Gandhinagar District. The rivers in the district do not flow throughout the year. The proposed alignment in Gandhinagar District does not cross any rivers, however in Piyaj Village, the alignment crosses the Narmada Canal. Picture of the Narmada Canal is presented in Photo 4.1.6.

Source: NKC Field Survey

Photo 4.1.6 Narmada Canal at Piyaj Village

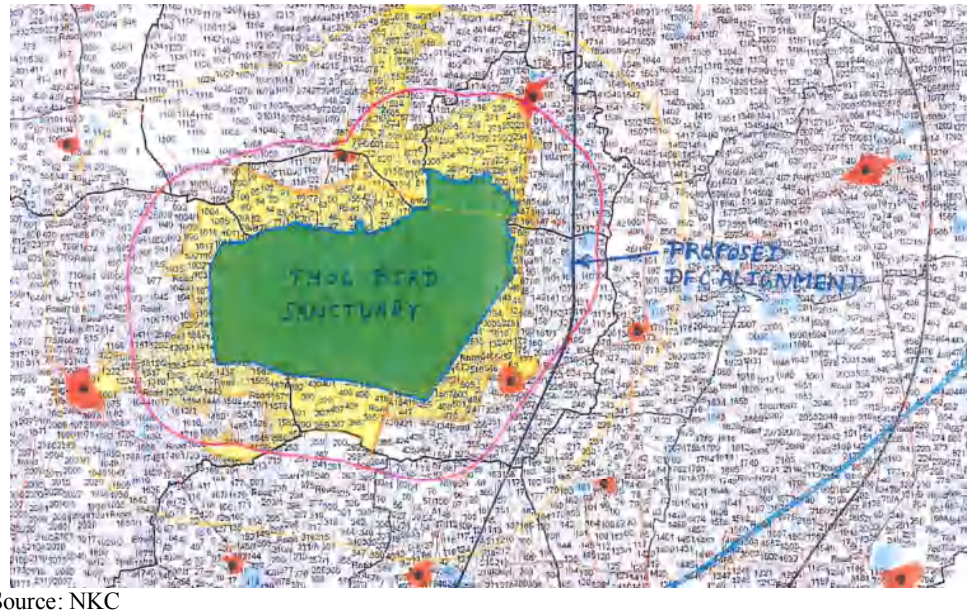
4.1.7 Legally Protected Area

The proposed DFC alignment passes through the protected area, a part of the western area of the BAWS in Banaskantha district and passes close to the JSBS in Banaskantha district as shown in Figure 4.1.8. In addition, the propsoed DFC alignment also passes close to the Thol Lake Bird Sanctuary (TLBS) in Mehsana district as shown in Figure 4.1.9 though it does not pass through other recorded forest areas or eco-sensitive areas.



Source: NKC

Figure 4.1.8 The Proposed Alignment and Legally Protected Areas (BAWS and JSBS)



Source: NKC

Figure 4.1.9 The Proposed Alignment and Legally Protected Area (TLBS)

1) Balaram Ambaji Wildlife Sanctuary (BAWS)

The BAWS was established as a wildlife sanctuary by the Government of Gujarat on 7 August 1989 for the purpose of protection, propagation and development of wildlife and its environment. It is comprised of dry deciduous forest on rocky hills and has a rich biological diversity, and is home to a wide range of rare medicinal herbs and shrubs as well as numerous species of rare and endangered fauna representative of the southern Aravalli Hills ecosystem. It has a total area of 54,208 ha, of which almost half, 26,700 ha is categorised as degraded (with a density of 0.1 - 0.4), 15,800 ha (30%) is categorised as closed forest with a density of greater than 0.4 and the remainder (22%) is open forest comprised of sparse vegetation cover.

The BAWS forms part of an important conservation complex of contiguous forests and protected areas including the Jessore Sloth Bear Sanctuary to the west, which is in turn linked to the Abu Road WS in Rajasthan to the north.

2) Jessore Sloth Bear Sanctuary (JSBS)

The area was declared as a wildlife sanctuary in May 1978 for the explicit purpose of protecting the endangered sloth bear and its natural habitat. Besides the sloth bear the dense dry deciduous forests of the protected area are also home to a number of other rare and endangered species of fauna and flora.

3) Thol Lake Bird Sanctuary (TLBS)

TLBS is located 40 km northwest of Ahmedabad, in Kadi Taluka of Mehsana district. Thol Lake, created in 1912, covers 7 km^2 of mostly open water. There are small marshes at the edges and some scrub forest on the sides of the high embankments. This man made wetland, declared as a sanctuary in November 1988, has high conservation value. The world's tallest flying bird, the Sarus crane inhabits this area and is found in good numbers. A shallow water reservoir and predominantly open water area without island, reeds beds give it a distinct ambience. TLBS is located to the east of the proposed DFC alignment.

4.1.8 Fauna

(1) General View in the Study Area

In spite of the fact that Gujurat is a relatively forest poor state, it remains rich in biodiversity. This is due to the significant differences in climate and diverse range of habitat types. As indicated in Figure 4.1.10, the state is comprised of 5 distinct biogeographic zones. In particular there are significant differences between the moist tropical areas found in the southern and coastal areas of the state (such as the Western Ghats) and the arid regions of the north.

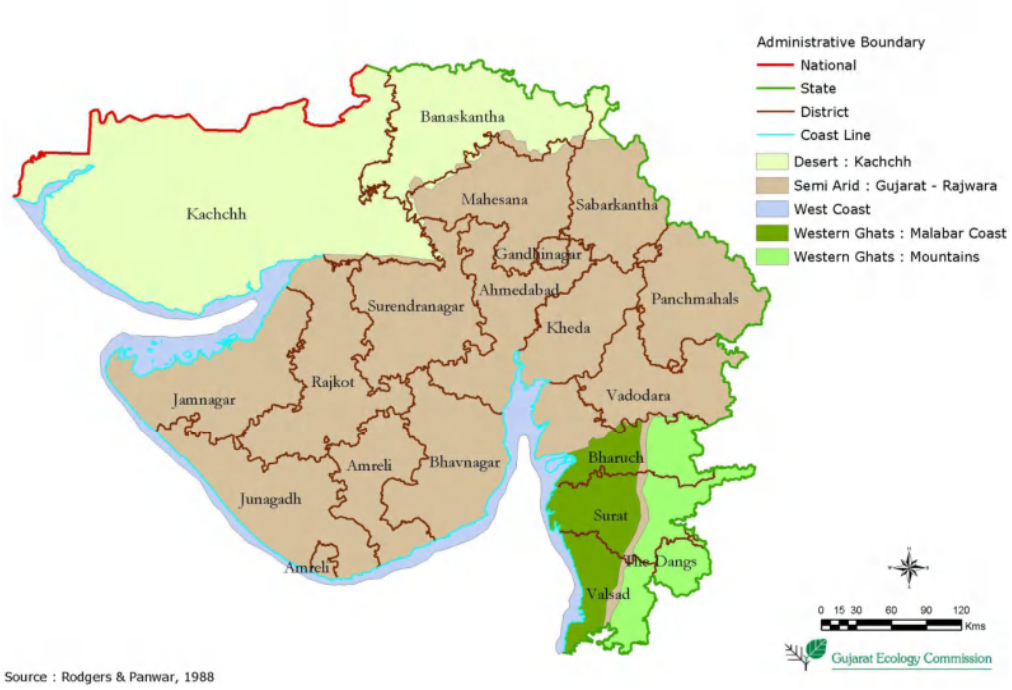


Figure 4.1.10 Biological Zones in the Study Areas

The Western Ghats in the south of the state are recognised as being a global biodiversity hotspot. The area is one of the world's ten 'hottest biodiversity hotspots' and has over 5,000 species of flowering plants, 139 mammal species, 508 bird species and 179 amphibian species including more than 325 globally endangered species (such as tiger, Asian elephants), many of which are endemic to the region. Meanwhile the forests are home to the last remaining wild population of Asiatic lions and the coastal and inland wetlands are critical ecosystems for many threatened bird species that migrate there.

The more arid parts northern Gujurat, in particular the more remote areas that have maintained denser natural forest cover provide important habitat for sloth bears, leopards, hyenas, pangolins and other species that have adapted to survive in semi-arid/arid environments. The proposed DFC alignment runs through the BAWS - JSBS landscape which is home to many of these endangered species. However, a considerable range of wildlife species also continue to exist outside of forest and protected areas. In many areas a combination of habitat destruction, degradation and fragmentation has brought wildlife into increasing conflict with humans. Certain species are also attracted to food and water sources created by humans including bird species attracted to farming and habitation areas as well as wolves, leopards and blue bulls (nilgai), and smaller mammal species. The rodents bring rat snakes, which in turn bring larger snakes such as cobra as well as birds of prey. Thus, in spite of poor and degraded forest cover, many fauna species can be found in agricultural/scrub areas.

(2) General View in BAWS

The Forest Department, under the supervision of the DFO/PA manager organises a major census every five years to monitor populations of key vertebrate species. Surveys are carried out during the peak of the dry pre-monsoon season (April - May), and take place over two days and nights coinciding with a full moon, to facilitate viewing faunal activity

around the water holes. Wildlife census data for key mammal species for the period 2006 - 2011 is presented in Table 4.1.9.

Table 4.1.9 Wildlife Census Data for Palanpur Sub-District (2006 – 2011)

Wildlife Species	2006	2011
Leopard	63	63
Sloth Bear	84	78
Hyena	101	81
Fox	62	37
Wild Boar	526	232
Jungle Cat	98	65
Porcupine	21	18
Blue bull	631	302

Source: Gujarat Forest Department

On the basis of data provided in the latest BAWS Management Plan (written in 2001), it would appear that the BAWS may contribute approximately 40-50% of these mammal populations. The population of leopards and sloth bears has apparently remained stable, although populations of hyena, fox, wild boar, jungle cat and blue bull appear to have declined sharply. Habitat degradation and encroachment, edge effects and developmental pressures (mining on the edge and inside the protected area, dams, roads and other infrastructure), human-wildlife conflict and road/railway accidents are the main threats to these wildlife species and the principal cause of these declines. Threat levels are also being exacerbated by climate changes, specifically the increased occurrence of severe drought (meaning mammals are forced to range further into human dominated areas in search of food and water).

(3) Protected/Endangered Species

Protected/endangered species recorded in the study area especially protected area (i.e. BAWS-JSBS landscapes) are outlined Tables 4.1.10-12.

Table 4.1.10 Mammal Species of BAWS and JSBS

No	Common Name	Scientific Name	IUCN Category	WPA Schedule
1	Sloth Bear	*Melursus ursinus*	Vulnerable	Schedule I
2	Leopard	*Panthera pardus*	Near Threatened	Schedule I
3	Striped Hyena	*Hyaena hyaena*	Near Threatened	Schedule III
4	Jackal	*Canis aureus*	Least Concern	Schedule II
5	Indian Fox	*Vulpes bengalensis*	Least Concern	Schedule II
6	Jungle Cat	*Felis chaus*	Least Concern	Schedule II
7	Nilgai	*Boselaphus tragocamelus*	Least Concern	Schedule III
8	Indian Pangolin	*Manis crassicaudata*	Near Threatened	Schedule I
9	Indian Crested Porcupine	*Hystrix indica*	Least Concern	Schedule IV
10	Threestriped Palm Squirrel	*Funambulus palmarum*	Least Concern	-
11	Common Langur	*Presbytis entellus*	Least Concern	Schedule II
12	Longeared Hedgehog	*Hemichienus auritus*	N.A.	Schedule IV
13	Wild Boar	*Sus scrofa*	Least Concern	Schedule III

Note: N.A. stands for "Not Applicable".
Source: BAWS Management Plan (2002-2007)

Table 4.1.11 Threatened Avian Fauna of BAWS

No	Common Name	Scientific Name	IUCN Category	Zoological Society of India Category
1	Greater Adjutant- Stork	*Leptoptilos dubius*	Endangered	Threatened
2	Eurasian Spoonbill	*Platelia leucorodia*	Least Concern	Threatened
3	Osprey	*Pandion haliaeatus*	Least Concern	Threatened
4	Indian Peafowl	*Pavo cristatus*	Least Concern	Threatened
5	Red Spurfowl	*Galloperdix spadicea*	Endangered	-
6	Grey Junglefowl	*Gallus sonneratii*	Near threatened	-
7	White-bellied Minivet	*Pericrocotus erythropygius*	Near threatened	-
8	Black Ibis	*Pseudibis papillosa*	Near threatened	-
9	Painted Stork	*Mycteria leucocephala*	Vulnerable	-
10	Pied Tit	*Parus nuchalis*	Vulnerable	-
11	Asian Openbill-Stork	*Anastomus oscitans*	Vulnerable	-
12	Indian White-backed Vulture	*Gyps bengalensis*	Vulnerable	-
13	Long-billed Vulture	*Gyps indicus*	Vulnerable	-
14	Red-headedulture	*Sarcogyps calvus*	Vulnerable	-
15	Red-headed Falcon	*Falco chicquera*	Vulnerable	-

Source: BAWS Management Plan (2002-2007)

Table 4.1.12 Herpetological Fauna of BAWS and JSBS

No	Common Name	Scientific Name	IUCN Category	WPA Schedule
1	Indian Python	*Python molurus*	Near Threatened	Schedule I
2	Bamboo Pit Viper	*Trimeresurus gramineus*	-	-
3	Russell's Viper	*Daboia russelii*	-	Schedule II
4	Indian Cobra	*Naja naja*	-	Schedule II
5	Common Krait	*Bungarus caeruleus*	-	Schedule IV
6	Indian Sand Boa	*Eryx johnii*	-	Schedule IV
7	Rat Snake	*Ptyas mucosus*	-	Schedule II
8	Monitor Lizard	*Varanus bengalensis*	-	Schedule II
9	Indian Chameleon	*Chamaeleon zeylanicus*	-	-
10	Starred Tortoise	*Geochelone elegans*	Least Concern	Schedule IV

Source: BAWS Management Plan (2002-2007)

4.1.9 Flora

(1) Overview in the Study Area

Gujurat overall is a forest poor state with forest cover accounting for only 9.6% of the state's total land area[1] and much of this is concentrated in the southern and eastern parts of the state. Whilst forests in the south and east are generally moist deciduous, the forest fragments of the Wamaj - Iqbalgarh section tend to be classified as dry deciduous or desert thorny scrub located on rocky hills, in small patches on hills, next to seasonal or dry rivers and wasteland. Table 4.1.13 illustrates ecosystem types and major vegetation composition in the Wamaj - Iqbalgarh section.

[1] In comparison with a national average of 23.4%

Table 4.1.13 Ecosystem Types in Gujurat

District/Area	Ecosystem Type/Vegetation Composition
Gandhinagar, Mahesana, Patan, and southern Banaskantha	Agricultural lands (dominant), wasteland, wetlands, (ponds and lakes), dry rivers, ravine forests, rocky hills
Banaskantha	Dry teak forest, dry mixed deciduous forest, *Boswellia* forests, riverine forests, *Anogeissus* forests, *Butea* forests, dry bamboo brakes, dry deciduous scrub, *Aegle* forests, *Zizyphus* scrub, *Acacia catechu* forests, *Butea monosperma* forests, rocky hills and seasonal rivers

Source: Adapted from GEER (2001)

Specifically along the alignment in Banaskantha district and extending further south into Patan and Mahesana, forests and vegetation cover tends to be dominated by *Acacia nilotica*, other *Acacia Sp* (e.g. *catechu, senegal*) and *Prosopis juliflora* trees and *Zizyphus Sp* scrubs/groundcover. Almost all of this is the direct result of plantations carried out by the Social Forestry Department for aesthetic purposes and to demarcate the RoW of the alignment of the existing track, such species being hardy and able to thrive in arid environments.

There is no recorded forest area along the alignment of the DFC in the section. More than 90% of the alignment in the Wamaj - Iqbalgarh section passes through agricultural land or scrub/wasteland. There is however a short stretch of approximately 10 km at the northern end of the section in Banaskantha District where the RoW bisects two protected areas, the BAWS and the JSBS. Within this stretch a 2.4 km section of the alignment runs through a small area on the western periphery of the BAWS. Thus in total only 1.7% of the total alignment in this section passes through any kind of protected area or recorded forest.

(2) Protected/Endangered Species

Protected/endangered species observed in the study area especially protected area, i.e. BAWS, is outlined in Table 4.1.14.

Table 4.1.14 Rare and Endangered Flora in BAWS

No	Species	WPA Schedule	Indian Red List	IUCN Red List
1.	*Sterculia urens*	N.A.	Rare	N.A.
2.	*Dendrocalamus strictus*	N.A.	-	N.A.
3.	*Tecomella undulata*	N.A.	-	N.A.
4.	*Commiphora wightii*	N.A.	-	N.A.
5.	*Phoenix sylvestris*	N.A.	-	N.A.
6.	*Anogeissus sericea*	N.A.	Rare	N.A.
7.	*Ceropegia odorata*	N.A.	Endangered	Endangered
8.	*Chlorophytum borivillanum*	N.A.	Rare	N.A.
9.	*Pavonia zeylanica*	N.A.	-	N.A.
10.	*Solanum indicum*	N.A.	-	N.A.
11	*Gloriosa superb*	N.A.	-	N.A.

Note: N.A. stands for "Not Applicable".
Source: BAWS Management Plan 2002-2007

4.2 EXISTING POLLUTION CONDITION

4.2.1 Air Quality

(1) Banaskantha and Patan Districts

Gujarat Pollution Control Boad is the agency responsible for ambient air quality monitoring at Vishram Gruha at Palanpur, the largest town and administrative seat of Banaskantha. Due to the proximity of the monitoring location with the National Highway connecting Ahmedabad with Abu Road, the maximum value of RSPM is observed as 210 $\mu g/m^3$ in past 5 years. The value is much higher than the National Ambient Air Quality Standards (No. B-29016/20/90/PCI-I dated 18 Nov, 2009 of Central Pollution Control Board) of 100 $\mu g/m^3$. On the other hand, the values of SO_2 and NO_x have been well below the national standards. For the detailed information, see 6.3.

(2) Mehsana District

Ambient air quality near the proposed alignment in Mehsana is monitored at two locations by the Gujarat Pollution Control Board. These two locations are - Kadi Char Rasta and Modhera Char Rasta. Both locations are near the traffic intersection on National Highway from Ahmedabad to Abu Road. These situations are reflected in the ocational excess of the RSPM value over the national standard. The values of SO_2 and NO_x have been well below the national standards. For the detailed information, see 6.3.

(3) Gandhinagar District

Gujarat Pollution Control Board carries out ambient air pollution monitoring at two locations in Kalol, - IFFCO Kalol and GIDC Kalol. Both locations are in industrial areas. At GIDC, the RSPM values exceed the national standard in some years. The values of SO_2 and NO_x have been well below the national standards at both locations. For the detailed information, see 6.3.

4.2.2 Water Quality

The results of water quality monitoring at Chitrasani of the Balaram River for the period of 1996-97 to 2005-06 are shown in Table 4.2.1.

Table 4.2.1 Water Quality of the Balaram River

1 Basin: Banas Basin Gujarat
2 River :BALARAM
3 Site : Chitrasani
4 Name & Location of Laboratory : Level II Laboratory , MahiDivision, CWC, Ahemadabad
5 Type of Staion, Parameter and frequency of monitoring : Baseline, Station , 24 parameters, monthly

Water Quality Data

Parameter	Unit	Analysis of Data From 1996-97 to 2005-06						Last year Average 2005-06		Remark
		Maximum observed		Average observed		Minimum observed				
		Monsoon	Non-Monsoon	Monsoon	Non-Monsoon	Monsoon	Non-Monsoon	Monsoon	Non- Monsoon	
1. PHYSICAL										
Discharge	Cumecs	7.32	0.00	0.71	0.00	0.00	0.00	1.69	0.00	
Temperature	0C	28.00	0.00	7.88	0.00	0.00	0.00	25.33	0.00	
pH		8.00	0.00	3.16	0.00	0.00	0.00	7.87	0.00	
Conductivity	Micro mho/cm	476.00	0.00	129.35	0.00	0.00	0.00	241.00	0.00	
at 25 C										
Total Dissolvev Solids	mg/l	296.00	0.00	41.33	0.00	0.00	0.00	165.33	0.00	
Total Suspended Solids	mg/l	62.00	0.00	10.33	0.00	0.00	0.00	41.33	0.00	
Turbidity	NTU	10.00	0.00	1.25	0.00	0.00	0.00	5.00	0.00	
2. CHEMICAL										
Potassium	mg/l	2.00	0.00	0.55	0.00	0.00	0.00	1.00	0.00	
Sodium	mg/l	42.00	0.00	9.60	0.00	0.00	0.00	14.00	0.00	
Calcium	mg/l	33.67	0.00	12.52	0.00	0.00	0.00	29.00	0.00	
Magnesium	mg/l	8.70	0.00	2.81	0.00	0.00	0.00	5.17	0.00	
Aluminium	mg/l	0.08	0.00	0.02	0.00	0.00	0.00	0.02	0.00	
Iron	mg/l	0.14	0.00	0.03	0.00	0.00	0.00	0.03	0.00	
Ammonia	mg/l	0.04	0.00	0.01	0.00	0.00	0.00	0.01	0.00	
Carbonate	mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Bicarbonate	mg/l	162.00	0.00	53.80	0.00	0.00	0.00	100.00	0.00	
Chloride	mg/l	46.00	0.00	10.90	0.00	0.00	0.00	20.00	0.00	
F luoride	mg/l	0.28	0.00	0.07	0.00	0.00	0.00	0.25	0.00	
Sulphate	mg/l	11.66	0.00	4.19	0.00	0.00	0.00	9.03	0.00	
Sulphite	mg/l	-	-	-						
Nitrate	mg/l	0.18	0.00	0.04	0.00	0.00	0.00	0.12	0.00	
Nitrite	mg/l	0.04	0.00	0.01	0.00	0.00	0.00	0.03	0.00	
Phosphate	mg/l	0.04	0.00	0.01	0.00	0.00	0.00	0.01	0.00	
Silicate	mg/l	20.16	0.00	7.22	0.00	0.00	0.00	12.97	0.00	
B.O.D.	mg/l	1.10	0.00	0.11	0.00	0.00	0.00	0.50	0.00	
D.O..	mg/l	7.40	0.00	3.10	0.00	0.00	0.00	6.20	0.00	
3. CHEMICAL INDICES										
Hardness Number	m.eq/l	119.78	0.00	42.84	0.00	0.00	0.00	94.00	0.00	
Sodium Percentage	m.eq/l	44.34	0.00	12.18	0.00	0.00	0.00	22.67	0.00	
S.A.R.	m.eq/l	1.73	0.00	0.40	0.00	0.00	0.00	0.80	0.00	
R.S.C.	m.eq/l	0.41	0.00	0.05	0.00	0.00	0.00	0.00	0.00	

Source: Central Water Commission

4.3 EXISTING SOCIAL ENVIRONMENT

4.3.1 General

The social profile of the four districts in the study area is outlined in Table 4.3.1. The table shows comparative population statistics for the target districts over the last 10 years.

Table 4.3.1 Synopsis of Census Data

District	Banaskantha		Patan		Mehsana		Gandhi Nagar	
Year	2011	2001	2011	2001	2011	2001	2011	2001
Total Population	3,116,045	2,504,244	1,342,746	1,182,709	2,027,727	1,837,892	1,387,478	1,334,455
Male Population	1,609,148	1,297,404	694,062	612,100	1,053,337	953,842	722,459	697,999
Female Population	1,506,897	1,206,840	648,684	570,609	974,390	884,050	665,019	636,456
Population Growth, %	24.43	26.38	13.53	14.16	9.91	12.08	12.15	21.73
Area, km^2	10,757	10,757	5,730	5,730	4,382	4,382	2,163	2,163
Density, /km^2	290	233	234	206	462	421	660	589
Proportion to Gujarat Population, %	5.16	4.94	2.22	2.33	3.36	3.63	2.3	2.63
Sex Ratio	936	930	935	932	925	927	920	912
Child sex ratio	890	907	884	865	845	801	847	813
Children (0-6 yrs), %	16.0	18.7	13.4	16.1	11.2	14.0	11.5	13.9
Literacy	66.4	41.4	73.5	50.7	84.3	64.7	85.8	65.9
Male Literacy	79.5	53.9	84.3	61.4	91.9	73.2	93.6	74.9
Female Literacy	52.6	28.1	62.0	39.2	76.1	55.4	77.4	56.1

Source: Census of India, 2001 and NKC Survey

4.3.2 Demographic Information

(1) Banaskantha District

The demographic profile of the study area in Banaskantha District is presented in Table 4.3.2. There are 20 villages in 3 Talukas of the district.

Table 4.3.2 Demographic Profile of Banaskantha District

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Banaskantha**	**426,781**	**2,504,244**	**1,297,404**	**1,206,840**	**10.8**	**8.2**	**41.4**	**43.6**
Taluka	**Amirgarh**	**17,026**	**101,133**	**52,148**	**48,985**	**3.2**	**53.2**	**27.0**	**39.7**
Village	Iqbalgarh	983	5,211	2,751	2,460	3.6	4.5	55.2	38.7
	Jethi	714	3,669	1,935	1,734	8.9	33.8	40.6	52.3
	Rajpuriya	63	316	169	147	0.0	97.8	27.8	51.9
Taluka	**Vadgam**	**40,735**	**205,992**	**104,967**	**101,025**	**16.6**	**2.4**	**57.7**	**39.6**
Village	Malosana	417	2,140	1,093	1,047	22.0	0.0	60.0	43.5
	Majadar	1,396	7,585	3,847	3,738	14.4	0.1	65.2	27.1
	Chhapi	1,412	7,592	4,014	3,578	12.3	5.7	64.4	31.0
	Kotadi	301	1,443	716	727	21.6	3.5	59.4	43.2
	Pasvadal	557	2,682	1,354	1,328	14.2	8.4	57.0	39.3
	Manpura	332	1,534	778	756	18.6	0.0	59.3	34.3
	Dharewada	209	1,066	542	524	14.2	0.0	54.2	34.3
Taluka	**Palanpur**	**72,765**	**380,707**	**196,956**	**183,751**	**11.2**	**3.8**	**59.5**	**37.2**
Village/ Town	Chitrasani	603	3,591	1,877	1,714	10.6	13.0	57.3	27.3
	Jaspuriya	207	1,068	562	506	8.5	8.1	56.8	40.3
	Hebatpur	140	732	381	351	13.8	1.9	55.6	40.6
	Karjoda	391	1,990	1,000	990	21.3	12.2	55.5	37.1
	Sadarpur	608	3,116	1,592	1,524	11.3	12.6	60.1	41.6
	Jagana	1,417	6,802	3,517	3,285	14.1	0.4	69.4	36.8
	Sedrasana	243	1,336	695	641	21.9	3.3	60.6	34.1
	Jasleni	491	2,507	1,280	1,227	16.7	2.6	62.9	44.1
	Palanpur	23,832	122,300	64,365	57,935	10.8	2.8	68.5	28.5
	Surajpura	NA	NA	NA	NA	NA	NA	NA	NA

Note: NA-Not available
Source: Census of India, 2001

Occupational Structure: According to the 2001 census of India, the total workers in the district are 1,092,201 (43.6% of total population), out of which 664,253 (51.2%) are male and 427,945 (35.5%) are female. Total main workers of the district are 830,579 (33.2% of total population), out of which 619,198 (47.7%) are male and 211,381 (17.5%) are female. Of the total population of the district, the proportion of main workers, marginal workers and non workers are 33.2%, 10.4% and 56.4% respectively. In the 2001 census, the workers have further been divided into 4 major sectors according to their main economic activity. The proportions of cultivators, agricultural labourers, workers in the household industries and other workers to total workers account for 44.2%, 22.2%, 1.7% and 31.8% respectively.

Cultivators: Persons who are engaged either as an employer or farmer, cultivating land owned by themselves or their family/household is termed as a cultivator. The total number of cultivators in the district is 482,803 (44.2% of total working population), out of which 336,184 (50.6%) are male and 146,679 (34.3%) are female.

Agricultural Labourers: Persons working on the land of others for wages or share in the yield have been treated as agricultural labourers. The total number of workers in this category is 242,728 (22.2% of total working population), out of which 116,893 (17.6%) are male and 125,835 (29.4%) are female.

Workers in Household Industries: Household industry is defined as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in an urban area. The industry is not run on the scale of a registered factory, which could qualify or has to be registered under the Indian Factories Act. The total number of workers in household factories in the study area is 18,875 (1.7% of total working population), out of which 10,726 (1.6%) are male and 8,149 (1.9%) are female.

Other Workers: All workers other than cultivators or agricultural labourers, who are engaged in some economic activity, are other workers. The workers that come under this category include plantation workers, commerce, business, transport, mining, construction, workers etc. the total number of other workers under the study area is 347,795 (31.8% of total working population), out of which 200,450 (30.2%) are male and 147,345 (34.4%) are female.

Marginal Workers: The marginal workers are those workers, who are engaged in some work for a period of less than six months, during the reference year prior to the census survey. The total marginal workers in the district are 261,622 (10.4% of total population), out of which 45,055 (3.5%) are male and 216,567 (17.9%) are female

Non-Workers: The non-workers include those engaged in unpaid household duties, students, retired persons, dependents, beginners etc. The total non-workers in the district are 1,412,043 (56.4% of total population), out of which 633,151 (48.8%) are male and 778,892 (64.5%) are female.

(2) Patan District

The demographic profile of the study area in Patan District is presented in Table 4.3.3. There are 4 villages in 1 Talukas of the district.

Table 4.3.3 Demographic Profile of Patan District

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Patan**	**222,630**	**1,182,709**	**612,100**	**570,609**	**9.9**	**1.1**	**50.7**	**45.1**
Taluka	**Sidhpur**	**35,640**	**190,937**	**98,063**	**92,874**	**11.7**	**0.9**	**61.1**	**39.6**
Village/ Town	Sujanpur	389	2,069	1,095	974	3.8	0.0	72.1	42.7
	Lalpur	446	2,294	1,191	1,103	6.9	7.9	56.2	38.7
	Khali	429	2,696	1,394	1,302	7.9	0.0	59.9	31.8
	Sidhpur	11,060	58,194	30,138	28,056	11.8	1.7	68.6	28.9

Source: Census of India, 2001

Occupational Structure: According to the 2001 census of India, the total workers in the district are 533,078 (45.1% of total population), out of which 325,825 (53.2%) are male and 207,253 (36.3%) are female. Total main workers of the district are 395,470 (33.4% of total population), out of which 298,380 (48.7%) are male and 97,090 (17.0%) are female. Of the total population of the district, the proportion of main workers, marginal workers and non workers are 33.4%, 11.6% and 54.9% respectively. In the 2001 census, the workers have further been divided into 4 major sectors according to their main economic activity. The proportions of cultivators, agricultural labourers, workers in the household industries and other workers to total workers account for 28.5%, 35.4%, 1.7% and 34.4% respectively.

Cultivators: The total number of cultivators in the district are 151,828 (28.5% of total population), out of which 110,477 (33.9%) are male and 41,351 (20.0%) are female

Agricultural Labourers: The total number of workers in this category is 188,699 (35.4% of total working population), out of which 88,443 (27.1%) are male and 100,256 (48.4%) are female.

Workers in Household Industries: The total numbers of workers in household factories in the study area is 9,057 (1.7% of total working population), out of which 4,406(1.4%) are male and 4,651 (2.2%) are female.

Other Workers: The total number of other workers under the study area is 183,494 (34.4% of total working population), out of which 122,499 (37.6%) are male and 60,995 (29.4%) are female.

Marginal Workers: The total marginal workers in the district are 137,608 (11.6% of total population), out of which 27,445 (4.5%) are male and 110,163 (19.3%) are female.

Non-Workers: The total non-workers in the district are 649,631 (54.9% of total population), out of which 286,275 (46.8%) are male and 363,356 (63.7%) are female.

(3) Mehsana District

The demographic profile of the study area in Mehsana District is presented in Table 4.3.4. There are 33 villages in 4 Talukas of the district.

Table 4.3.4 Demographic Profile of Mehsana District

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Mahesana**	**364,447**	**1,837,892**	**953,842**	**884,050**	**8.1**	**0.5**	**64.7**	**45.1**
Taluka	**Unjha**	**35,064**	**174,303**	**90,235**	**84,068**	**7.6**	**0.2**	**70.7**	**44.6**
Village/ Town	Kamli	1,365	6,508	3,347	3,161	3.7	0.1	73.4	49.3
	Maktupur	1,037	5,138	2,662	2,476	9.4	0.2	67.6	48.7
	Aithor	1,769	8,509	4,372	4,137	7.3	0.0	66.9	40.5
	Unjha (M)	10,734	53,876	28,396	25,480	7.7	0.7	75.6	36.1
Taluka	**Visnagar**	**49,906**	**253,179**	**131,809**	**121,370**	**7.4**	**0.4**	**69.5**	**43.8**
Village	Jetalvasana	723	3,417	1,739	1,678	15.9	0.0	74.7	51.9
	Bhandu	1,432	7,186	3,733	3,453	5.5	0.2	66.9	44.2
Taluka	**Mahesana**	**90,920**	**461,320**	**241,115**	**220,205**	**8.2**	**0.9**	**67.4**	**41.6**
Village/ Town	Motidau	948	4,901	2,492	2,409	10.5	0.0	65.2	52.8
	Nanidau	581	3,051	1,541	1,510	0.0	0.0	41.5	50.9
	Palodar	831	4,225	2,217	2,008	7.4	0.0	66.9	56.5
	Ramosana	565	3,097	1,583	1,514	9.0	0.5	62.9	36.2
	Taleti	331	1,785	918	867	15.1	0.0	64.8	42.0
	Kukas	499	2,640	1,366	1,274	9.8	0.1	67.4	50.9
	Heduva Hanumat	316	1,480	782	698	14.5	0.9	52.4	48.6
	Sobhasan	433	2,230	1,138	1,092	10.2	0.0	61.2	38.1
	Hebuva	258	1,514	781	733	2.1	0.0	71.0	49.1
	Punasan	426	2,186	1,125	1,061	9.8	0.0	61.4	38.1
	Mevad	362	2,093	1,091	1,002	3.7	0.0	68.9	43.5
	Jagudan	1,104	5,502	2,902	2,600	8.1	0.3	68.3	36.6
	Geratpur	50	258	140	118	6.6	0.0	55.8	53.1
	Ditasan	204	1,114	576	538	3.1	0.0	41.8	63.8
	Dholasan	591	3,267	1,684	1,583	3.2	0.3	64.4	39.4
	Chaluva	635	3,671	1,915	1,756	4.2	0.0	41.3	67.3
	Jornang	1,181	5,945	3,099	2,846	7.2	0.0	68.8	49.2
	Navi Sedhavi	319	1,638	871	767	13.4	0.0	62.6	41.9
	Mahesana	28,161	141,453	74,866	66,587	9.6	1.6	76.0	28.9
	Ambaliyasan	1,382	6,739	3,617	3,122	12.2	5.4	65.2	40.5
Taluka	**Kadi**	**59,882**	**296,921**	**154,947**	**141,974**	**9.2**	**0.4**	**62.9**	**45.1**
Village	Kaiyal	694	3,608	1,850	1,758	6.2	0.0	65.7	49.1
	Tankiya	218	1,098	556	542	18.6	0.0	58.0	42.3
	Dangarva	1,167	5,716	2,959	2,757	9.5	0.1	66.5	39.0
	Anandpura	225	1,167	618	549	7.5	0.2	74.2	36.6
	Ghumasan	875	4,222	2,197	2,025	10.2	0.0	66.5	41.7
	Jhulasan	1,046	4,892	2,555	2,337	5.7	0.0	63.3	46.3
	Vamaj	846	4,357	2,448	1,909	8.2	0.1	73.6	56.2

Source: Census of India, 2001

Occupational Structure: According to the 2001 census of India, the total workers in the district are 828,519 (45.1% of total population) out of which 512,458 (53.7%) are male and 316,061 (35.8%) are female. Total main workers of the district are 665,080 (36.2% of total population), out of which 474,349 (49.7%) are male and 190,731 (21.6%) are female. Of the total population of the district, the proportion of main workers, marginal workers and non workers are 36.2%, 8.9% and 54.9% respectively. In the 2001 census, the workers

have further been divided into 4 major sectors according to their main economic activity. The proportions of cultivators, agricultural labourers, workers in the household industries and other workers to total workers account for 23.3%, 24.5%, 1.7% and 50.5% respectively.

Cultivators: Total cultivators in the district are 193,337 (23.3 % of total working population), out of which 159,654 (31.2 %) are male and 33,683 (10.7 %) are female.

Agricultural Labourers: The total workers of this category are about 202,733 (24.5 % of total working population), out of which 104,160 (20.3%) are male and 98,573 (31.2%) are female.

Workers in Household Industries: The total numbers of workers in household factories under the study area is 13,967 (1.7% of total working population), out of which 7,302 (1.4%) are male and 6,665 (2.1%) are female.

Other Workers: The total number of other workers under the study area is 418,482 (50.5 % of total working population), out of which 241,342 (47.1%) are male and 177,140 (56.0%) are female.

Marginal Workers: The total marginal workers in the district are 163,439 (8.9 % of total population), out of which 38,109 (4.0%) are male and 125,330 (14.2%) are female

Non-Workers: The total non-workers in the district are 1,009,373 (54.9 % of total population), out of which 441,384 (46.3 %) are male and 567,989 (64.2 %) are female.

(4) Gandhinagar District

The demographic profile of the study area in Gandhinagar District is presented in Table 4.3.5. There are 11 villages in 1 Talukas of the district.

Table 4.3.5 Demographic Profile of Gandhinagar District

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Gandhinagar**	**269,440**	**1,334,455**	**697,999**	**636,456**	**8.7**	**1.3**	**65.9**	**41.5**
Taluka	**Kalol**	**62,381**	**310,081**	**162,845**	**147,236**	**10.5**	**0.4**	**65.2**	**41.1**
Village/ Town	Pansar	1,731	7,953	4,131	3,822	12.8	0.2	67.1	34.8
	Isand	726	3,556	1,900	1,656	8.9	6.6	56.6	47.2
	Vadavsvami	251	1,298	661	637	8.6	1.9	67.0	54.8
	Chhatral	2,111	9,744	5,451	4,293	7.7	1.6	63.0	41.6
	Ola	320	1,607	826	781	10.2	0.0	64.9	52.6
	Pratappura	326	1,734	906	828	0.9	0.0	59.5	56.9
	Piyaj	718	3,766	1,955	1,811	10.8	0.0	51.7	50.9
	Borisana	1,742	8,700	4,569	4,131	5.3	0.0	70.1	39.3
	Ramnagar	372	1,965	1,024	941	6.9	0.0	69.0	48.9
	Vansajada	456	2,356	1,194	1,162	2.4	0.0	50.7	55.9
	Kalol	22,194	112,013	59,539	52,474	16.0	0.3	72.8	30.6

Source: Census of India 2001

Occupational Structure: According to the 2001 census of India, the total workers in the district are 554,336 (41.5% of total population), out of which 370,462 (53.1%) are male and 183,874 (28.9%) are female. Total main workers of the district are 467,413 (35.0% of

total population), out of which 343,992 (49.3%) are male and 123,874 (19.4%) are female. Of the total population of the district, the proportion of main workers, marginal workers and non workers are 35.0%, 6.5% and 58.5% respectively. In the 2001 census, the workers have further been divided into 4 major sectors according to their main economic activity. The proportions of cultivators, agricultural labourers, workers in the household industries and other workers to total workers account for 18.6%, 21.6%, 1.3% and 58.5% respectively.

Cultivators: Total cultivators in the district are 102,849 (18.6% of total working population), out of which 90,404 (24.4%) are male and 12,446 (6.8%) are female.

Agricultural Labourers: The total workers of this category are 120,003 (21.6% of total working population), out of which 68,607 (18.5%) are male and 51,396 (28.0%) are female.

Workers in Household Industries: The total numbers of workers in household factories under the study area is 7,195 (1.3 % of total working population), out of which 4,313 (1.2%) are male and 2,882 (1.6 %) are female.

Other Workers: The total number of other workers under the study area is 324,289 (58.5 % of total working population), out of which 207,138 (55.9 %) are male and 117,151 (63.7%) are female.

Marginal Workers: The total marginal workers in the district are 86,923 (6.5% of total population), out of which 26,470 (3.8%) are male and 60,453 (9.5%) are female

Non-Workers: The total non-workers in the district are 780,119 (58.5% of total population), out of which 327,537 (46.9%) are male and 452,582 (71.1%) are female.

4.3.3 Ethnic Minorities

(1) Banaskantha District

The Schedule Caste (SC) population of Banaskantha is 271,484; it is 10.8% of total population. Out of total SC population, male SC population is 140,999 (10.9% of total population) and female SC population is 130,485 (10.8% of total population). The Schedule Tribe (ST) population of the Banaskantha is 205,904 (8.2% of total population). Out of total ST population, male ST population is 105,818 (8.2% of total population) and female ST population is 100,086 (8.3% of the total population).

(2) Patan District

The SC population in Patan is 116,879; it is 9.9% of total population. Out of total SC population male SC population is 61,023 (10.0% of total population) and female SC population is 55,856 (9.8% of total population). The ST population of the Patan is 12,637 (1.1% of total population). Out of total ST population, male ST population is 6,722 (1.1% of total population) and female ST population is 5,915 (1.0% of the total population).

(3) Mehsana District

The SC population of Mehsana is 148,597; it is 8.1% of total population. Out of total SC population male SC population is 77,710 (8.1% of total population) and female SC population is 70,887 (8.0% of total population). The ST population of the Mehsana is

8,975 (0.5% of total population). Out of total ST population, male ST population is 4,884 (0.5% of total population) and female ST Population is 4,091 (0.5% of the total population).

(4) Gandhinagar District

The SC population of Gandhinagar is 115,955; it is 8.7% of total population. Out of total SC population male SC population is 60,756 (8.7% of total population) and female SC population is 55,199 (8.7% of total population). The ST population of the Gandhinagar is 17,681 (1.3% of total population). Out of total ST population, male ST population is 9,575 (1.4% of total population) and female ST population is 8,106 (1.3% of the total population).

4.3.4 Economy

(1) Banaskantha District

Banaskantha district is the third largest district in Gujarat and is located in the North eastern Region in the State. The district contributes significantly to Agricultural produce, with production of Potato as recorded highest in India and third largest producer of oil seeds. The district produces 67.0% of Isabgul, Fenugreek and Cumin. Principal crops grown in the district include owar, bajri, wheat, cotton and potato, and the district is also known for its diamond and ceramic industry.

The proposed Delhi-Mumbai Industrial Corridor (DMIC) passes through the Diamond Hub, and Palanpur is expected to emerge as a major economic driver of the district. The vast reserves of Marble also offer a good potential for ceramic industry.

(2) Patan District

Patan district is located in North Gujarat. There are 4,641 small scale industries in Patan district. Vegetable and Vanaspati, paper and pulp industry and food processing industries are some of major industries operating in the small scale sector in the district.

Vegetable and Vanaspati sector has attracted investment to the tune of INR 1,269 lakh (USD 3 Million), highest among all sectors (2006-07). Patan Taluka hosts the highest number of industrial units (1617) among all Talukas in the district.

Close proximity to the agro-food and biotech clusters of Ahmadabad has opened up new avenues for the food processing industries, research centres and educational institutions. Small scale industry sector such as cotton based textiles, food processing, paper and pulp industry and vegetable oil mills are the supporting pillars of the district economy.

(3) Mehsana District

There are more than 70 medium and large scale industries in Mehsana district primarily operating in the Engineering, Chemicals, Pharmaceuticals, Dairy products, Oil and Textiles sectors.

The industries are concentrated in Kadi, Mehsana, Visnagar, Vijapur and Becharaji talukas.

There are around 7,183 small scale industries operating in Mehsana district operating in Chemicals, Textiles, Rubber & Plastic articles, Metals, Repairing Services, Food & Agro processing and engineering sector.

Mehsana has 2,406 units engaged in Repairing Services followed by 1221 Textile units Most of the small scale industries are concentrated in Mehsana, Kadi, Vijapur and Visnagar talukas of the district.

Gujarat Industrial Development Corporation (GIDC: the Government of Gujarat undertaking) has identified Palanpur – Mehsana region for establishing an industrial park. It is expected that GIDC will be a significant contributing factor in boosting the industrial and economic growth of the district.

(4) Gandhinagar District

Since Gandhinagar district is the state capital, public sector services are the major economic sector. However, electronics and Textiles have been the main sectors of investment and employment in Gandhinagar district since the late 1980s, and food processing, IT/ITeS and ceramics are increasingly becoming major economic activities at the present time.

There are at present 330 medium and large scale industries in Gandhinagar, most of which are concentrated in Kalol Taluka (203 units). In addition, there are approximately 8,000 small scale industries (SSIs) in Gandhinagar providing employment to over 36,000 persons. Textiles, Wood products, Mineral based industries and Engineering are the major Small Scale Industrial sectors of the district.

4.3.5 Agriculture

(1) Banaskantha District

The major crops grown in Banaskantha District are given in Table 4.3.6.

Table 4.3.6 Major Crops Grown in Banaskantha District

Name of the Crop	Scientific Name	Remarks
Bajri	*Pennisetum typhoidem*	Kharif crop
Wheat	*Triticum vulgare*	Rabi crop
Maize	*Zea mays*	Kharif crop
Pulses		Kharif crop
Tur	*Cajanus indicus*	
Gram	*Cicer arietinum*	
Mag	*Phaseolus radiatus*	
Math	*Phaseolus acontifolius*	
Udid	*Phaseolus mungo*	
Val	*Lablab niger*	
Isabgul	*Plantago ovata*	Kharif crop It is a sort of husk, which has a high medicinal value and therefore exported abroad

Source : Supplemental ESIMMS

(2) Patan District

The major crops grown in Patan District are given in Table 4.3.7.

Table 4.3.7 Major Crops Grown in Patan District

Name of the Crop	Scientific Name	Remarks
Bajri	*Pennisetum typhoidem*	Kharif crop
Wheat	*Triticum vulgare*	Rabi crop
Maize	*Zea mays*	Kharif crop
Pulses Tur Gram Mag Math Udid Val	 *Cajanus indicus* *Cicer arietinum* *Phaseolus radiatus* *Phaseolus acontifolius* *Phaseolus mungo* *Lablab niger*	Kharif crop
Tobacco	*Nicotiana tobacum*	Kharif crop
Isabgul	*Plantago ovata*	Kharif crop It is a sort of husk, which has a high medicinal value and therefore exported abroad.

Source : Supplemental ESIMMS

(3) Mehsana District

The major crops grown in Mehsana District are given in Table 4.3.8.

Table 4.3.8 Major Crops Grown in Mehsana District

Name of the Crop	Scientific Name	Remarks
Bajri	*Pennisetum typhoidem*	Kharif crop
Wheat	*Triticum vulgare*	Rabi crop
Isabgul	*Plantago ovata*	Kharif crop
Tobacco	*Nicotiana tobacum*	Kharif crop
Cotton	*Gossypium herbaccum*	

Source : Supplemental ESIMMS

(4) Gandhinagar District

The proposed DFC alignment mainly passes through agricultural land in Gandhinagar District. Agriculture plays a prominent part in the economy of the district. The district has a total area of 67,600 ha, of which 48,800 ha are under cultivation. The agricultural land of Gandhinagar is irrigated by wells and tube-wells. The Sabarmati and Khari Rivers flow through this district but they are not utilized for irrigation purposes. The major crops grown in Gandhinagar District are given in Table 4.3.9.

Table 4.3.9 Major Crops grown in Gandhinagar District

Name of the Crop	Scientific Name	Remarks
Bajri	*Pennisetum typhoidem*	Kharif crop
Paddy	*Oryza sativa*	Kharif crop
Jowar	*Andropogau sorghum*	Rabi crop Mainly for fodder purpose
Cotton	*Gossypium herbaccum*	
Pulses		
Tur	*Cajanus indicus*	Kharif crop
Gram	*Cicer arietinum*	
Mag	*Phaseolus radiatus*	
Math	*Phaseolus acontifolius*	
Udid	*Phaseolus mungo*	
Val	*Lablab niger*	

Source : Supplemental ESIMMS

4.3.6 Education

(1) Banaskantha District

Literacy level: In the district, the overall literacy rate is 41.4% which is far below the state average of 69.1%. The male and female literacy rates of the district account for 53.9% and 28.1% respectively. The total number of literate in district is 1,037,619 out of which male literate population is 699,080 and female literate population is 338,539.

Education Facility: Table 4.3.10 shows the number of schools and institutes in Banaskantha district.

Table 4.3.10 Number of Educational Institutions in Banaskantha District

SN	Type of Educational Institute	Total Number
1.	Primary Schools	1983
2.	Secondary Schools	153
3.	Higher Secondary Schools	56
4.	Private Arts, Commerce, Science, B.Ed &Law Colleges	7
5.	Industrial Training Institutes (ITIs)	5
6.	Cottage Industries Training Institutes	2
7.	Polytechnic College	1

Source: Industries Commissionerate Government of Gujarat

(2) Patan District

Literacy Level: In the district, the overall literacy rate is 50.7% which is far below the state average of 69.1%. The male and female literacy rates of the district account for 61.4% and 39.2% respectively. The total number of literate in district is 599,082 out of which male literate population is 375,588 and female literate population is 223,494.

Education Facility: Table 4.3.11 shows the number of schools and institutes in Patan district.

Table 4.3.11 Number of Educational Institutions in Patan District

SN	Type of Educational Institute	Total Number
1.	Primary Schools	786
2.	Secondary Schools	171
3.	Higher Secondary Schools	
4.	Industrial Training Institutes (ITIs)	8
5.	Polytechnic College	1
6.	Pharmacy College	1
7.	MCA College	1
8.	Engineering College	1
9.	Management College	1
10.	Private Arts, Commerce, Science, B.Ed &Law Colleges	15

Source: Industries Commissionerate Government of Gujarat

(3) Mehsana District

Literacy Level: In the district, the overall literacy rate is 64.7%. The male and female literacy rates of the district account for 73.2% and 55.4% respectively. The total number of literate in district is 1,188,224 out of which male literate population is 698,626 and female literate population is 489,598.

Education Facility: Table 4.3.12 shows the number of schools and institutes in Mehsana district.

Table 4.3.12 Number of Educational Institutions in Mehsana District

SN	Type of Educational Institute	Total Number
1.	Primary Schools	1160
2.	Secondary Schools	40
3.	Higher Secondary Schools	17
4.	Industrial Training Institutes (ITIs)	8
5.	Polytechnic Colleges	4
6.	Pharmacy Colleges	8
7.	Engineering Colleges	4
8.	Medical Colleges	3
9.	Management Colleges	4
10.	Private Arts, Commerce, Science, B.Ed &Law College	18

Source: Industries Commissionerate Government of Gujarat

(4) Gandhinagar District

Literacy Level: In the district, the overall literacy rate is 65.9%. The male and female literacy rates of the district account for 74.9% and 56.1% respectively. The total number of literate in district is 879,834 out of which male literate population is 522,575 and female literate population is 357,259.

Education Facility: Table 4.3.13 shows the number of schools and institutes in Gandhinagar district.

Table 4.3.13 Number of Educational Institutions in Gandhinagar District

SN	Type of Educational Institute	Total Number
1.	Primary Schools	608
2.	Secondary Schools	247
3.	Higher Secondary Schools	
4.	Industrial Training Institutes (ITIs)	9
5.	Polytechnic Colleges	2
6.	Pharmacy Colleges	10
7.	Engineering Colleges	6
8.	MCA Colleges	5
9.	Medical (Dental) Colleges	2
10.	Management Colleges	7
11.	Private Arts, Commerce, Science, B.Ed &Law College	9

Source: Industries Commissionerate Government of Gujarat

4.3.7 Historical and Cultural Heritage

There are 28 World Heritage Sites in India, out of which 23 are Cultural Sites and 5 are Natural Sites. All sites are outside of the ESIA study area in the Wamaj - Iqbalgarh section.

All important ancient and historical monuments and archaeological sites and remains are protected under the Ancient and Historical Monuments and Archaeological Sites and Remains (Declaration of National Importance) Act, 1951 (No LXXI of 1951). There are 22 properties of national importance in districts covered by the ESIA overall. Out of these, 5 are located within project affected Taluk/Tahsil (See Table 4.3.14) though they are away from the proposed RoW.

Table 4.3.14 Archaeological Sites in the Study Area

No.	Name of Monument / Sites	Location	District
1.	Gate of Khan Sarover	Patan	Patan
2.	Rani Vav	Patan	Patan
3.	Shaikh Farid Dargah	Patan	Patan
4.	Jami Masjid	Sidhhpur	Patan
5.	Ruins of Rudra Mahalaya	Sidhhpur	Patan

Source: The Archaeological Survey of India (ASI)

CHAPTER 5 SCOPING RESULTS

As per the current regulations of Government of India, railway projects do not require EIA studies or Environmental Clearance from the MOEF. Clause 11 of The Railways Act 1989 empowered the Railways to carry out any kind of construction anywhere without any restriction. As per the notification of the MOEF dated 27th January 1994, amendment dated 4th May 1994 and new notification dated 14th September 2006, expansion or modernization of any activity shall not be undertaken in any part of India, unless it has been accorded environmental clearance for the projects enlisted under schedule of the Act. Under this schedule, railway is not included. However, considering the magnitude of activities envisaged as part of the proposed DFC an ESIA study has been conducted to mitigate potential negative environmental and social impacts by the project.

The process of ESIA constitutes a systematic approach to the evaluation of a project in the context of the natural, regulatory and environment of the area in which a development project is proposed. Soon after the commencement of the planning and design process, based on desk studies, reconnaissance surveys and experience of earlier projects, a detailed methodology and schedule is prepared for the effective and timely execution of the ESIA. The next step in the ESIA is to define the proposed project activities and the natural, regulatory (i.e. legal) and environment of the area in which the proposed development will occur. This is achieved through Scoping, a process identifying which activities have the potential to impact the environment. Scoping is carried out at an early stage in the ESIA process to focus on the priority issues (i.e. those that have the greatest potential to affect the natural and/or environment) to be considered in the rest of the ESIA process.

5.1 Environmental Scoping for the ESIA Study

The purpose of scoping is to identify the potential environmental and social impacts caused by the project based on available secondary data and information, and preliminary site reconnaissance. This serves to prioritise subjects to be studied further in the Environmental and Social Considerations (ESC) study. The potential impacts on the environment and social aspects during planning, construction and operation phases are identified by using an environmental scoping matrix and checklist. At first, draft scoping is carried out, and its result is finalized through Public Consultation Meetings (PCMs) conducted as part of the ESIA study.

5.1.1 Environmental Scoping for the ESIA Study

The environmental scoping matrix for the Wamaj to Iqbalgarh section is presented in Table 5.1.1.

Table 5.1.1 Environmental Scoping Matrix for the Project (Wamaj to Iqbalgarh Section)

	No.	Likely Impacts	Overall Rating	Project Phase		
				Planning / Design Phase	Construction Phase	Operation Phase
Social Environment*	1	Involuntary resettlement	A-	A-	-	-
	2	Local economy such as employment and livelihood	A-/A+	A-	B+/B-	A+
	3	(Surrounding) Land use and utilization of local resources	C-	-	-	C-
	4	Social institutions (including regional severance)	B-	-	B-	B-
	5	Social infrastructures and services	B-	B-	B-	C-
	6	Socially vulnerable groups such as the poor, indigenous and ethnic people	C-	C-	C-	C-
	7	Inequitable or unfair distribution of benefit and damage	C-	C-	C-	C-
	8	Local conflict of interests	C-	C-	C-	C-
	9	Water usage or water rights and rights of common	B-	-	B-	B-
	10	Historical and cultural heritage (including religious matters)	B-	B-	B-	B-
	11	Sanitation	B-	-	B-	-
	12	Hazardous (risk) infectious diseases such as HIV/AIDS	B-	-	B-	-
	13	Occupational Health and Safety (OHS)	B-	-	B-	-
	14	Accident and Public Safety	B+/B-	-	B-	B+/B-
Natural Environment	15	Topography and geographical features	-	-	-	-
	16	Soil erosion	B-	-	B-	-
	17	Coastal zone	-	-	-	-
	18	Hydrological situation	-	-	-	-
	19	Groundwater	-	-	-	-
	20	Meteorology	-	-	-	-
	21	Flora, fauna and biodiversity	B-	-	B-	B-
	22	Landscape	-	-	-	-
	23	Disaster	B-	-	-	B-
	24	Global warming	B+	-	-	B+
Pollution	25	Air pollution	B-/B+	-	B-	B+
	26	Water pollution	B-	-	B-	B-
	27	Soil contamination	-	-	-	-
	28	Noise and vibration	A-	-	B-	A-
	29	Ground subsidence	-	-	-	-
	30	Offensive odor	-	-	-	-
	31	Bottom sediment	-	-	-	-
	32	Waste	B-	-	B-	-

Note: * Regarding the impacts on "Gender" and "Children's Right", might be related to all criteria of Social Environment.

<Rating>

A-: Serious impact is expected, if any measure is not implemented to the impact.

B-: Some impact is expected, if any measure is not implemented to the impact.

C-: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses.)

-: No impact is expected. Therefore, EIA is not required.

A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.

B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.

Overall rating: Highest rate will be the overall rating among the rating of relevant project-related activities for negative and positive ratings, respectively. (e.g. Even only one "A-" is included in an environmental item, overall rating of the environmental item becomes "A-".)

Reference: Japan Transport Cooperation Association (JTCA) and Japan Railway Technical Service (JARTS) (1996) "Manual for Environmental Considerations in International Cooperation for Transportation Technology (Railway Project) (provisional translation)", Tokyo, Japan.

The rating of water usage or water rights and rights of common was evaluated as no impact in the scoping report, and impacts on water supply was considered to be discussed as part of social infrastructures and services. However, since issues of impacts on local water supply systems and irrigation systems by the project were raised during the PCMs for environmental scoping, these issues are also discussed in water usage or water rights and rights of common. Therefore, rating of these items was changed to "B".

5.1.2 Environmental Scoping Checklist

The environmental scoping checklist for the Wamaj to Iqbalgarh section of the Western Corridor of the DFC was prepared during the scoping stage as described in Table 5.1.2. It was presented and discussed at the first round of PCMs.

Table 5.1.2 Environmental Scoping Checklist for the Project (Wamaj to Iqbalgarh Section)

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
Social Environment*					
1	Involuntary Resettlement	A-	-	-	**Planning/ Design Phase** *<Land acquisition>* Most of the proposed alignment in the section is parallel to the existing railway as well as within the designated land of MOR in order to minimize involuntary resettlement. However, since some land acquisition of private land is still necessary, a certain degree of involuntary resettlement including squatters and encroachers is inevitable. In addition, governmental/public facilities such as railway offices, and governmental quarters will be acquired in some sections (i.e. Sidhpur, Unjha, Mehsana, Palanpur and Jethi) according to the current design.
2	Local economy such as employment and livelihood	A-	B-/ B+	A+	**Planning/ Design Phase** *<Land acquisition>* There are some sections passing through agricultural land. Acquisition of the agricultural land would affect the livelihoods of farmers whose farmland will be acquired. In addition, there is a possibility that income of those who do not depend on land such as vendors would be also affected by land acquisition.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Overall construction activities together with traffic restrictions would disturb local economic activities to some extent. On the other hand, it is also expected that local business opportunities would be temporarily improved by the construction activities and the presence of construction workers.
					Operation Phase *<Operation of trains>* During the operation phase of the DFC, the regional economy particularly industrial sectors in major industrial locations are expected to be improved due to smooth freight transportation. Besides, employment and business opportunities would also be improved by the DFC operation.
3	(Surrounding) Land use and utilization of local resources	-	-	C-	**Operation Phase** *<Change of land use>* Land use could be changed as a result of development along the proposed alignment and around new stations unless the land use is property planned by the local government.

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
4	Social institutions (including regional severance)	-	B-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* During construction, if access to the rest of the community is disturbed, social institutions could be disturbed. People's movements may be restricted and they may face inconveniences (eg. visiting temples in Sidhhpur and Palanpur) traveling across the proposed alignment.
					Operation Phase *<Appearance of the tracks and related facilities>* Accessibility and connection with communities would be affected due to the new freight tracks and other related facilities.
5	Social infrastructures and services	B-	B-	C-	**Planning/ Design Phase** *<Land acquisition>* Land acquisition involving the relocation of public and/or community facilities would affect local communities to some extent. In addition, there is a possibility that the project will require the relocation of station facilities such as station buildings and platforms.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Construction works and traffic restriction could disturb access to existing social infrastructure and services.
					Operation Phase *<Appearance of the tracks and related facilities>* Unless affected existing social infrastructure is replaced in a proper manner, nearby residents' access to existing social infrastructure would be affected.
6	Socially vulnerable groups such as poor, indigenous and ethnic people	C-	C-	C-	**Planning/ Design Phase** *<Land acquisition>* There is a possibility that the proposed alignment passes through areas where socially vulnerable groups live, which will be examined further in the course of RRP preparation.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Construction works, traffic restriction and design layout of proposed DFC plan (construction in front of station, track passing through or near residential or market area etc.) could cause inconveniences to disabled people, children, and women in the construction areas.
					Operation Phase *<Appearance of the tracks and related facilities>* The project could cause inconveniences for the physically disabled in the detour areas.
7	Inequitable or unfair distribution of benefit and damage	C-	C-	C-	**Planning/Design, Construction, Operation Phases** *<Land acquisition>* *<Construction works>* *<Operation of trains>* Inequality among the stakeholders might be expected, since some would receive a benefit from the project and others would be affected negatively by the project

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
8	Local conflict of interests	C-	C-	C-	**Planning /Design Phase, Construction Phase, Operations Phase** *<Land acquisition, etc.>* The project implementation might cause conflict between beneficiaries and PAPs at all phases (i.e. land acquisition at planning phase, inconvenience during constriction, reducing land price at operation phase due to the alignment passing, etc.) without adequate RRP and public consultation measures.
9	Water usage or water rights and rights of common	-	B-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Some of the overhead water tanks such as Sidhpur and Pallanpur will have to be dismantled in affected railway stations. These will create water deficiencies during the construction period until they are re-constructed in nearby areas. There would be inconveniences to the railway station water users. In some areas, construction of the proposed alignment may temporarily restrict accessibility to local water sources for domestic use and irrigation.
					Operations Phase *<Appearance of the tracks and related facilities>* In some areas, the proposed alignment may restrict the accessibility of water sources for domestic use and irrigation unless appropriate measures are provided for.
10	Historical and cultural heritage (including religious matters)	B-	B-	B-	**Planning/Design Phase** *<Land acquisition>* There is a possibility that the proposed alignment will require some land in religious places such as temples.
					Construction Phase *<Operation of construction equipment and vehicles >* *<Traffic restriction in construction area>* Religious places which usually require silence might be affected by noise and vibration from operation of construction equipments and vehicles in some areas such as Sidhhpur, Palanpur, and Unjha. In addition, access to religious places might be disturbed by construction works and traffic restriction.
					Operation Phase *<Operation of trains>* Religious places near the DFC proposed alignment and relevant facilities might be affected by noise and vibration due to operation of the trains.
11	Sanitation	-	B-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Sanitary issues such as hygiene, health and environmental sanitation in and around labor camps and construction areas may exist where sanitary facilities are not adequately installed such as toilets and septic tanks.
					Operation Phase No impact is expected.
12	Hazardous (risk) infectious diseases such as HIV/AIDS	-	B-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Risk of spreading infectious diseases due to the inflow of construction workers.

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
					Operation Phase No impact is expected.
13	Occupational health and safety (OHS)	-	B-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Minor negative impacts on occupational safety could be expected during construction; however, it will be secured in accordance with the domestic laws and regulations during construction.
					Operation Phase No impact is expected.
14	Accident and public safety	-	B-	B+/ B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Operation of construction equipment and vehicles>* Increased risk of accidents is expected due to the operation of heavy equipment and heavy vehicles during the construction.
					Operation Stage *<Operation of trains>* Increased risk of accidents is expected due to the trains. On the other hand, in the long run, with the change of transport mode from freight trucks to the railway system, a reduction of accidents would be expected as the tracks will be fenced off from both sides.
Natural Environment					
15	Topography and geographical features	-	-	-	**Planning/Design** No impact is expected.
					Construction Phase *<Alteration to ground by cut land, filling, drilling, etc.>* Since elevated embankments of the railway tracks will mainly be constructed along the existing road/track in most of the sections, the expected impact on topography and geographical features is negligible or small.
					Operation Stage No impact is expected.
16	Soil erosion	-	B-	-	**Planning /Design Phase** No impact is expected.
					Construction Phase *<Alteration to ground by cut land, filling, drilling, etc.>* Construction works along the river/channel in some sections could cause soil erosion.
					Operation Phase No impact is expected.
17	Coastal zone	-	-	-	Not applicable
18	Hydrological situation	-	-	-	The project will have no impacts on the hydrological cycle or regimes
19	Groundwater	-	-	-	The project will not have any impacts on groundwater.
20	Meteorology	-	-	-	The project will not have any impact on meteorological conditions.

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
21	Flora, fauna and biodiversity	-	B-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Land clearing / tree cutting>* Existing trees and plants on the ROW and work sites would be removed temporarily or permanently for construction. The proposed DFC alignment passes through the Balaram Ambaji Wildlife Sanctuary in parallel to the existing railway.
					Operational Phase *< Appearance / occupancy of track and related facilities, Operation of trains>* The proposed DFC alignment passes the areas of Balaram Ambaji Wildlife Sanctuary in parallel to the existing railway. Birds and animal movements in those areas are likely affected by the embankment and movement of trains.
22	Landscape	-	-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase No impact is expected.
					Operational Phase *<Appearance / occupancy of track and related facilities>* Appearance of the proposed DFC alignment and related facilities would change the landscape. However, since there is no significant landscape to be considered along the proposed DFC alignment and most alignment is parallel to the existing track the impact on landscape would be negligible or small.
23	Disaster	-	-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase No impact is expected.
					Operation Phase *<Appearance of track and related facilities>* The embankment structure could trap rain water and may lead to water logging around the project area.
24	Global warming	-	-	B+	**Planning/Design Phase** No Impact is expected.
					Construction Phase *< Land clearing / tree cutting>* Cutting of existing trees and plants alongside the ROW of the railway will reduce CO_2 sequestration. However, since trees will be replanted, the impacts could be negligible or small or even positive depending on the rate of replacement.
					Operation Phase *<Operation of trains>* The change of transport mode from fossil fuel used automobile to electrified railway system, significant reduction of emissions of greenhouse gas such as CO_2 will be expected per unit transport distance per person.

No.	Likely Impacts	Rating			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
Pollution					
25	Air pollution	-	B-	B+	**Planning/Design Phase** No Impact is expected. **Construction Phase** *<Operation of construction equipment and vehicles>* Emission of exhaust gases from construction equipment and vehicles and dust pollution due to construction works will cause air pollution in and around the construction sites. **Operation Phase** *<Operation of trains>* A reduction of emissions from vehicles would be expected overall due to the reduction of traffic congestion and traffic volume by changing freight transportation mode from truck to the proposed railway system.
26	Water pollution	-	B-	B-	**Planning/Design Phase** No impact is expected. **Construction Phase** *<Alteration to ground by cut land, filling, drilling, tunnel, etc.>* Muddy water from construction sites and oil spill from construction equipment and vehicles could cause water pollution in the channel/river in and around the construction sites. **Operation Phase** *<Operation of trains>* Oil-content wastewater and domestic wastewater from trains and stations could affect water bodies nearby in the cases of direct discharge without pre- treatment or without connection to the sewerage system.
27	Soil contamination	-	-	-	The project does not have any significant factor which may cause soil contamination.
28	Noise and vibration	-	B-	A-	**Planning/Design Phase** No impact is expected. **Construction Phase** *<Operation of construction equipment and vehicles>* Noise and vibration caused by operation of construction vehicles/equipment could annoy the residents and school/hospital nearby. Vibration caused by such construction works may damage the houses and other kinds of building structures such as cracks in the wall/foundation of old buildings/structures. **Operation Phase** *<Operation of trains>* Operation of the trains would cause noise along the railway track. Religious, educational and health places near the freight railway and relevant facilities may be particularly sensitive to the noise and vibration of the freight trains.
29	Ground subsidence	-	-	-	The project will not have any impacts in terms of ground subsidence.
30	Offensive odor	-	-	-	The project will not have any impacts in terms of offensive odors.
31	Bottom sediment	-	-	-	The project will not have any impacts on bottom sediment.
32	Waste	-	B-	-	**Planning/Design Phase** No impact is expected. **Construction Phase** *<Alteration to ground by cut land, filling, drilling, etc.>* Residue soil due to earth works/domestic waste from labor camps areas etc. would be generated. **Operation Phase** No impact is expected.

Note: * Regarding the impacts on "Gender" and "Children's Right", might be related to all criteria of Social Environment.
<Rating>
A-: Serious impact is expected, if any measure is not implemented to the impact.
B-: Some impact is expected, if any measure is not implemented to the impact.
C-: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses.)
-: No impact is expected. Therefore, ESIA is not required.
A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.
B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.
Overall rating: Highest rate will be the overall rating among the rating of relevant project-related activities for negative and positive ratings, respectively. (e.g. Even only one "A-" is included in an environmental item, overall rating of the environmental item becomes "A-".)
<Project phase> P: Planning and design phase, C: Construction phase, O: Operation phase
Reference: Japan Transport Cooperation Association (JTCA) and Japan Railway Technical Service (JARTS) (1996) "Manual for Environmental Considerations in International Cooperation for Transportation Technology (Railway Project) (provisional translation)", Tokyo, Japan.

5.2 Study Items in ESIA

On a basis of the Scoping result, the following impacts were examined further in the ESIA Study.

Pollution control:
(1) Air pollution, (2) Water pollution, (3) Noise and vibration, and (4) Waste

Natural environment:
(1) Soil erosion, (2) Flora, fauna and biodiversity, (3) Disaster, and (4) Global warming

Social environment:
(1) Involuntary Resettlement including social impacts due to land acquisition without resettlement, (2) Local economy such as employment and livelihood, (3) (Surrounding) land use and utilization of local resources, (4) Social institutions (including regional severance), (5) Social infrastructure and services, (6) Socially vulnerable groups, (7) Inequitable or unfair distribution of benefit and damage, (8) Local conflict of interests (9) Historical and cultural heritage, (10) Sanitation, (11) Hazardous (risk) infectious diseases such as HIV/AIDS, (12) Occupational health and safety (OHS), and (13) Accident and public safety.

5.3 Public Consultation Meeting

Public Consultation Meeting (PCM) primarily aims at providing a platform for the PAPs and other stakeholders to express their views on the possible impacts of the proposed intervention.

(1) Objectives

The PCMs were conducted during the project planning stage to gather comments, feedback and opinions of the public with regard to anticipated environmental and social impacts of the project and the mitigation measures recommended to be included for project implementation. The key objectives are:

- Dissemination of information to a wide range of stakeholders including PAPs in respect to the alignment, schedules, plans, environmental and social impacts/benefits,

and proposed mitigation measures of the DFC project for feedback and general consensus building.

- To offer opportunities to stakeholders to voice their concerns on the project during the planning stage so that their concerns could be addressed in appropriate mitigation measures to be included in the project design.
- To obtain public opinions and feedback to the planning process of the project.

(2) Scope

The PCMs for the ESIA were carried out at two different stages in order to collect opinions and feedback of the public and to disseminate information on the project and ESIA study.

- The first stage of the PCMs for ESIA was conducted at the time of environmental scoping. Information on the project and scope of the ESIA study was disseminated to the public, and comments and opinions were collected to incorporate in the ESIA study.
- The second stage of the PCMs for ESIA was conducted at the time of the preparation of the draft ESIA report. Information about findings of the ESIA study and proposed mitigation measures were disseminated to the general public that are directly or indirectly affected by the project and to obtain their feedback and opinions. Stakeholder comments and opinions were integrated in the final ESIA report especially for the environment and social mitigation measures and ESMP and ESMoP.
- Another round of PCMs were conducted for RRP to gather views and suggestions from the PAPs on the draft RRP Report and to take appropriate actions.

5.4 Information Dissemination

The ESIA study findings were/will be disseminated to the PAPs, other stakeholders and the implementation authorities so that preventative measures can be taken for the successful completion of the project.

(1) Objective

The full report and summary report of the draft ESIA and final ESIA were/will be distributed to relevant stakeholders for further public consultation.

(2) Scope

Information disclosure was/will be implemented at two stages for the ESIA.

- The first stage of information dissemination was conducted when the draft ESIA was prepared. The draft ESIA report in English was delivered and placed at each DFCCIL office, major existing railway stations and district authorities along the proposed alignment. Additionally, the summary of the draft ESIA was prepared in local language, i.e. Gujarati and was delivered to all the project affected villages along the proposed alignment.
- The second stage of information dissemination will be implemented when the ESIA is finalized. The final ESIA in English will be delivered and placed at each DFCCIL office, major existing railway stations and district authorities along the proposed DFC alignment. Additionally, the summary of the final ESIA will be prepared in

local language, i.e. Gujarati and will be delivered to all the project affected villages the proposed alignment.

Further information dissemination relating to the RRP shall be separately conducted at two stages, namely when the draft RRP and the final RRP are prepared.

CHAPTER 6 POLLUTION CONTROL STUDY

6.1 NOISE

6.1.1 Study Methodology

(1) Survey on Railway Noise Regulations

The published literature, governmental documents, and existing regulations related to the noise pollution in India and those in Japan were reviewed to consider potential impacts and for the purpose of identifying appropriate mitigation measures.

(2) Survey on Railway and Background Noise Levels

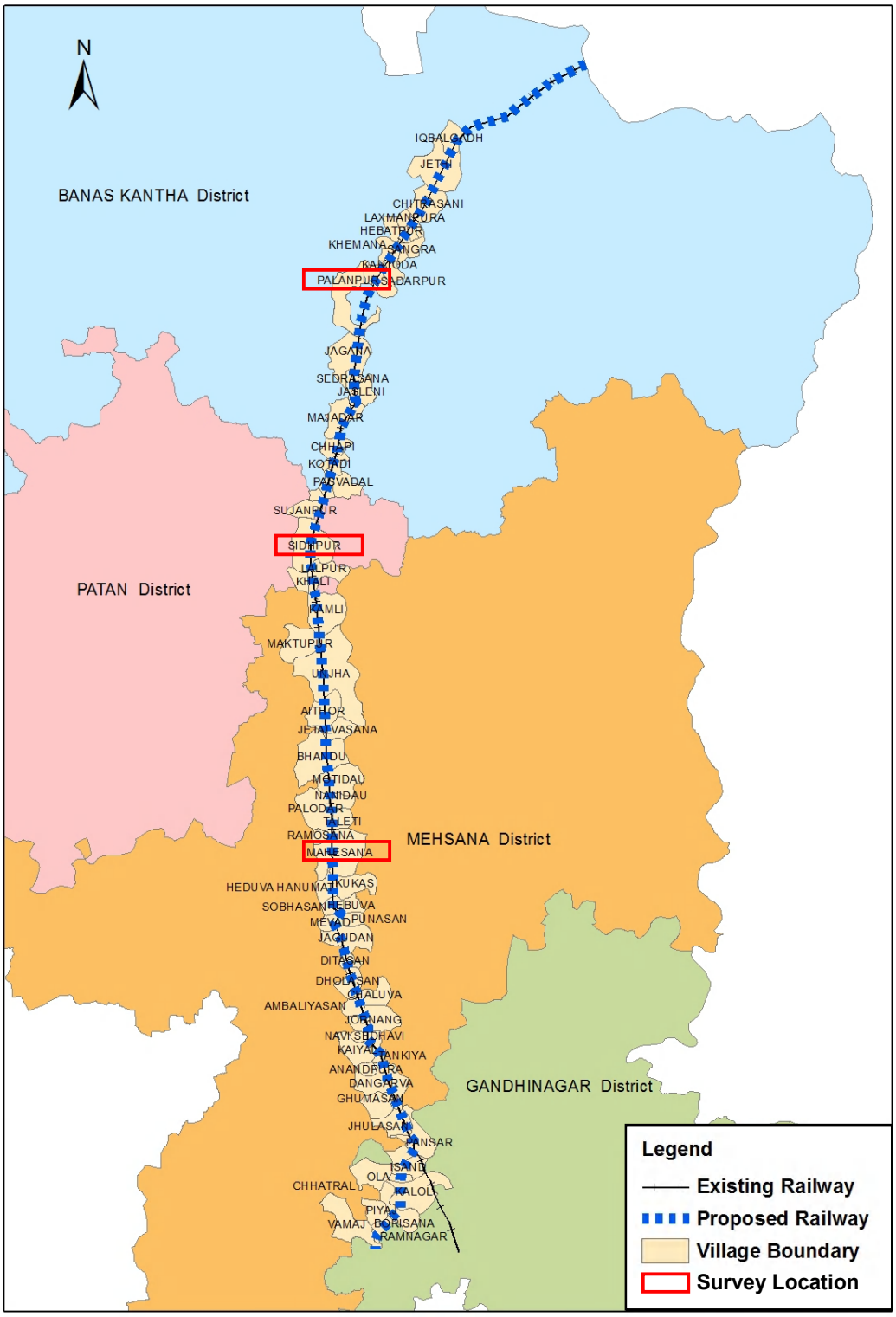
1) Measurement Sites

Noise generated by the DFC in addition to the existing railway may significantly impact facilities which require a quiet environment such as schools, hospitals, temples and residential areas during the operation phase. Therefore, in consideration of land use, relatively nearby and densely populated areas were selected as noise level measurement locations. They are Palanpur, Sidhhpur, and Mehsana stations. Measurements were taken at a height of 1.2 m above the ground. These measurement sites are shown in Table 6.1.1, Figure 6.1.1 and Figure 6.1.2.

Table 6.1.1 Details of Noise Measurement Sites

Survey Point	№	Location		Numbers of measurement point	Reason of choose
		Latitude	Longitude		
Palanpur	1	N24 10.836	E72 25.929	2（12.5m,20.0m）	Residential area
	2	N24 10.015	E72 25.724	2（12.5m,25.0m）	Residential area, near school
Sidhpur	1	N23 55.664	E72 22.123	2（12.5m,25.0m）	Residential area
	2	N23 54.750	E72 22.069	2（12.5m,20.0m）	Residential area, near temple
Mehsana	1	N23 37.097	E72 23.367	2（12.5m,25.0m）	Residential area
	2	N23 35.730	E72 23.332	2（12.5m,25.0m）	Residential area, near temple

Note: ( ) indicates the distance from centre of existing railway line.
Source: NKC



Source: NKC

Figure 6.1.1 Survey Location of Noise and Vibration Measurement

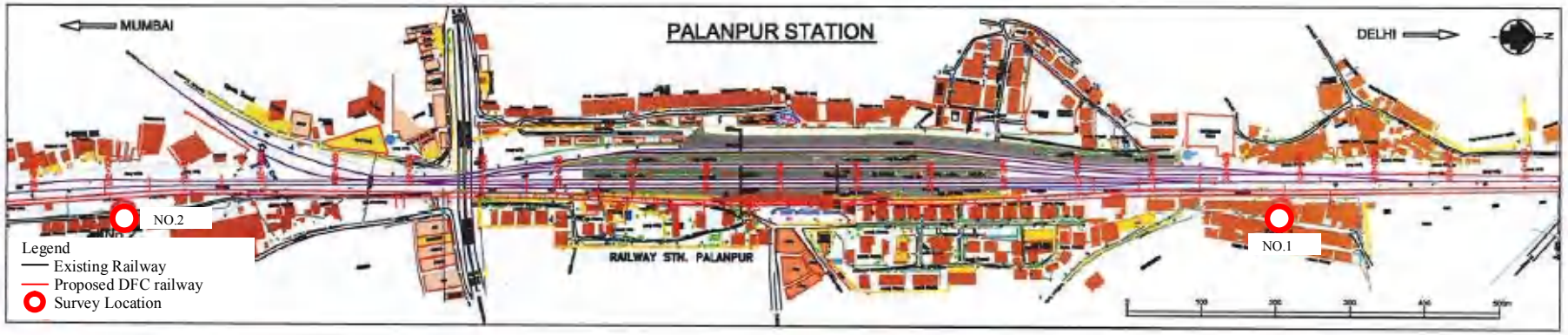


Figure 6.1.2(1) Location of Noise Measurement Sites in Palanpur

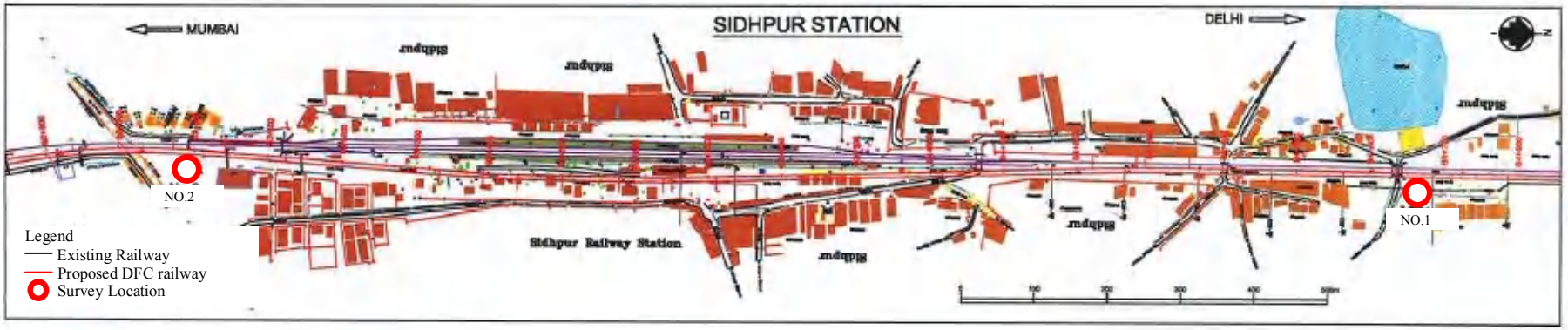


Figure 6.1.2(2) Location of Noise Measurement Sites in Sidhpur

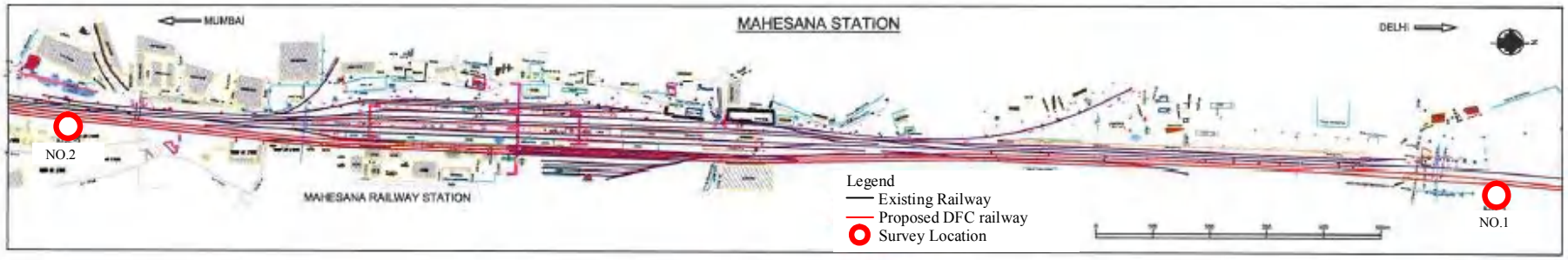


Figure 6.1.2(3) Location of Noise Measurement Sites in Mehsana

Source: NKC

2) Measurement Method

Since there is no relevant standard method for measuring railway noise in India, noise measurements are generally conducted following International Standards. Therefore the Japanese standard of noise measurement, JIS Z 8731 (Method of Measurement of Noise Level) which is accepted by the International Organization for Standardization (ISO) was used. The measurement machines generally used in Japan were utilized for this study.

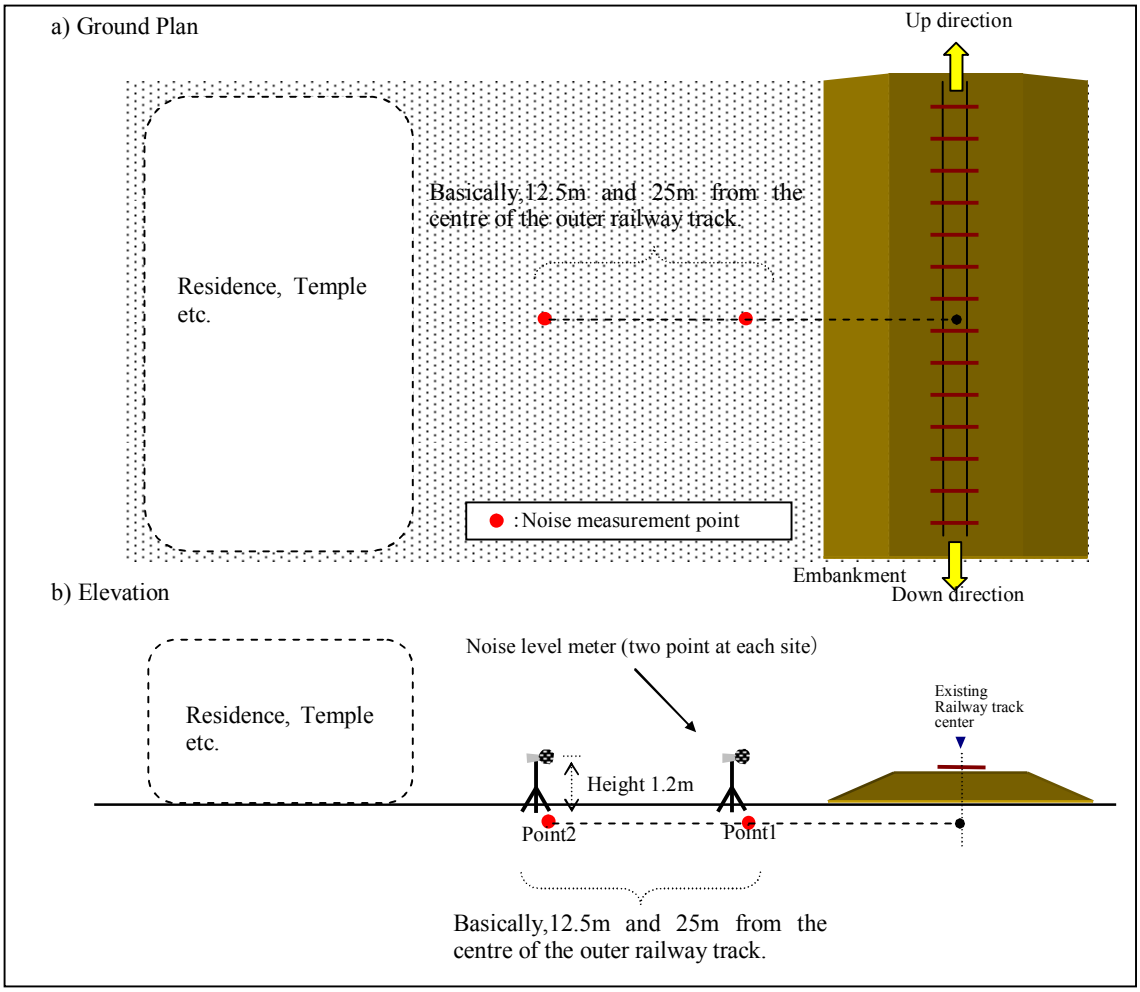
Considering the distribution of facilities and noise impact on sensitive receptors such as schools, hospitals, temples and residences, two measurement sites were selected in each location. Background noise was also measured at the same sites during the time when trains did not pass through. The measuring method is shown in Table 6.1.2.

Table 6.1.2 Measurement Method of Railway and Background Noise Levels

Item	Specifications
Noise Level Meter	Noise Level Meter which complies with "JIS C 1509-1: 2005 Electro acoustics-Sound Level Meters- Part1: Specifications" (RION NL-21)
Measurement Points	Select two points at each site. 12.5 m and 25 m from the centre of the outer railway track. The height is 1.2 m above the ground.
Measurement Items	**Railway noise** L_{AE} (sound exposure level), L_{Amax} (maximum sound level), 1/3 octave frequency analysis (1/3 octave band center frequency : 20-8,000Hz) **Background noise** L_{Aeq} (equivalent continuous A-weighted sound pressure level)
Frequency Weighting Characteristics	A
Time Weighting Characteristics	Slow
Measurement Period	2011.8.30 - 2011.9.6
Measurement Time	**Railway noise** : 10:00-17:00 **Background noise** : 10 minutes within each term (10:00-12:00, 12:00-14:00, 14:00-16:00, 16:00-18:00)
Other Data	Date and time, location, train types (freight/passenger) & load (container/bulk), number of train cars, train length, passage time, train speed, pictures, information on surrounding environment, etc.

Source: NKC

Measurement instruments were installed as shown in Figure 6.1.3.



Source: NKC

Figure 6.1.3 Schematic Layout of Railway and Background Noise Levels Measurement Equipment

(3) Survey of Sensitive Receptor and Landuse

1) Definition of Sensitive Receptor

According to past railway noise surveys in Japan, influence by railway noise to the facilities is expected as below.

- The areas affected by railway noise are considered to be within 100 m of horizontal distance from the centre of the nearest railway track.
- With the distance from the railway track, the railway noise measurement without influence from the other source becomes difficult in most cases due to increase of ratio of the other noise (background noise) such as traffic noises.

Sensitive Receptors (SRs) which are particularly vulnerable to the impacts of noise are defined in Ambient Noise Standards in India. They are school, hospital, and temple which require silent circumstances. The area within 100 m from those facilities is defined as Silence Zone as well where strict limits of noise level (Daytime: 50 dB, Night: 40 dB) are applied as the standards. In this survey, facilities where require silent and less vibration circumstance such as school, hospital, temple and residence were defined as SRs and the distribution of SRs alongside the railway tracks was identified.

2) Methodology

Survey was conducted within the range of approximately 100 m from the centre of the nearest railway track on one side (about 200 m at both sides) and SRs were listed up though filed reconnaissance. The SRs that falls in the alignment and within 100 m of ROW were recorded. For identification of SRs, GPSs were utilized. Photographs of SRs and land use category were also collected.

The land use pattern and the central line position were also confirmed through ground truth for mapping of various features. This survey has helped in collecting the geographical coordinates of the villages falling on the alignment and there special features such as agricultural land and settlement.

6.1.2 Survey Results

(1) Noise Regulations and Standards

1) Regulations and Standards of Railway Noise in India

Regulations, standards or guidelines for railway noise are not yet established in India. On the other hand, the ambient noise standards in India are defined in the Noise Pollution (Regulation and Control) Rules 2000 as shown in Table 6.1.3.

Table 6.1.3 Ambient Noise Level Standards in India

Area Code	Category of Area Zone	Limits in dB (L_{Aeq})	
		Daytime (6:00 – 22:00)	Night (22:00 - 6:00)
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

Note: Silence zone is defined as an area comprising not less than 100 meters around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.
Source: The Noise Pollution (Regulation and Control) Rules, 2000

2) Regulations and Standards of Railway Noise in Japan

In Japan, standards for railway noise levels are established for 'Shinkansen', a superexpress railway (also known as "bullet train"), and railway. For Shinkansen, in accordance with the land use categories (Category I: residential area, Category II: industrial area), different noise level standards are defined as shown in Table 6.1.4.

Table 6.1.4 Environmental Quality Standards for Shinkansen Superexpress Railway Noise

Category of Area	Standard Value (dB (A))
I	70 or less
II	75 or less

Note: Area category I refer to areas used mainly for residential purpose and area category II refers to other areas, including commercial and industrial areas, where the normal living conditions shall be preserved.
Source: Environmental Agency of Japan, July.1975

For conventional railways, the recommended standard level of railway noise has been proposed in the Guidelines for Countermeasures for Railway Noise in Case of New Constructions and Large-scale Improvement of Existing Railways, by the

Environmental Agency of Japan, December 1995 as shown in Table 6.1.5.

Table 6.1.5 Recommended Standard Level of Railway Noise in Japan

Case	Recommended Standard Noise Level
New Construction of Railway	Daytime (7:00 - 22:00): 60 dB (L_{Aeq}) or less Night time (22:00 - 7:00): 55 dB (L_{Aeq}) or less
	Minimize the railway noise in the residential areas as much as possible
Large-Scale Improvement of Existing Railway	Reduce the railway noise level to less than before the construction

Note: Railway other than Shinkansen Express Railway (bullet train)
Source: Guidelines for Countermeasures for Railway Noise in Case of New Constructions and Large-scale Improvement of Existing Railways, Environmental Agency of Japan, Dec.1995

(2) Results of Field Survey on Railway and Background Noise

1) Background Noise Level

Measurement results of background noise level (L_{Aeq}) at each site are shown in Table 6.2.6. The background noise level was measured once in each four different time zones during a day, namely 10:00-12:00, 12:00-14:00, 14:00-16:00, and 16:00-18:00 when trains did not pass through. The noise level at all the sites except Mehsana No.2 is within the limits of daytime ambient standard for residential areas in India. In Mehsana No.2, a religious festival (Ganesha festival) was performed in the residential area of the neighbourhood from around 14:00 to 16:00 on the investigation day and the area was affected by the sound from the festival at that time.

Table 6.1.6 Results of Background Noise Measurement

Unit: dB(A)

Location		Background Noise Level L_{Aeq}					Indian Ambient Noise Level Standard Day time/Night time	
	No.	10:00-12:00	12:00-14:00	14:00-16:00	16:00-18:00	Overall 10:00-18:00	Residential Area	Silence Zone
Palanpur	1	52	50	51	51	51	55/45	50/40
	2	50	49	53	52	51		
Sidhpur	1	53	52	55	53	53		
	2	55	53	51	54	54		
Mehsana	1	52	55	52	52	53		
	2	55	53	58	54	56		

Note: Day time of Indian Ambient Noise Level standards: 6:00-22:00
Night time of Indian Ambient Noise Level standards: 22:00-6:00
Source: NKC

2) Railway Noise Level (L_{AE} and L_{Amax}) from the Existing Railway

The results of railway noise level measurements mean values of L_{AE} and L_{Amax} at each site are summarized in Table 6.1.7. The results also indicate L_{AE} and L_{Amax} of different train type and direction of the trains, such as up and down directions. At the nearest measurement point from the railway, the range of 75 to 96 dB as L_{Amax} and the range of 86 to 105 dB as L_{AE} were measured. At that time, train's speed was approximately 20 to 50 km/hr at each measurement site.

Table 6.1.7 Results of Railway Noise Measurement in Parallel Section

Location		Date (2011)	Number of Trains	Train Type	Train Direction	Average Train Speed (km/h)	Average Train Length (m)	Distance from Railway Center (m)		Average Noise Level [dB(A)]			
										L_{AE}		L_{Amax}	
	No.							point 1	point 2	point 1	point 2	point 1	point 2
Palanpur	1	31 Aug	4	Passenger	Up	45	445	12.5	20	97	97	92	91
			4		Down	26	429			99	97	89	87
			2	Freight	Up	33	505			99	97	95	93
			1		Down	22	657			99	97	89	87
	2	30 Aug	3	Passenger	Up	32	438	12.5	25	98	96	88	85
			4		Down	55	423			96	94	90	87
			4	Freight	Up	15	477			99	96	81	77
			4		Down	25	667			94	92	81	78
Sidhpur	1	3 Sep	6	Passenger	Up	56	445	12.5	25	99	95	83	80
			7		Down	45	410			98	97	91	88
			2	Freight	Up	40	651			90	88	75	72
			3		Down	37	481			100	99	92	89
	2	2 Sep	3	Passenger	Up	43	460	12.5	20	98	97	89	86
			6		Down	28	375			94	93	84	82
			5	Freight	Up	24	518			100	99	88	87
			2		Down	31	547			105	103	96	93
Mehsana	1	5 Sep	4	Passenger	Up	84	456	12.5	25	100	98	95	94
			6		Down	54	378			97	94	90	85
			4	Freight	Up	52	588			96	89	78	71
			-		Down	-	-			-	-	-	-
	2	6 Sep	3	Passenger	Up	30	319	12.5	25	92	90	80	78
			5		Down	34	352			86	86	77	75
			-	Freight	Up	-	-			-	-	-	-
			-		Down	-	-			-	-	-	-

Note: "-" means that train didn't go through on the survey day.
Source: NKC

(3) Results of Field Survey on Sensitive Receptor

1) Sensitive Receptor (SR)

Sensitive receptors (SRs) located within 100 m from the center of the railway track were extracted. SRs in each state were given in Tables 6.1.8. As the results of this survey, 121 SRs in total have been identified. Further details of the result and photographs are referred to Appendix 5.

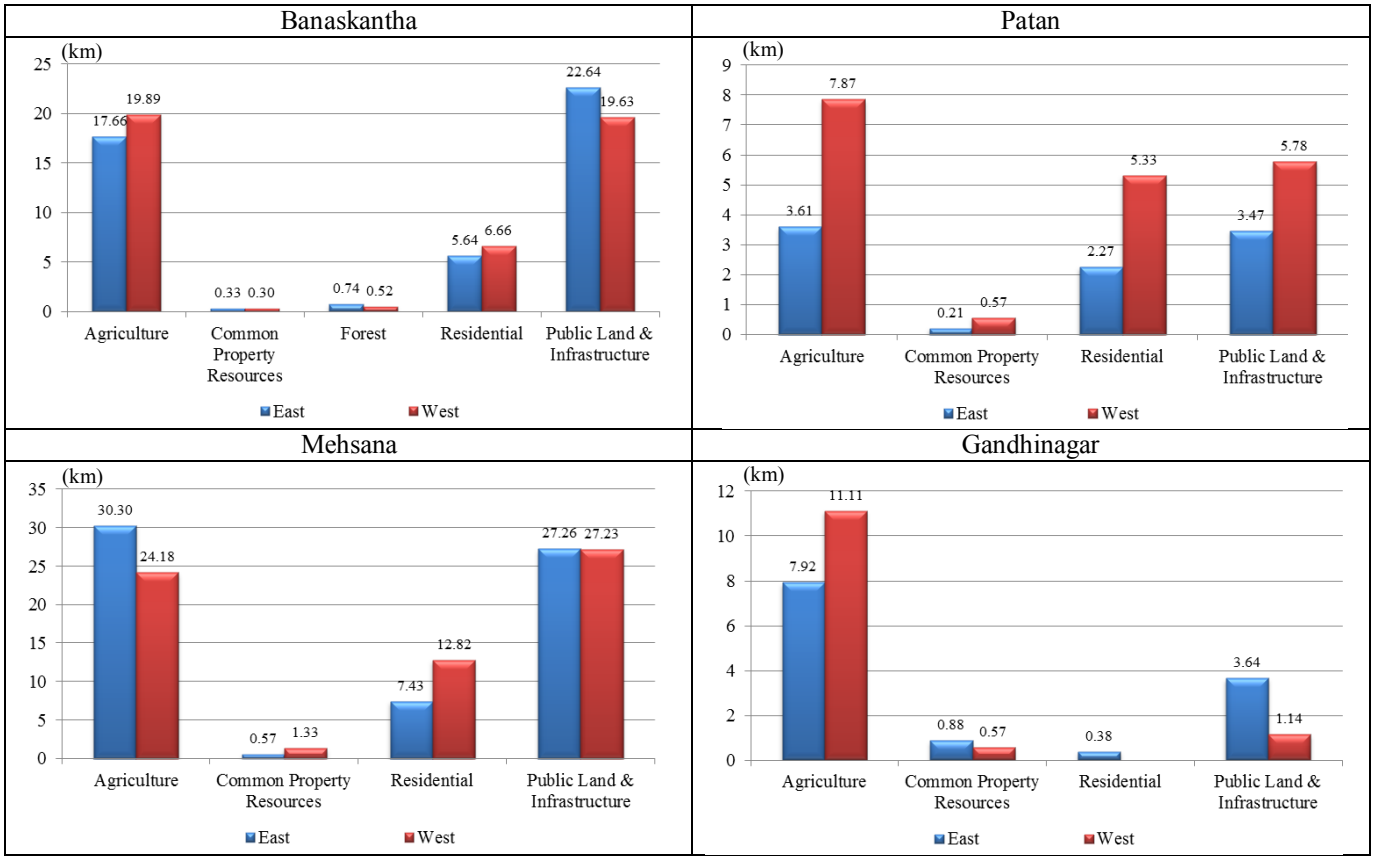
Table 6.1.8 Summary of Sensitive Receptor Distribution

District	Category of Structure	Distance from DFC Center Line				Total No. of SR
		0-50 m		50-100 m		
		West	East	West	East	
Gandhinagar	Education	-	-	-	-	-
	Religious	-	1	-	-	1
	Health	-	-	-	-	-
Mehsana	Education	2	2	1	-	5
	Religious	9	20	2	1	32
	Health	-	2	3	-	5
Patan	Education	-	-	1	-	1
	Religious	3	12	2	-	17
	Health	2	-	-	-	2
Banaskantha	Education	5	2	1	1	9
	Religious	11	22	3	6	42
	Health	2	2	2	1	7

Remark: Education means school at all categories including nursery, religious means temple, church, mosque and grave yard, health means small/ large scale of hospital and clinics.
Source: NKC

2) Landuse

The result of land use survey is summarized in Figure 6.1.4 and Table 6.1.9. Agriculture is the main land use in the Wamaj - Iqbalgarh section, and the length of DFC alignment which pass thorough the human settlement areas approximately 16 km at the east side and 25 km at the west side.



Source : NKC

Figure 6.1.4 Land Use Status along the Proposed Alignment

Table 6.1.9 Distribution of Residential Area along the Proposed Alignment

(Unit:km)

Section / Category	Side	Banaskantha	Mehsana	Patan	Gandhinagar	Total
Residential are	East	5.64	7.43	2.27	0.38	15.72
	West	6.66	12.82	5.33	-	24.81

Source : NKC

6.1.3 Impact Assessment during Construction Phase

(1) Impact

Construction of DFC structures and facilities including ROBs, RUBs and bridges requires the use of heavy equipment/ vehicles. In and around the construction areas, noise pollution would be increased by the operation of heavy equipment and increased traffic volume due to construction activities.

(2) Evaluation

Adequate measures will be planned and provided to reduce the negative impacts of noise pollution during construction phase, such as planning of the deliberate and efficient use of equipment, use of low noise type machines, regular maintenance of construction machines. DFCCIL will coordinate with relevant authorities to reduce the negative impacts on the traffic flow whenever necessary. In addition, noise impacts during the construction phase would be of a short, temporary duration. It is therefore considered that noise impacts during construction phase are minor especially when mitigation measures and site management practices are applied.

6.1.4 Impact Assessment during Operation Phase

(1) Noise Level Prediction

1) Item of Prediction

Item of prediction is railway noise level (L_{Aeq}) after the DFC would be placed in service.

2) Prediction Term

As for the term of prediction, the time when the railway would be operated after placed in service is targeted.

3) Locations for prediction

As for locations for the prediction, the same three (3) sites as measurement sites are selected because these locations are relatively larger cities in this targeted section. These locations for the prediction are shown in Table 6.1.10.

Table 6.1.10 Prediction Location

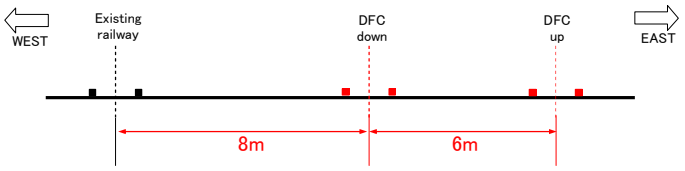
Section	Prediction Location	State
Parallel section	Palanpur	Gujarat
	Sidhpur	
	Mehsana	

Source: NKC

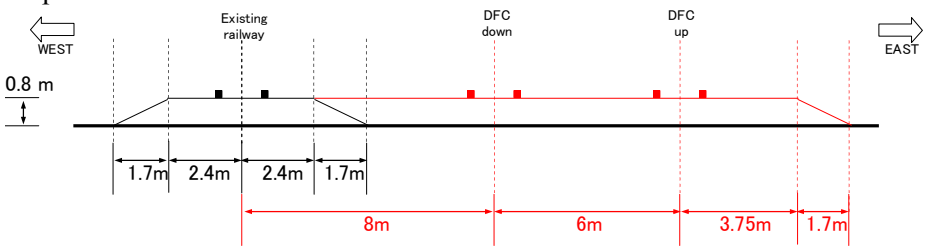
4) Prediction Point

In consideration of noise impact distance from the railway track, a distance of 200 m from the centre of the existing railway track was set as a prediction range. The height of prediction is 1.2 m above the ground. The cross-section drawings at each prediction location are shown in Figure 6.1.4. In Palanpur, Sidhpur, and Mehsana, cross-section drawings for the prediction were set based on actual widths measured at each site and the latest DFC plan.

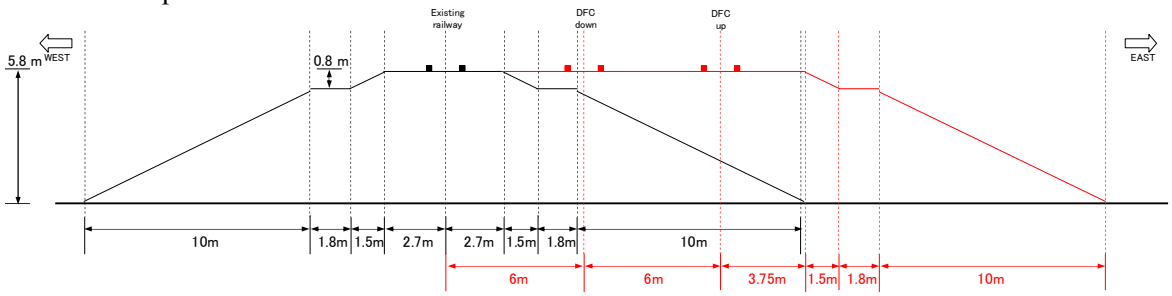
・Palanpur No.1



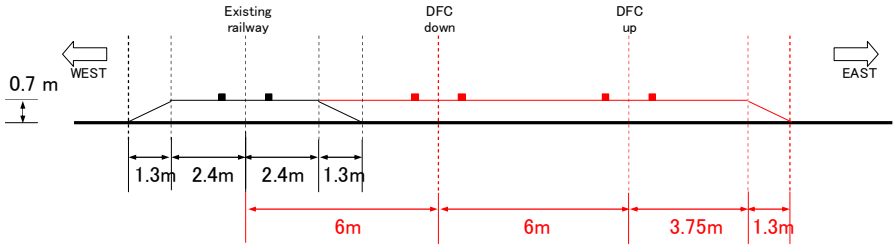
・Palanpur No.2



・Sidhhpur No.1



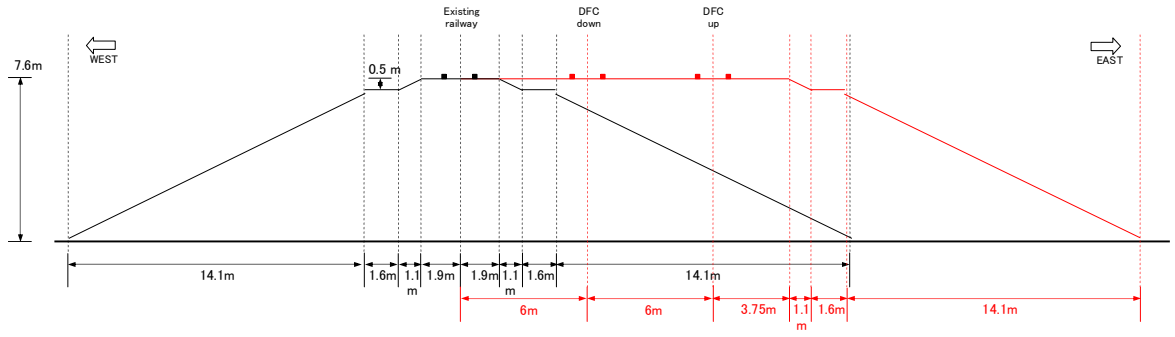
・Sidhhpur No.2



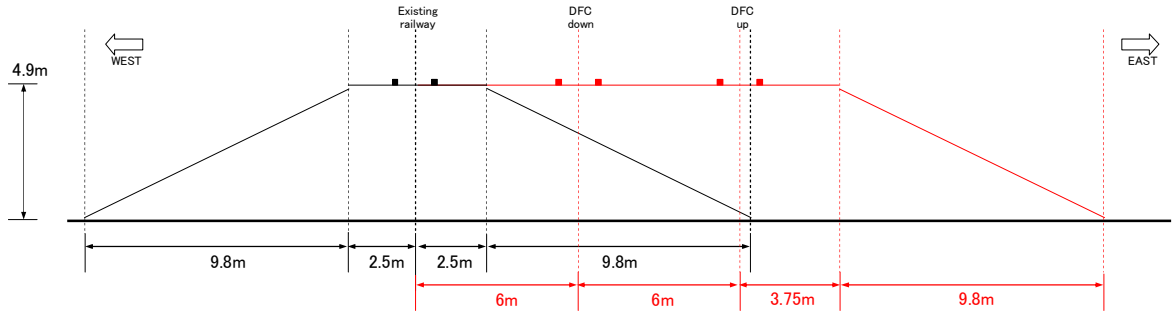
Source: NKC

Figure 6.1.5(1) Cross-Section for Noise and Vibration Prediction

・Mehsana No.1



・Mehsana No.2



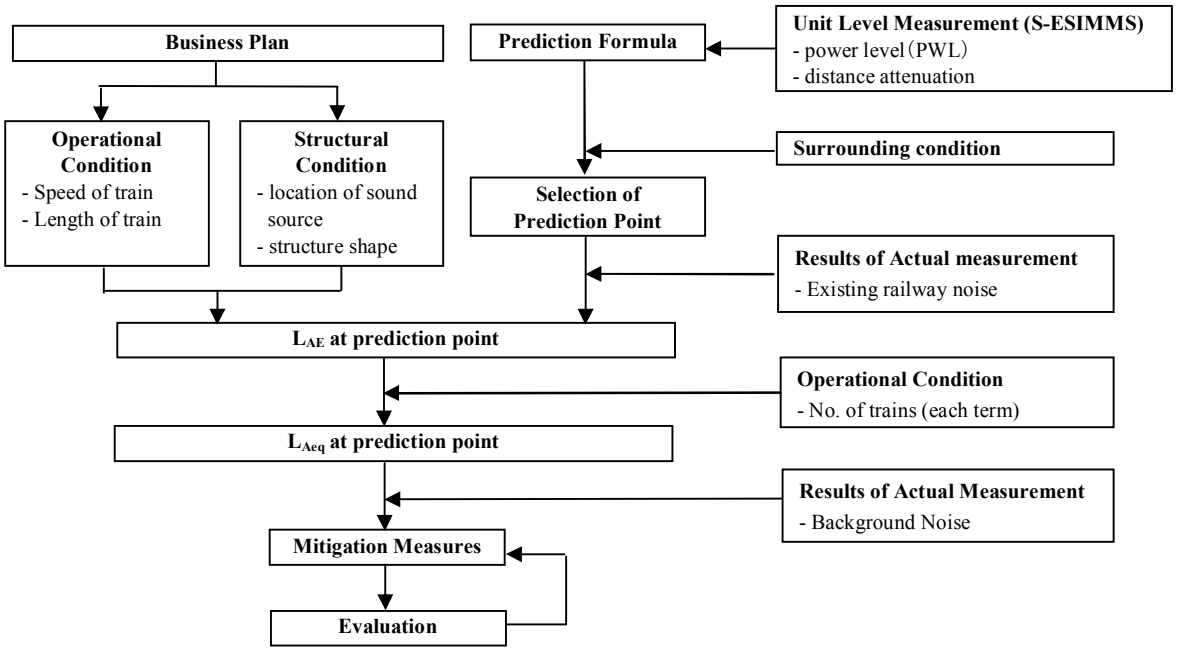
Source: NKC

Figure 6.1.5(2) Cross-Section for Noise and Vibration Prediction

(2) Method of Prediction

1) Procedure of Prediction

The procedure for prediction is shown in Figure 6.1.5. In order to predict, an empirical formula based on unit level measurement conducted in S-ESIMMS (JBIC's SAPROF Study, June 2008 - December 2009) was utilized. At the same time, background noise level and noise exposure level (L_{AE}) of existing train were utilized based on the results of actual measurements.



Source: NKC

Figure 6.1.6 Procedure for Prediction of Noise Level

2) Prediction Formula

a) Noise Level of DFC Railway

The noise exposure level is estimated by using total amount of unit Power Level (PWL) obtained from the results of actual measurements and multiplied by the amount of distance attenuation coefficient and logarithms of the distance from the center of the source of sound in S-ESIMMS. In addition, in order to calculate $L_{Aeq,}$ a formula indicated by the guidelines for existing railways in Japan was applied. The empirical formula is shown below:

$L_{AE} = PWL + B \log_{10}(D)$

$L_{Aeq} = L_{AE} + 10 \log_{10}(N/T)$

where:

PWL : Power level (PWL = 24.2・Log10 (V) + 52.4)
D : Distance (m)
B : Distance attenuation coefficient (B = 14.9)
N : Number of trains
T : Target time [s]
Day time (7:00-22:00) T=54,000[s], Night time (22:00-7:00): T=32,400[s]

Source : Guidelines for Existing Railway in Japan

b) Noise Level of Existing Railway

An empirical formula derived from L_{AE} and distance attenuation coefficient based on the results of existing railway noise level measurements in the parallel section was applied for the prediction. In addition, in order to calculate $L_{Aeq,}$ a formula indicated by the guidelines for existing railways in Japan was applied. The empirical formula is shown below.

<Freight train>

$L_{AE}(D_2) = L_{AE}(D_1) - B * \log_{10}(D_2/D_1)$

$L_{Aeq}(D_2) = L_{AE}(D_2) + 10 * \log_{10}(N/T)$

<Passenger train>

$L_{AE}(D_2) = L_{AE}(D_1) - B * \log_{10}(D_2/D_1)$

$L_{Aeq}(D_2) = L_{AE}(D_2) + 10 * \log_{10}(N/T)$

where:

D_1 : Distance from center of existing railway to the nearest measurement point [m]
D_2 : Distance from center of existing railway to prediction point [m]
B : Distance attenuation coefficient
(Freight train : B = 14.9, Passenger train : B = 15.7)
N : Number of trains
T : Target time [s]
Day time (7:00-22:00) T=54,000 [s], Night time (22:00-7:00): T=32,400 [s]

3) Condition of Prediction

a) Plan of DFC Operation

The following conditions of the DFC operation are assumed in this study for the purposes of prediction.

- Type of traction: electrified traction
- Maximum train length: 650 [m]
- Train speed: 100 [km/h]
- Running operation: 140 trains/direction/day with the same time interval (approximately one train every five minutes, day time 88trains/direction/day, night time 52trains/direction/day） *day time 7:00-22:00, night time 22:00-7:00

b) Number of Existing Freight Trains

For existing freight trains in parallel sections, the operational schedule is assumed to remain the same. Based on the actual measurement in the parallel section from 10:00 to 17:00 and the assumption that the number of existing freight trains passing remains unchanged, the number of freight trains is divided simply in terms of the time of day/ night they are passing. As for Mehsana No.2, although no freight train actually went through on the measurement day, in order to avoid underestimation, the value of Mehsana No.1 is applied there. The number of freight trains is as shown in Table 6.1.11.

Table 6.1.11 Setting of Number of Freight Train

Time / Direction / Location	Day time		Night time	
	Up	Down	Up	Down
Palanpur No.1	4	2	2	1
Palanpur No.2	8	8	5	5
Sidhhpur No.1	3	5	2	3
Sidhhpur No.2	8	3	5	2
Mehsana No.1	6	0	4	0
Mehsana No.2	6	0	4	0

Note: 1) Day time (7:00-22:00), Night time (22:00-7:00)
2) The value of Mehsana No.1 is applied to Mehsana No.2.
Source: NKC

c) Number of Existing Passenger Trains

As for the existing passenger trains in the parallel sections, based on the current time table (as of July, 2011), the number of passenger trains is decided for the prediction as shown in Table 6.1.12. Currently there are passenger trains operated daily or not daily, which means the frequency is from one (1) to six (6) / week. After the beginning of DFC operation, the number of passenger trains may increase in the future due to economic growth and a decrease in the number of existing freight trains. Therefore, in order to set the number of passenger trains for this prediction, passenger trains presently operated at the frequency from one (1) to six (6) /week were assumed once a day.

Table 6.1.12 Setting of Number of Passenger Trains

Time / Direction / Location	Day time		Night time	
	Up	Down	Up	Down
Palanpur	15(7)	20(7)	14(3)	10(3)
Sidhhpur	14(6)	21(7)	15(4)	9(3)
Mehsana	14(6)	21(7)	15(5)	9(3)

Note: 1) Passing trains are included in above number.
2) Day time (7:00-20:00), Night time (22:00-7:00)
3) The figures in parenthesis means the number of passenger trains operated daily at the present.
Source: NKC

(3) Results of Prediction

The predicted future noise levels (L_{Aeq}) at 30 m and 50 m distances (estimated average RoW end), from the centre of existing railway track in the parallel section range from 63 through 69 dB(A) at Day time, and 64 through 69 dB at Night time at 30 m away, then 61 through 64 dB(A) at Day time and Night time at 50 m away respectively. The result is summarized in Table 6.1.13.

Table 6.1.13 Result of Prediction (L_{Aeq})

Unit: dB(A)

Prediction location			Time	Background Level (measured value)	Railway Noise (predictive value)					
					(a) Existing railway		(b) DFC railway		(a) + (b)	
					30 m	50 m	30 m	50 m	30 m	50 m
Palanpur	1	East	daytime	51	62	58	68	63	69	64
			nighttime	50	62	58	68	63	69	64
		West	daytime	51	61	58	63	60	65	62
			nighttime	50	62	58	63	60	65	62
	2	East	daytime	51	61	57	68	63	69	64
			nighttime	49	60	57	68	63	68	64
		West	daytime	51	61	57	63	60	65	62
			nighttime	49	61	58	63	60	65	62
Sidhhpur	1	East	daytime	53	61	58	67	63	68	64
			nighttime	52	62	59	67	62	68	64
		West	daytime	53	61	58	63	60	65	62
			nighttime	52	62	59	63	60	66	63
	2	East	daytime	54	62	59	67	63	68	64
			nighttime	51	63	60	67	63	68	64
		West	daytime	54	62	59	63	60	66	63
			nighttime	51	63	60	63	60	66	63
Mehsana	1	East	daytime	53	*60	58	*64	63	*66	64
			nighttime	52	*61	59	*64	62	*66	64
		West	daytime	53	61	58	63	60	65	62
			nighttime	52	62	59	63	60	66	63
	2	East	daytime	56	54	51	67	63	67	63
			nighttime	53	55	52	67	63	67	63
		West	daytime	56	54	51	63	60	63	61
			nighttime	53	55	52	63	60	64	61

Note: 1) day time (7:00-20:00), night time (22:00-7:00)
2) *value measured at 40m from a railway.
3) 40 m point is inside ROW.

Source: NKC

(4) Evaluation

1) Evaluation

a) Parallel Section

As for parallel sections, it is targeted that predicted noise level which consists of DFC railway noise level and existing railway noise level will meet guideline values at 30 m and 50 m from the center of the existing railway track where ROW might be located. As for the results of the prediction, in all locations for the prediction and at both daytime and nighttime, predicted values didn't meet guideline values (daytime: 60 dB, nighttime: 55 dB). In fact, the results also indicate that railway noise levels only from the existing railway track already exceed the guideline level at almost all sites. Therefore, some mitigation measures are recommended to be taken especially along the residential areas and near the sensitive receptors.

b) Sensitive Receptor

It is targeted that predicted noise level which consists of DFC railway noise and

existing railway noise meets guideline values within about 100 m from the center of the existing railway track. As for the results of the prediction, it does not meet the guideline levels. Therefore, some mitigation measures are recommended to be taken.

2) Case Study on Environmental Mitigation Measures

Among conceivable environmental mitigation measures for the railway noise level, establishment of a soundproof wall along the track is one of the most effective measures to lower noise levels. In order to determine the necessary height requirements of the soundproof wall at different locations, case studies have been conducted at the prediction locations.

The results of case studies are summarized in Tables 6.1.12. If the ROW is set at 30 m from the center of railway track, the soundproof walls with a height range from 0.5m to 3.5 m may be required. While if the ROW is set 50 m from the center of railway track, soundproof wall with a height range from 0.5 m to 2.0 m may be required.

Table 6.1.14 Results of Case Studies on Soundproof Wall Mitigation Measure

Unit: dB(A)

Prediction location			Time	Recommended Standard Level	Without measure		Height of soundproof (m)		With measure	
					30 m	50 m	30 m	50 m	30 m	50 m
Palanpur	1	East	daytime	60	69	64	3.5	2.0	55	54
			nighttime	55	69	64			55	54
		West	daytime	60	65	62	2.5	1.5	54	54
			nighttime	55	65	62			54	54
	2	East	daytime	60	69	64	3.0	1.5	55	55
			nighttime	55	68	64			55	55
		West	daytime	60	65	62	2.0	1.0	55	55
			nighttime	55	65	62			55	55
Sidhhpur	1	East	daytime	60	68	64	1.5	0.5	54	55
			nighttime	55	68	64			54	55
		West	daytime	60	65	62	1.0	0.5	55	54
			nighttime	55	66	63			55	55
	2	East	daytime	60	68	64	3.5	2.0	54	54
			nighttime	55	68	64			55	54
		West	daytime	60	66	63	2.5	1.5	54	54
			nighttime	55	66	63			54	54
Mehsana	1	East	daytime	60	66	64	0.5	0.5	55	54
			nighttime	55	66	64			55	55
		West	daytime	60	*65	62	*0.5	0.5	*55	53
			nighttime	55	*66	63			*55	54
	2	East	daytime	60	67	63	1.5	0.5	54	55
			nighttime	55	67	63			54	55
		West	daytime	60	63	61	0.5	0.5	55	53
			nighttime	55	64	61			55	53

Note: 1) day time (7:00-20:00), night time (22:00-7:00)
2) *value measured at 40m from a railway.
3) 40 m point is inside ROW.
4) Shaded section indicates that the noise levels exceed the recommended standard level

Source: NKC

6.2 VIBRATION

6.2.1 Study Methodology

(1) Survey on Regulations of Vibration Pollution

The published literature and governmental documents, the existing regulations related to vibration pollution in India and those in Japan were reviewed to understand potential impacts and to consider mitigation measures.

(2) Survey on Railway and Background Vibration Levels

1) Measurement Sites

Measurement sites are the same as for the noise survey, and the height of measurement is ground level.

2) Railway and Background Vibration Measurement Method

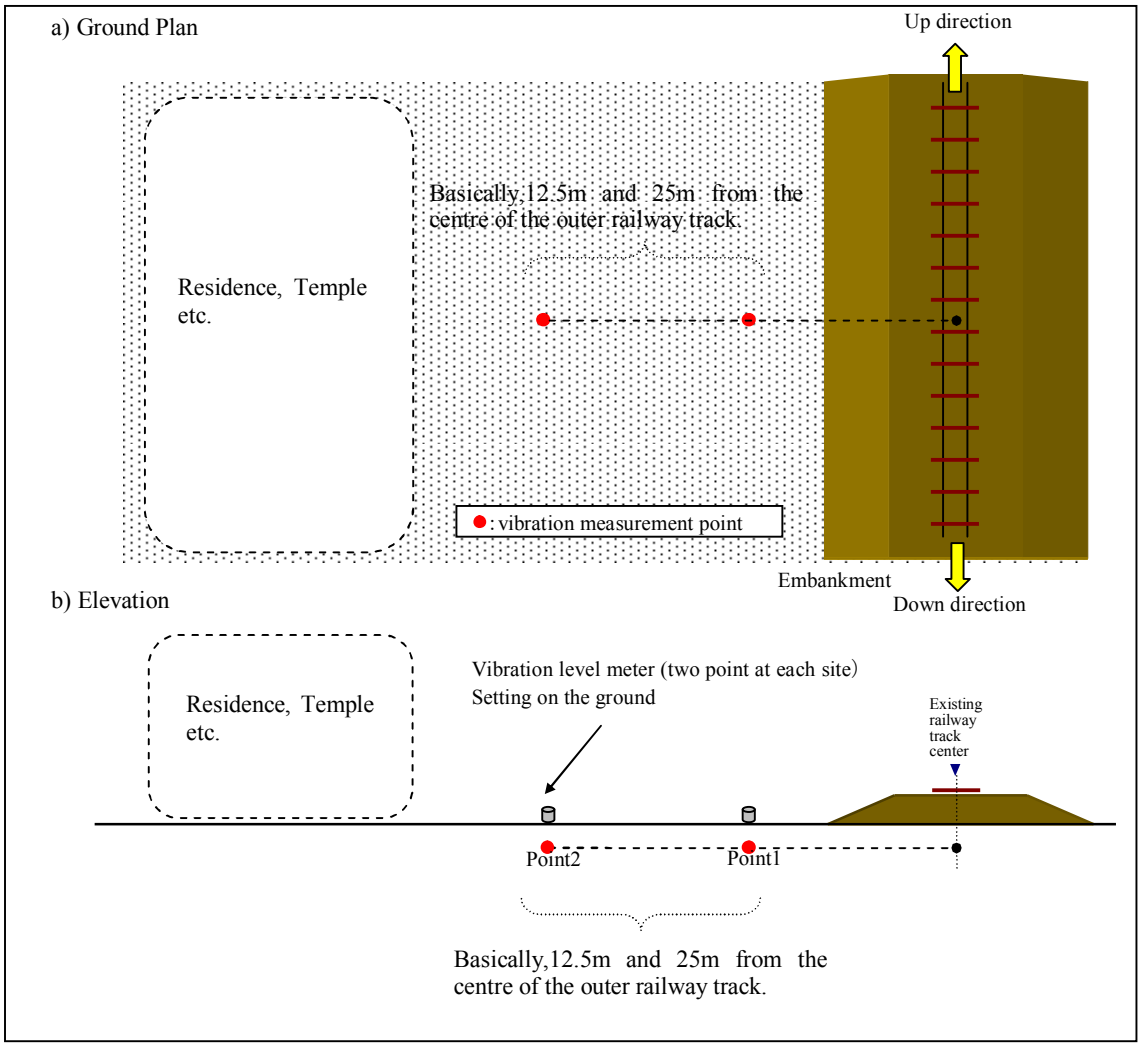
Since there is no relevant standard method for measuring railway vibration in India, vibration measurements are generally conducted following International Standards. Therefore, the vibration measurement was conducted based on JIS Z 8735 (Method of Measurement of Vibration Level) and the measurement machinery generally used in Japan was utilized.

Considering the distribution of facilities that needed to be considered for vibration impacts such as schools, hospitals, temples and residences, two measurement sites were selected in each location. Background vibration was also measured at the same sites during the time when trains did not pass through. The measurement method is shown in Table 6.2.1. Measurement instruments were installed as shown in Figure 6.2.1.

Table 6.2.1 Measurement Method of Railway and Background Vibration Levels

Item	Specifications
Vibration Level Meter	Vibration Level Meter which complies with "JIS C 1510-1: 1995" RION VM-53A
Measurement Points	Select two points at each site. Basically, 12.5 m and 25 m from the centre of the outer railway track. The height is ground level.
Measurement Items	**Railway Vibration** L_p (peak level), 1/3 octave frequency analysis (1/3octave band center frequency: 1-80Hz) **Background Vibration** L_p (peak level)
Vibration Axis	X, Y, Z
Time Weighting Characteristics	630 ms
Measurement Period	2011.8.30 - 2011.9.6
Measurement Time	**Railway vibration** : 10:00-18:00 **Background vibration**: 10 minutes within each term (10:00-12:00, 12:00-14:00, 14:00-16:00, 16:00-18:00
Other Data	Date and time, location, train types (freight/passenger) and load (container/bulk), number of train cars, train length, passage time, train speed, pictures, information on surrounding environment, etc.

Source: NKC



Source: NKC

Figure 6.2.1 Schematic Layout of Railway and Background Vibration Levels Measurement Equipment

6.2.2 Survey Results

(1) Vibration Regulation and Standards

There are no particular regulations, standards or guidelines for railway or background vibration levels to be applied in India.

In Japan, the guideline values for railway vibration level are set for the Shinkansen super-express railway as shown in Table 6.2.2, however there is no other national guideline value or recommended standard level on railway vibration level. However, vibration speed of 0.5 mm/sec or less (corresponding to vibration level of 65 dB (L_p) or less) for the railway is recommended by the Pollution Control Committee of Yokohama City (1974). This value has been applied as the standard value of the railway vibration level in EIA procedures in Japan.

Table 6.2.2 Guideline Value of Vibration from Shinkansen Super Express Railway in Japan

Corrected Acceleration Level	dB (L_p)
	70 or less

Source: Environmental Agency of Japan, 1976

(2) Results of Field Survey on Railway and Background Vibration

1) Background Vibration Level (L_p: Peak Level)

The results of background vibration levels (L_p) in each site are shown in Table 6.2.3. Measurement values are shown for each different time period (10:00-12:00, 12:00-14:00, 14:00-16:00, and 16:00-18:00) when trains did not pass through. At all measurement sites, the results of the vibration values indicated less than 41 dB, and below 55 dB which is the perceivable limit value.

Table 6.2.3 Results of Background Vibration Measurement

Location	No.	Background Vibration Level L_p (dB)														
		10:00-12:00			12:00-14:00			14:00-16:00			16:00-18:00			Overall 10:00-18:00		
		X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Palanpur	1	<30	<30	<25	<30	<30	30	<30	<30	<25	<30	<30	<25	<30	<30	30
	2	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25
Sidhpur	1	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25
	2	<30	<30	35	38	35	41	32	36	36	<30	32	36	38	36	41
Mehsana	1	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25
	2	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25

Note: Since measurement lower limit of vibration level meter is 30 dB for X and Y-direction, 25 dB for Z-direction, measurement value under these limit indicates with [<].

Source: NKC

2) Railway Vibration Level (L_p: Peak Level)

The results of the railway vibration level (L_p) study at each site is summarized in Table 6.2.4. In Japan, correlation between the appeal rate of damages to buildings and vibration level has been studied and it concludes that 70 dB of vibration level is the limitation so as not to damage buildings. During the survey, it is found that at each survey point located at a distance of 25 m from the center of the railway track, vibration measured was not over 70 dB. Hence, under the present situation, no serious damage to buildings due to railway vibrations is expected.

Table 6.2.4 Results of Railway Vibration Measurement in Parallel Section

Location		Date (2011)	Number of Trains	Train Type	Train Direction	Average Train Speed (km/h)	Average Train Length (m)	Distance from Railway Center (m)		Vibration Level (dB)					
								L_{px}		L_{py}		L_{pz}			
	No.							point 1	point 2	point 1	point 2	point 1	point 2	point 1	point 2
Palanpur	1	31 Aug	4	Passenger	Up	45	445	12.5	20	58	60	66	62	71	69
			4		Down	26	429			57	58	64	61	68	67
			2	Freight	Up	33	505			59	59	65	63	72	70
			1		Down	22	657			57	58	64	60	69	68
	2	30 Aug	3	Passenger	Up	32	438	12.5	25	54	42	56	46	66	55
			4		Down	55	423			54	45	57	47	65	54
			4	Freight	Up	15	477			51	42	54	44	63	53
			4		Down	25	667			54	43	57	46	66	55
Sidhpur	1	3 Sep	6	Passenger	Up	56	445	12.5	25	58	49	59	50	67	58
			7		Down	45	410			55	47	58	48	65	56
			2	Freight	Up	40	651			59	50	60	52	68	60
			3		Down	37	481			57	48	59	49	65	58
	2	2 Sep	3	Passenger	Up	43	460	12.5	20	58	54	62	55	69	64
			6		Down	28	375			57	50	61	53	70	63
			5	Freight	Up	24	518			57	53	58	51	68	61
			2		Down	31	547			60	55	64	58	71	66
Mehsana	1	5 Sep	4	Passenger	Up	84	456	12.5	25	60	50	63	52	68	59
			6		Down	54	378			56	45	58	48	65	54
			4	Freight	Up	52	588			59	49	61	49	65	56
			-		Down	-	-			-	-	-	-	-	-
	2	6 Sep	3	Passenger	Up	30	319	12.5	25	60	48	59	50	66	68
			5		Down	34	352			59	50	59	51	67	59
			-	Freight	Up	-	-			-	-	-	-	-	-
			-		Down	-	-			-	-	-	-	-	-

Source: NKC

6.2.3 Impact Assessment during Construction Phase

(1) Impact

Construction of DFC structures and facilities including ROBs, RUBs and bridges requires the use of heavy equipment/vehicles. In and around the construction areas, vibration would be increased by the operation of heavy equipment and increased traffic volume due to construction activities.

(2) Evaluation

Adequate measures will be planned and provided to reduce the negative impacts of vibration during construction phase, such as planning the deliberate and efficient use of equipment, use of the low vibration type machines, and regular maintenance of construction machines. DFCCIL will coordinate with relevant authorities to reduce the negative impacts on traffic flow whenever necessary. In addition, vibration impacts during the construction phase should be of a short, temporary duration. It is therefore concluded that vibration impact during construction phase can be considered to be minor especially where mitigation measures and site management practices are applied.

6.2.4 Impact Assessment during Operation Phase

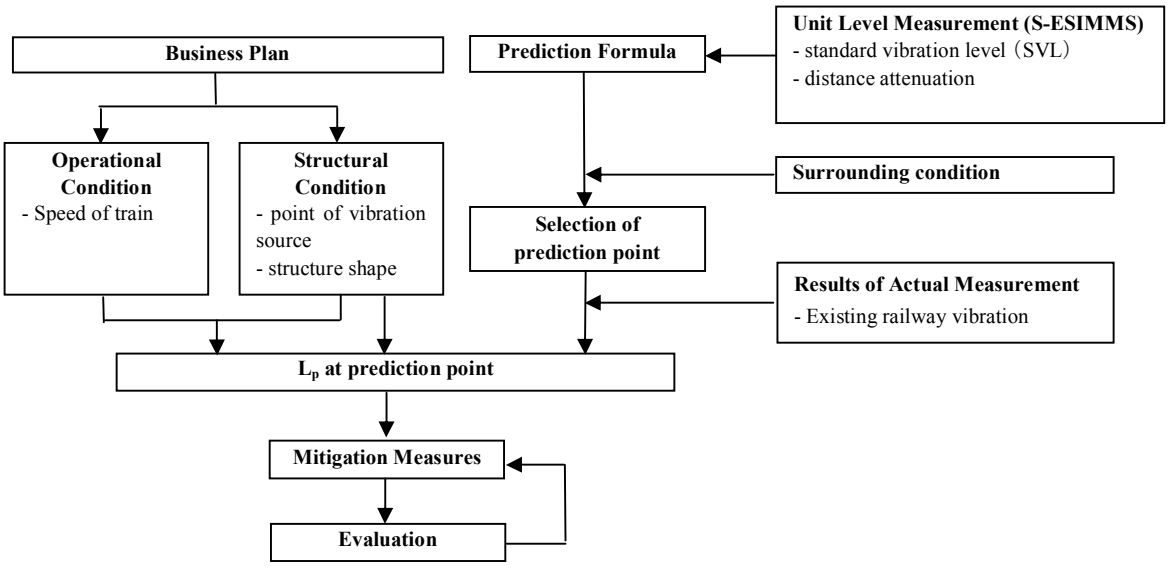
(1) Vibration Level Prediction

Railway vibration levels (L_p) generated by the DFC operation was predicted at the same selected three (3) sites as the railway noise prediction locations. Considering the influence range of vibration levels generated by the railway, a range of 200 m from the center of the existing railway track is targeted. The height of prediction is ground level. The cross-section drawings of the prediction location are same as the ones of the railway noise prediction.

(2) Method of Prediction

1) Procedure of Prediction

Procedure of prediction is given in Figure 6.2.2.



Source: NKC

Figure 6.2.2 Procedure for Prediction of Vibration Level

2) Prediction formula

a) Vibration Level of DFC Railway

An empirical formula which consists of standard vibration level (SVL) and distance attenuation coefficient based on the results of unit level measurements was applied for the prediction. The empirical formula is shown below:

$L_p = SVL + B \cdot LOG_{10}(D)$

where;

SVL :standard vibration level
For X axis, $SVL = 7.9 \cdot LOG_{10}(V) + 58.9$
For Y axis, $SVL = 10.6 \cdot LOG_{10}(V) + 58.9$
For Z axis, $SVL = 7.8 \cdot LOG_{10}(V) + 70.2$
D : Distance [m]
B : Distance attenuation coefficient
X axis B = -9.4, Y axis B = -11.4, Z axis B = -15.9

b) Vibration Level of Existing Railway

An empirical formula which consists of L_p and distance attenuation coefficient based on the result of actual existing railway vibration measurement in S-ESIMMS was adopted for the prediction as shown below.

<Freight Train>

X axis $L_p(D_2) = L_p(D_1) - 9.4 * LOG_{10}(D_2/D_1)$

Y axis $L_p(D_2) = L_p(D_1) - 11.4 * LOG_{10}(D_2/D_1)$

Z axis $L_p(D_2) = L_p(D_1) - 15.9 * LOG_{10}(D_2/D_1)$

<Passenger Train>

X axis $L_p(D_2) = L_p(D_1) - 14.1 * LOG_{10}(D_2/D_1)$

Y axis $L_p(D_2) = L_p(D_1) - 13.9 * LOG_{10}(D_2/D_1)$

Z axis $L_p(D_2) = L_p(D_1) - 18.3 * LOG_{10}(D_2/D_1)$

where:

D_1 : Distance from center of existing railway to the nearest measurement point [m]
D_2 : Distance from center of existing railway to prediction point [m]

3) Condition of Prediction

The conditions of vibration prediction are the same as the noise prediction.

(3) Result of Prediction

The predicted vibration levels (L_p) at 30 m and 50 m from the centre of existing railway track in the parallel section are summarized in Table 6.2.5. The predicted point determined at 30m and 50m of distances, that is estimated average RoW end. The result of the predicted vibration levels of the existing railway ranges respectively from 58 through 66 dB (Z-axis) at 30m away, then 56 through 63 dB (Z-axis) at 50m away. The result of the predicted vibration levels of the DFC railway ranges respectively from 61 through 67dB (Z-axis) at 30m away, then 58 through 61 dB (Z-axis) at 50 m away.

Table 6.2.5 Result of Predicted Vibration Level (L_p)

(Unit : dB)

Prediction Location				Background Level (measured value)	Railway Vibration (predictive value)			
					(a) Existing Railway		(b) DFC Railway	
					30 m	50 m	30 m	50 m
Palanpur	1	X	East	<30	55	53	63	60
			West		55	53	60	58
		Y	East	<30	60	58	64	60
			West		60	58	59	57
		Z	East	30	66	63	67	61
			West		66	63	61	58
	2	X	East	<30	50	48	63	60
			West		50	48	60	58
		Y	East	<30	52	50	64	60
			West		52	50	59	57
		Z	East	<25	59	56	67	61
			West		59	56	61	58
Sidhhpur	1	X	East	<30	55	53	63	60
			West		55	53	60	58
		Y	East	<30	55	52	63	59
			West		55	52	60	57
		Z	East	<25	62	58	66	61
			West		62	58	61	58
	2	X	East	38	57	55	63	60
			West		57	55	60	58
		Y	East	36	60	57	63	59
			West		60	57	60	57
		Z	East	41	65	61	66	61
			West		65	61	61	58
Mehsana	1	X	East	<30	*54	53	*61	60
			West		55	53	60	58
		Y	East	<30	*56	54	*61	59
			West		57	54	60	57
		Z	East	<25	*58	56	*63	61
			West		61	56	61	58
	2	X	East	<30	55	53	63	60
			West		55	53	60	58
		Y	East	<30	56	54	63	59
			West		56	54	60	57
		Z	East	<25	60	56	66	61
			West		60	56	61	58

Note: 1) *value measured at 40m from a railway.
2) 40 m point is inside ROW.
Source: NKC

(4) Evaluation

It is targeted that predicted vibration level (L_p) which consists of DFC railway vibration and existing railway meet the guideline value of vibration from Shinkansen in Japan (70 dB) at 30 m and 50 m from the center of the existing railway track where RoW would be located. At all of the prediction locations, predicted values resulted in meeting the guideline value. Therefore, environmental impact due to railway vibration is considered to be light.

6.3 AIR QUALITY

6.3.1 Study Methodologies

(1) Study on Air Quality Standards

The published literature, governmental documents, and existing regulations related to the air quality in India and those in Japan were reviewed to understand potential impacts and for the purpose of identifying appropriate mitigation measures.

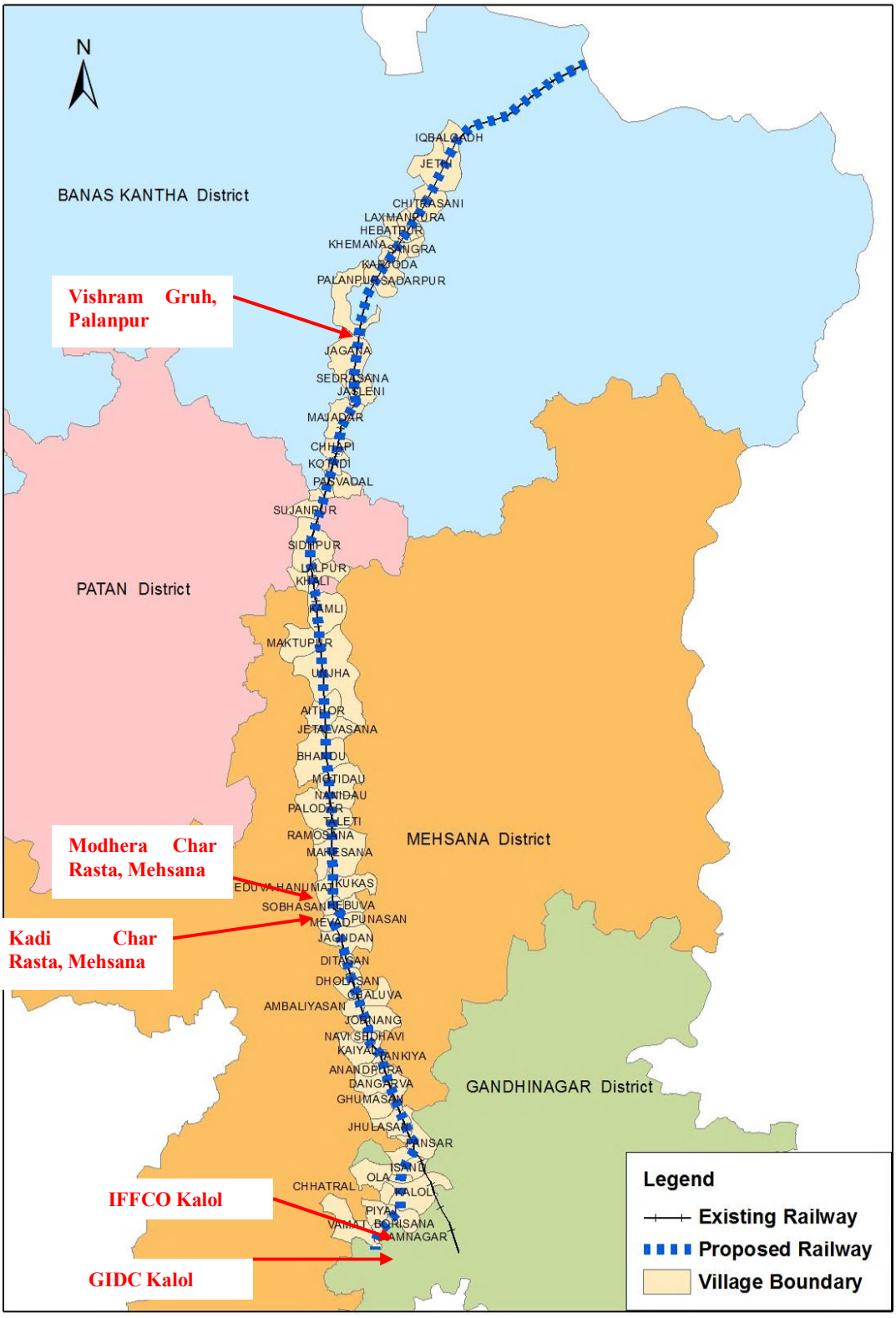
(2) Survey on Current Condition

The official monitoring data was collected to survey current air quality around the proposed alignment for the Wamaj - Iqbalgarh section. The Gujarat Pollution Control Board (GPCB) is responsible for monitoring ambient air quality in the State of Gujarat. Five monitoring stations are located near the proposed alignment. The location details of these five monitoring stations are presented in Table 6.3.1 and Figure 6.3.1.

Table 6.3.1 Location Details of Ambient Air Quality Monitoring Stations along the Proposed Alignment

Monitoring Station (distance/direction from alignment)	Location detail	Latitude	Longitude	Altitude
CEDS, GIDC, Kalol (0.5 km South)	Security Gate of CEDS, 2.5 m above ground	23°15' N	72°33' E	100 m above MSL
IFFCO, Kalol (2.5 km South)	Security Gate of IFFCO, 3 m above ground	23°15' N	72°33' E	100 m above MSL
Kadi Char Rasta, Mehasana (0.5 km North)	Office Complex, 3.5 m above ground	23°42' N	72°37' E	80 m above MSL
Modhera Char Rasta, Mehsana (0.5 km North)	Office Complex, 3.0 m above ground	23°42' N	72°37' E	80 m above MSL
Vishram Gruh, Palanpur (0.25 km North)	Circuit House, 3 m above ground	24°12' N	72°28' E	209 m above MSL

Source: Gujarat Pollution Control Board



Source: Gujarat Pollution Control Board

Figure 6.3.1 Location of Ambient Air Quality Monitoring Stations along the proposed Alignment

6.3.2 Survey Results

(1) Air Quality Standards

1) Air Quality Standards in India

The ambient air quality standards in India which have been in force from November 2009 are shown in Table 6.3.2.

Table 6.3.2 Ambient Air Quality Standards in India

Parameter	Time Weighted Average	Concentration in Ambient Air	
		Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)
SO_2 (µg/m^3)	Annual*	50	20
	24 hours**	80	80
NO_2 (µg/m^3)	Annual*	40	30
	24 hours**	80	80
PM_{10} (µg/m^3)	Annual*	60	60
	24 hours**	100	100
$PM_{2.5}$ (µg/m^3)	Annual*	40	40
	24 hours**	60	60
O_3 (µg/m^3)	8 hours**	100	100
	1 hour**	180	180
Pb (µg/m^3)	Annual*	0.50	0.50
	24 hours**	1.0	1.0
CO (mg/m^3)	8 hours**	02	02
	1 hour**	04	04
NH_3 (µg/m^3)	Annual*	100	100
	24 hours**	400	400
C_6H_6 (µg/m^3)	Annual*	05	05
BaP (ng/m^3)	Annual*	01	01
As (ng/m^3)	Annual*	06	06
Ni (ng/m^3)	Annual*	20	20

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

**24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Source: National Ambient Air Quality Standards (No. B-29016/20/90/PCI-I dated 18 Nov, 2009 of Central Pollution Control Board)

2) Air Quality Standards in Japan

The environmental air quality standards in Japan are shown in Table 6.3.3.

Table 6.3.3 Environmental Air Quality Standards in Japan

Parameter	Concentration in Environmental Air	Conditions
SO_2 (ppm)	0.04	Daily average for hourly values
	0.1	Hourly values
CO (ppm)	10	Daily average for hourly values
	20	Average of hourly values for any consecutive eight hour period
SPM (mg/m^3)	0.10	Daily average for hourly values
	0.20	Hourly values
NO_2 (ppm)	within 0.04-0.06 or below	Daily average for hourly values
O_x (ppm)	0.06	Hourly values
Benzene (mg/m^3)	0.003	Annual average
Trichloroethylene (mg/m^3)	0.2	Annual average
Tetrachloroethylene (mg/m^3)	0.2	Annual average
Dichloromethane (mg/m^3)	0.15	Annual average
Dioxins ($pg\text{-}TEQ/m^3$)	0.6	Annual average
$PM_{2.5}$ ($\mu g/m^3$)	15	Annual average
	35	Daily average for hourly values

Source: Environmental Agency of Japan

(2) Results of Official Monitoring

GPCB monitors the ambient air quality for four parameters - RSPM, SPM, SO_2 and NOx. The monitoring data is summarized in Table 6.3.4.

Table 6.3.4 Status of Air Pollutants at Monitoring Stations

Sr.	Monitoring Station	Year/month	Parameters (µg/m^3)			
			RSPM	SPM	SO_2	NO_X
Sr. 1	CEDS, GIDC, Kalol, Dist. Gandhinagar	2007.10	74	646	12	4
		2008.11	183	376	12	24
		2009	83	310	13	24
		-	-	-	-	-
		2011.12	85	186	10	11
Sr. 2	IFFCO, Kalol, Dist. Gandhinagar	2007	56	224	17	7
		2008.12	88	292	17	26
		2009. 5	50	275	12	16
		-	-	-	-	-
		2011.12	99	222	13	12
Sr. 3	Kadi Char Rasta, Mehsana	2007.10	108	538	20	9
		2008.11	145	458	17	38
		2009.12	92	340	8	19
		2010.12	39	157	8	20
		2011.12	80	180	10	11
Sr. 4	Modhera Char Rasta, Mehsana	2007.11	50	475	16	6
		2008.10	63	265	12	21
		2009.12	159	457	4	20
		2010.12	83	461	15	21
		2011.11	82	189	13	13
Sr. 5	Vishram Gruh, Palanpur	2007.10	44	317	15	6
		2008.12	63	265	12	21
		2009.11	119	365	6	17
		2010.12	41	343	12	18
		-	-	-	-	-
Air Quality Standards (Industrial, Residential, Rural and Other Area) *			**100**	**-**	**80**	**(80**)**

* National Ambient Air Quality Standards (No. B-29016/20/90/PCI-I dated 18 Nov, 2009 of Central Pollution Control Board)

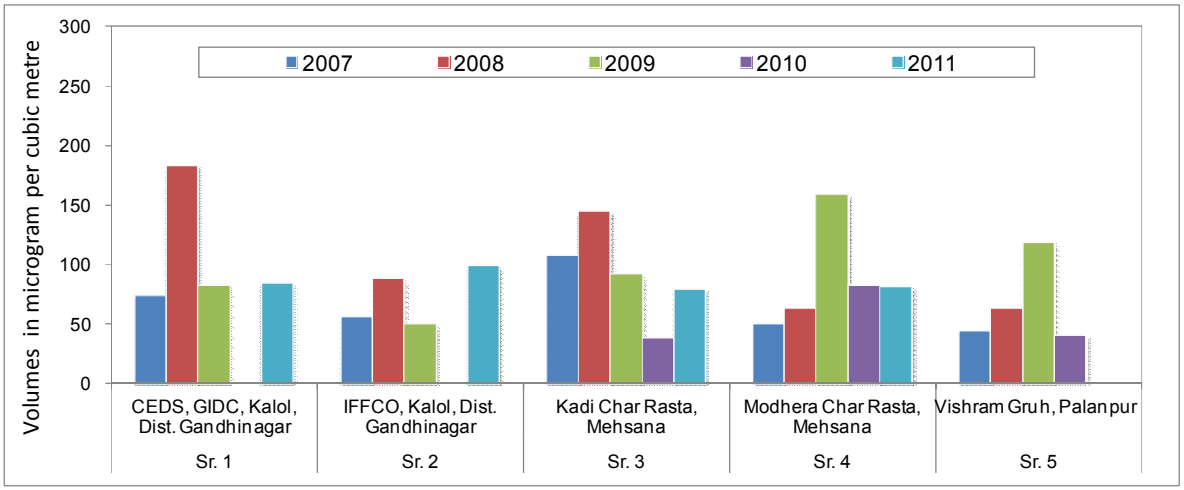
** Standard for NO_2

Note: 1) There is no detail record about the measurement date of Sr.1 in 2009 and Sr.2 in 2007.
2) The measurement at Sr.1 and Sr.2 in 2019 and Sr.5 in 2011 are not conducted.

Source: Gujarat Pollution Control Board

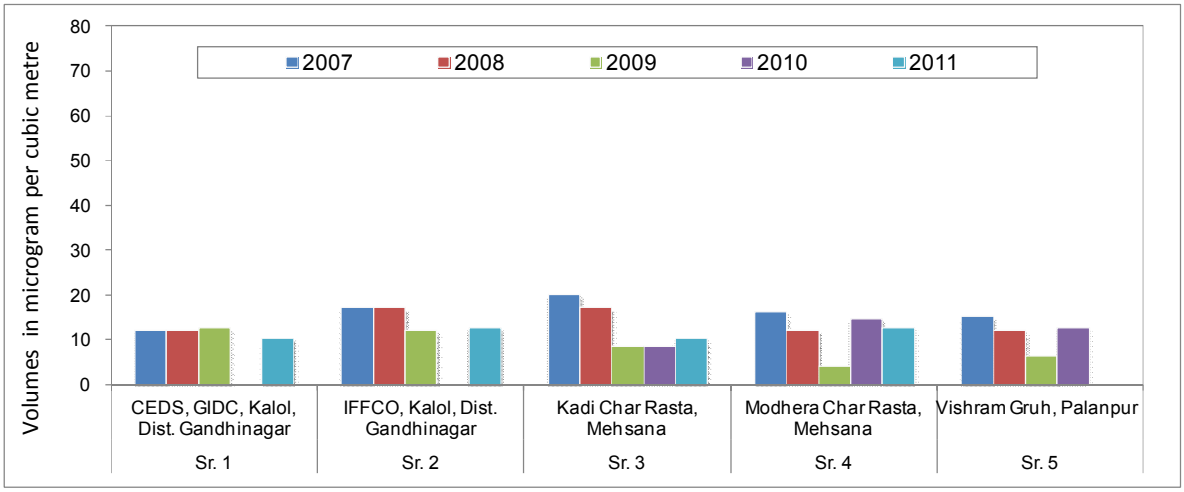
The annual change of PM_{10} (RSPM) is presented in Figure 6.3.2. The maximum value of PM_{10} (RSPM) is observed at Gandhinagar as 183 µg/m^3, which is high compared to National Ambient Air Quality Standards (No. B-29016/20/90/PCI-I dated 18 Nov, 2009 of Central Pollution Control Board) of 100 µg/m^3. The excess of the standards is also observed at Mehsana and Palanpur in some years. The main reason for high values of RSPM is heavy traffic on the National Highway and dust arising from the unpaved village roads.

The annual changes of SO_2 and NO_x are shown in Figure 6.3.3 and Figure 6.3.4 respectively. The all values of SO_2 are below the standards of 80 µg/m^3. The values of NO_x are also below the standards though the standard is for NO_2.



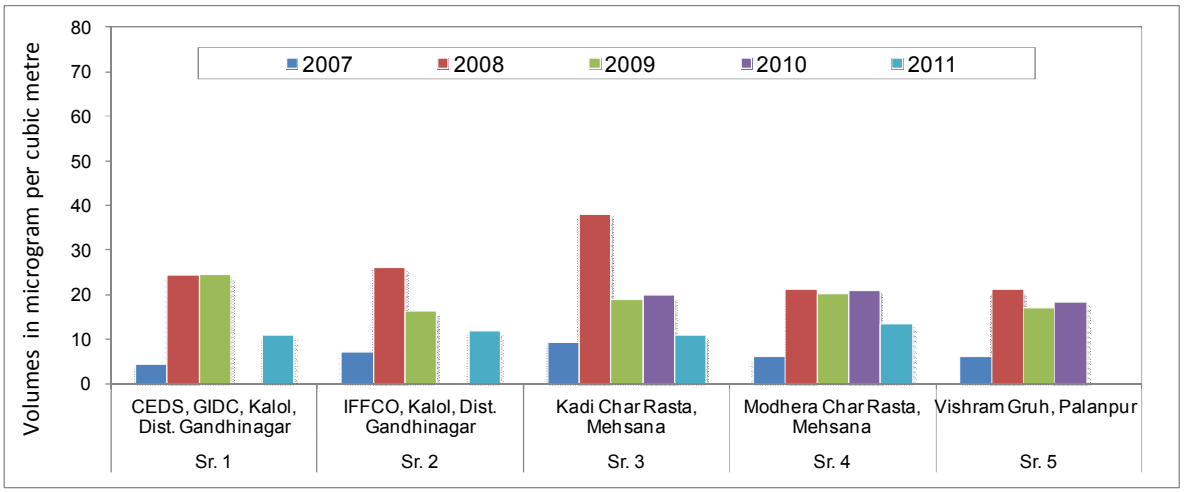
Source: Gujarat Pollution Control Board

Figure 6.3.2 Annual Change of RSPM at Monitoring Stations



Source: Gujarat Pollution Control Board

Figure 6.3.3 Annual Change of SO_2 at Monitoring Stations



Source: Gujarat Pollution Control Board

Figure 6.3.4 Annual Change of NO_x at Monitoring Stations

6.3.3 Impact Assessment

(1) Impact

Air quality along the proposed alignment is expected to be improved overall by reducing emissions from the goods carriers by the DFC project. The only time when air pollution is expected from the project is during the construction phase. The air pollution generated during the construction phase would be from the movement of construction machinery, earth moving activities and also from movement of materials through trucks. In addition, localized air pollutants will be generated due to cooking activities in workers hutments. All the activities are temporary in nature and would be ceased after the completion of construction.

Preconstruction Phase: During pre-construction phase, no impact has been assessed on ambient air quality.

Construction Phase: Respirable Particulate Matter (PM_{10}) would be the predominant pollutant affecting air quality during the construction phase as it is likely to generate considerable quantities of dust, especially during dry conditions due to excavation, backfilling, concreting, hauling, dumping of earth materials, construction spoils and vehicular movement along unpaved routes. Deterioration of air quality due to gaseous emissions from construction equipment and vehicular traffic will also occur. As for ROB construction areas, increases in air pollutants are also envisaged resulting from traffic jams due to construction work on the existing road.

Operation Phase: Electric locomotives are environment friendly as they run on electricity and no emission is produced. During operation phase, the impact on air quality will be positive. After the inception of the DFC, it is expected that road transportation of goods would be reduced which will lead to the reduction of vehicular pollution. Plantations along the alignment will also act as a sink for air pollutants.

(2) Evaluation

Air pollution impact during construction phase is of a short duration and temporary. As for ROB construction areas, the impact on ambient air quality would be localized and short term. It is therefore concluded that air pollution impacts during construction phase can be considered to be minor especially where appropriate mitigation measures and site management practices are applied.

6.4 WATER QUALITY

6.4.1 Study Methodologies

(1) Study on Water Quality Standards

The published literature, governmental documents, and existing regulations related to the water quality in India and those in Japan were reviewed to understand potential impacts and for the purpose of identifying appropriate mitigation measures.

(2) Study on Current Conditions

1) Official Monitoring

The official survey results of flow rate and water quality at the Balaram River were referred to determine river water quality characteristics at the bridge construction locations. The survey has been conducted by the Central Water Commission (CWC) as a part of long term sampling programme.

The CWC sampling point in the Balaram River is located in Banaskantha District. Details of sampling locations and parameters are presented in Table 6.4.1.

Table 6.4.1 The CWC Sampling Points in the Balaram River

Sampling point	GPS	Parameter	Sampling Date/Season
Balaram at Chitrasani	24°17'20"N 72°29'54"E	**PHYSICAL** – flow rate	Daily (2009-2010)
		PHYSICAL – Temperature, pH, EC, SS, TDS, Turbidity, flow rate **CHEMICAL** – Alkalinity (Phenolphthalein/ Total), Ca, Cl, CO_3, F, Fe, HCO_3, K, Mg Na, NH_3-N, NO_2+NO_3, NO_2-N, NO_3-N, P-Total, SiO_2, SO_4 **BIOLOGICAL/BACTERIOLOGICAL** – BOD_3-27, DO, DO saturation **TRACE & TOXIC** – Al **CHEMICAL INDICES** – Hardness (Ca/ Total), Na, Residual Sodium Carbonate (RSC), Sodium Adsorption Ratio (SAR)	Flood season average (2005-2009)

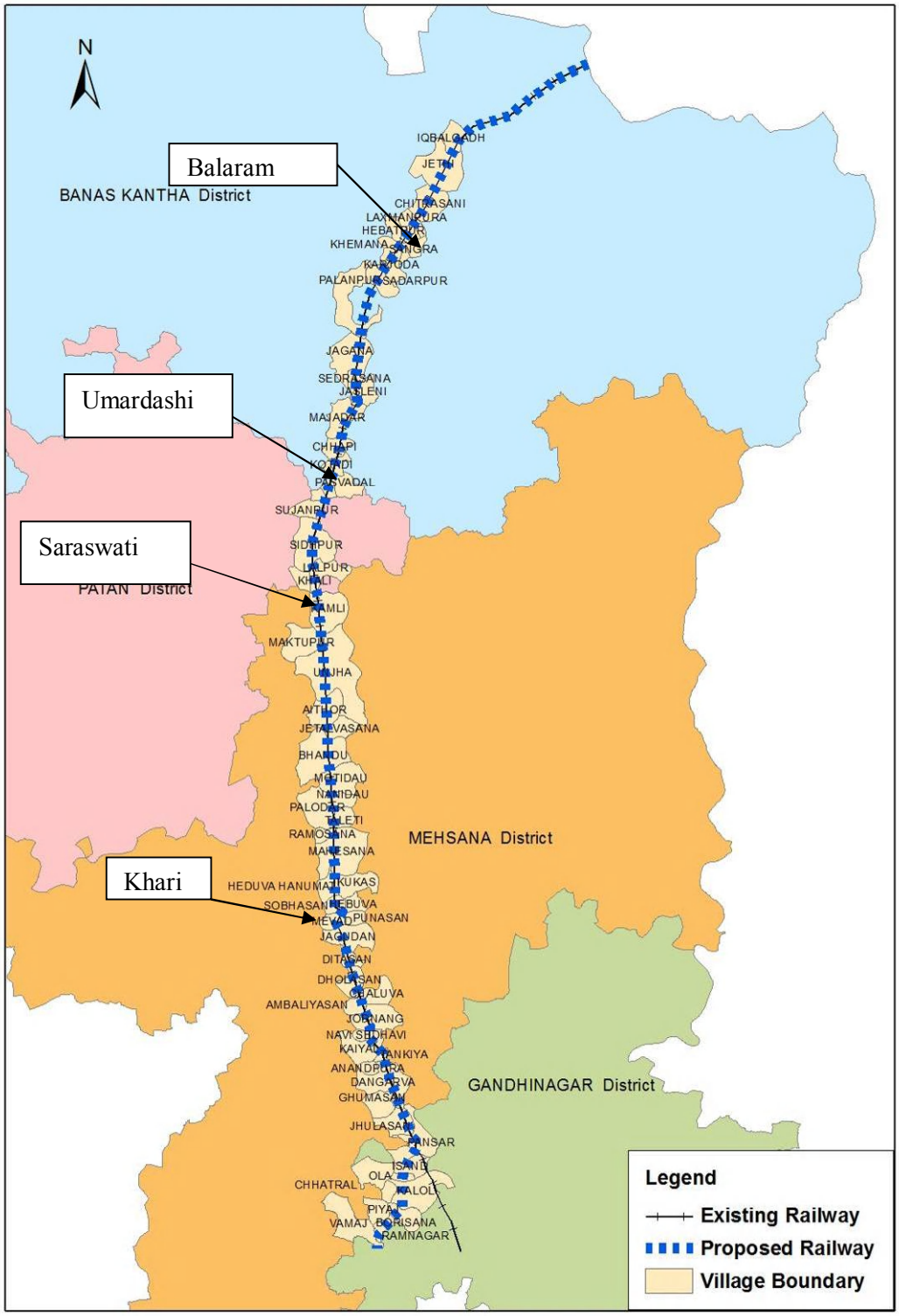
Source: Central Water Commission

2) On-Site Measurement

a) Measurement Sites

In the Wamaj - Iqbalgarh section, the DFC alignment crosses four prominent rivers (in respect of breadth of river bed) – the Khari (near Mehsana), Umardashi (near Chhapi), Saraswati (near Sidhhpur) and Balaram (near Chitrasani) Rivers. Locations of the crossing points of the rivers and the proposed DFC alignment are presented in Figure 6.4.1. However, site visits in August and September 2011 and interviews with local people revealed that water does not flow, even during monsoon season, in the Khari, Umardashi and Saraswati Rivers as shown in Photo 6.4.1. Dry river beds of the rivers have grasses and shrubs, which are used as fodder by cattles. As for the Khari River, it is effectively a stagnant pool of effluent produced by the industries located upstream and also for wastewater discharge from Mehsana town.

On the other hand, the Balaram River is ephemeral in nature and flows only in response to precipitation in the catchment. Consequently, field measurement and river water sampling were conducted in the Balaram River only.



Source: NKC

Figure 6.4.1 Location of Crossing Points of the Major Rivers and Proposed Alignment

Khari River (14 September, 2011)

Khari River (10 October, 2011)

Source: NKC

Umardashi River (14 September, 2011)

Saraswati River (14 September, 2011)

Source: NKC

Photo 6.4.1 Conditions of the Khari, Umardashi and Saraswati Rivers

b) Sampling Points in the Balaram River

The bridge construction site along the Balaram River is located in Banaskantha District at the edge of the Balaram Ambaji Wildlife Sanctuary. Sampling and field measurement of river water quality of the Balaram River was conducted at three points, i.e. upstream, near alignment and downstream in the Balaram River. Details of sampling locations and parameters are presented in Table 6.4.2.

Table 6.4.2 Sampling Points in the Balaram River

Sampling point	GPS	Sampling Date/Season	Parameter
1. Upstream (near Balaram temple, 1.2 km)	24°16'14.5"N 72°30'30.2"E	14.Sep.2011 (Monsoon)	pH, DO, Temperature, Turbidity, BOD, COD, TDS, TSS, Oil & Grease, Zinc, Copper, Magnesium, Total Coliform, Fecal Coliform
2. Near Alignment (existing railway Bridge - Core)	24°17'00.6"N 72°30'08.7"E	10.Oct.2011 (Post Monsoon)	
3. Downstream (near NH Bridge, 400 metres)	24°17'16.0"N 72°29'57.6"E		

Source: NKC

c) Measurement Season

Water sampling and field measurements were conducted in two different seasons, i.e., in September 2011 as monsoon season survey and in October 2011 as post-monsoon season survey.

d) Measurement Method

Water quality analysis was carried out for major parameters comprising of general parameters, organic matter, nutrients, major ions, other inorganic, toxic metals and microbiological. The details of parameter wise testing protocols used in the laboratory along with range of accuracy are given in Table 6.4.3.

Temperature, pH, DO and flow velocity were measured on-site. For other parameters, especially for biodegradable parameters, a preservation method was used as shown in Table 6.4.4. For greater reliability of results, the time gap between collection from the site and testing at the laboratory was kept to a minimum. Samples, which are packed in dry ice during transportation, were immediately transferred to the laboratory after preserving them.

Table 6.4.3 Testing Protocol and Range of Accuracy

Test Parameter	Detection Limit	Test Method
Temperature, ^{o}C	0.1	IS:3025(Part-9)1984
Dissolved Oxygen, mg/l	0.1	IS:3025(Part-38)1989
pH	0.01	IS:3025(Part-11)1984
Total Suspended Solids (TSS), mg/l	0.1	IS:3025(Part-17)1984
Turbidity, NTU	0.1	IS:3025(Part-10)1984
Total Dissolved Solids (TDS), mg/l	1.0	IS:3025(Part-16)1984
Biochemical Oxygen Demand (BOD), mg/l	0.1	IS:3025(Part-44)1993
Chemical Oxygen Demand (COD), mg/l	4.0	APHA 5220C
Oil & Grease, mg/l	0.05	IS:3025(Part-39)1991
Copper (as Cu), mg/l	0.003	IS:3025(Part-2)2004
Zinc (as Zn), mg/l	0.025	IS:3025(Part-2)2004
Manganese (as Mn), mg/l	0.003	IS:3025(Part-2)2004
Total Coliform, MPN/100ml	1.0	IS:1622-1981
Faecal Coliform, MPN/100ml	1.0	IS:1622-1981

Source: Central Pollution Control Board

Table 6.4.4 Preservation Methods for Important Parameters

Parameter	Preservation Methods
Turbidity	Refrigerate at 4°C
TDS	Refrigerate at 4°C
TSS	Refrigerate at 4°C
DO	Fix with $MnSO_4$ and alkaline iodide on site, titration may be delayed after acidification
BOD	Refrigerate at 4°C
COD	Add $H_2SO_4$to pH < 2
Oil& Grease	Add $H_2SO_4$to pH < 2, Refrigerate at 4°C
T.Coli & F.Coli	Refrigerate, keep in incubated bottle
Zn	Refrigerate at 4°C
Cu	Refrigerate at 4°C
Manganese	Refrigerate at 4°C

Source: Central Pollution Control Board

6.4.2 Survey Results

(1) Water Quality Standards

1) Water Quality Standards in India

The environmental water quality standards in India as designated best use with classes from A to below E are shown in Table 6.4.5.

Table 6.4.5 Environmental Water Quality Standards in India

Designated-Best-Use	Class	Criteria
Drinking water wource without conventional treatment but after disinfection	A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • DO 6mg/l or more • BOD 5 days 20°C 2mg/l or less
Outdoor bathing (Organised)	B	• Total Coliforms Organism MPN/100ml shall be 500 or less • pH between 6.5 and 8.5 • DO 5 mg/l or more • BOD 5 days 20°C 3 mg/l or less
Drinking water source after conventional treatment and disinfection	C	• Total Coliforms Organism MPN/100ml shall be 5,000 or less • pH between 6 to 9 • DO 4 mg/l or more • BOD 5 days 20°C 3 mg/l or less
Propagation of wildlife and fisheries	D	• pH between 6.5 to 8.5 • DO 4 mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
Irrigation, industrial cooling, controlled waste disposal	E	• pH between 6.0 to 8.5 • Electrical Conductivity at 25°C micro mhos/cm Max.2250 • Sodium absorption Ratio Max.26 • Boron Max.2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

Source: Central Pollution Control Board

2) Water Quality Standards in Japan

In Japan, the basic Environmental Law establishes two kinds of Environmental Quality Standards relating to water quality: for protecting human health and for protecting the living environment. Here the environmental quality standards for protecting the living environment in rivers are shown in Table 6.4.6 for comparison to the standards in India.

Table 6.4.6 Environmental Water Quality Standards in Japan (Rivers)

Item / Class	Water Use	Standard Value				
		pH	BOD (mg/l)	SS (mg/l)	DO (mg/l)	Total Coliform (MPN/100ml)
AA	Water supply class 1, conservation of natural environment, and uses listed in A-E	6.5-8.5	≤ 1	≤ 25	≥ 7.5	≤ 50
A	Water supply class 2, fishery class 1, bathing and uses listed in B-E	6.5-8.5	≤ 2	≤ 25	≥ 7.5	≤ 1,000
B	Water supply class 3, fishery class 2, and uses listed in C-E	6.5-8.5	≤ 3	≤ 25	≥ 5	≤ 5,000
C	Fishery class 3, industrial water class 1, and uses listed in D-E	6.5-8.5	≤ 5	≤ 50	≥ 5	-
D	Industrial water class 2, agricultural water, and uses listed in E	6.0-8.5	≤ 8	≤ 100	≥ 2	-
E	Industry water class 3 and conservation of environment	6.0-8.5	≤ 10	*	≥ 2	-

* Floating matter such as garbage should not be observed.
Source: Ministry of the Environment, Japan

(2) Results of Official Monitoring

1) Flow Rate in the Balaram River

The official monitoring results of flow rate by CWC are summarized in Table 6.4.7. In the Balaram River, water flows only in the brief period of monsoon season. The average flow rate peaked in the last 10 days of July 2009 at 3.84 m^3/s.

Table 6.4.7 Flow Rate in the Balaram River

			2009					
			Jun	Jul	Aug	Sep	Oct	Nov
Average flow rate (m3/s)	In every 10 days	First	0.00	0.00	0.05	0.11	0.00	0.00
		Middle	0.00	1.04	0.00	0.00	0.00	0.00
		Last	0.00	3.84	0.32	0.00	0.00	0.00
	Monthly		0.00	1.70	0.13	0.04	0.00	0.00
			2009	2010				
			Dec	Jan	Feb	Mar	Apr	May
Average flow rate (m3/s)	In every 10 days	First	0.00	0.00	0.00	0.00	0.00	0.00
		Middle	0.00	0.00	0.00	0.00	0.00	0.00
		Last	0.00	0.00	0.00	0.00	0.00	0.00
	monthly		0.00	0.00	0.00	0.00	0.00	0.00

Source: Central Water Commission

2) Water Quality in the Balaram River

The results of water quality analysis in monsoon season (Jun.-Oct.) are presented in Table 6.4.8. The values of pH ranged between 7.3 to 8.4, which remain within CPCB criteria (between 6.5 to 8.5 for Class A water).

Table 6.4.8 Water Quality in the Balaram River (Monsoon Season)

Parameters	Monsoon (Jun. – Oct.)				
Year	2005	2006	2007	2008	2009
PHYSICAL					
Temperature (deg C)	25.3	27.0	28.5	27.2	26.8
pH (pH units)	7.9	7.3	8.4	7.9	8.1
EC (µmho/cm)	241	610	522	736	567
SS (mg/L)	41	36	52	17	18
TDS (mg/L)	165	380	317	465	368
Turbidity (NTU)	5.0	10.0	7.5	1.5	1.0
Flow rate (m3/s)	2.026	4.150	2.160	0.110	0.226
CHEMICAL					
Alkalinity-Phen ($mgCaCO_3/L$)	0.0	0.0	3.7	0.0	0.0
Alkalinity-Total ($mgCaCO_3/L$)	164	233	251	304	156
Ca (mg/L)	29	31	39	52	30
Cl (mg/L)	20.0	68.0	61.0	80.0	76.0
CO_3 (mg/L)	0.0	0.0	4.5	0.0	0.0
F (mg/L)	0.25	0.76	0.94	1.02	0.96
Fe (mg/L)	0.0	0.0	0.2	0.3	0.2
HCO_3 (mg/L)	100	142	149	186	190
K (mg/L)	1.0	0.9	1.1	2.6	2.1
Mg (mg/L)	5.2	9.7	11.7	11.2	22.4
Na (mg/L)	14.0	52.0	42.4	59.7	55.6
NH_3-N (mg N/L)	-	-	0.05	0.28	0.46
NO_2+NO_3 (mg N/L)	0.14	0.19	0.83	0.81	0.10
NO_2-N (mgN/L)	0.03	0.01	0.02	0.01	0.03
NO_3-N (mgN/L)	0.12	0.18	0.81	0.80	0.07
P-Total (mgP/L)	0.013	0.010	0.030	0.055	0.040
SiO_2 (mg/L)	12.9	20.5	37.9	29.0	21.6
SO_4 (mg/L)	9.0	14.5	16.1	23.1	22.8
BIOLOGICAL/BACTERIOLOGICAL					
BOD_3-27 (mg/L)	0.5	0.7	1.6	2.2	2.6
DO (mg/L)	6.2	5.9	8.7	7.5	7.4
DO-SAT (%)	76	74	112	93	91
TRACE & TOXIC					
Al (mg/L)	0.02	0.01	0.05	0.01	0.02
CHEMICAL INDICES					
Hardness-Ca ($mgCaCO_3/L$)	73	78	98	130	76
Hardness -Total ($mgCaCO_3/L$)	94	119	147	177	169
Na (%)	23	49	39	42	41
RSC (-)	0.0	0.0	0.0	0.0	0.0
SAR (-)	0.6	2.1	1.5	2.0	1.9

Note: RSC-Residual Sodium Carbonate, SAR-Sodium Adsorption Ratio
Source: Central Water Commission

(3) Results of On-Site Measurement

1) Field Observation

The observed conditions near sampling points are summarized in Table 6.4.9. Photographs of sampling activities for monsoon season survey and post-monsoon season survey are enclosed as Photos 6.4.2 and 6.4.3, respectively.

Table 6.4.9 Description of Sampling Locations in the Balaram River

Item	Description
About the river	It originates from north-east hills and flows near the Balaram temple, where it is called Balaram. It joins the Banas river near Karja Village of Palanpur Taluka. The length of this river is 32 km.
Sampling point description	The sampling point is exactly at the point where the DFC bridge would be constructed. Downstream point is approx. 400 m away, near the highway bridge. Upstream point is approx. 1.2 km away, near Balaram temple.
Natural environmental conditions near sampling point	Both banks of the river are rich in herbs and dense shrubs. The site on the river is a habitat of freshwater and estuarine aquatic biota. Both banks of the river have hard rocks. Apparently the water was very clear and clean, without much silt load. Local people used water near the Balaram temple though area near the bridge and immediate downstream was not used.

Source: NKC






Source: NKC

Photo 6.4.2 Water Sampling at the Balaram River (Monsoon Season)

Source: NKC

Photo 6.4.3 Water Sampling at the Balaram River (Post-Monsoon Season)

2) Water Quality Analysis

The results of water quality analysis in monsoon season survey, which was conducted on 14 September 2012, are summarized in Table 6.4.10. DO ranged between 5.8 to 6.4 mg/l which corresponded to water classes A or B as per CPCB water quality standards in India. On the other hand, BOD ranged between 5 to 8 mg/l which corresponded to below water class D. Total Coliform showed more than 1,600 MPN/100ml which corresponded to water class B or below. The relatively higher values of BOD and Total Coliform, including Faecal Coliform, indicated there was some pollution probably from bathing of cattle, especially domesticated buffalo in the river. As for the other parameters, COD ranged between 20 to 28 mg/l; TDS between 184 to 296 mg/l and TSS ranged between 26 to 38 mg/l. Oil & Grease was present in traces and metals were almost insignificant.

Table 6.4.10 Result of Water Quality Survey of the Balaram River (Monsoon Season)

Parameters with CPCB Standard								Surface Water Sampling Location (River)			
Sr. No.	Parameters	Unit	Classification for Inland Surface Water (CPCB)					SW - 1 Nr. Railway Bridge Core Stream 14th September 2011	SW - 2 Nr Balaram Temple Upstream 14th September 2011	SW - 3 Nr Balaram Bridge Downstream 14th September 2011	Remark
			A	B	C	D	E	Results			
1	pH	pH Scale	6.5 to 8.5	6.5 to 8.5	6.0 to 9.0	6.5 to 8.5	6.0 to 8.0	7.26	7.19	7.10	
2	Total Dissolved Oxygen	mg/l	6.0	5.0	4.0	4.0	NS	6.1	5.8	6.4	
3	Temperature	°C	NS	NS	NS	NS	NS	25	25	25	
4	Turbidity	NTU	NS	NS	NS	NS	NS	10	4	13	
5	BOD	mg/l	2.0	3.0	3.0	NS	NS	5	6	8	
6	COD	mg/l	NS	NS	NS	NS	NS	20	24	28	
7	Total Dissolved Solids	mg/l	500	NS	1500	NS	2100	184	296	224	
8	Total Suspended Solids	mg/l	NS	NS	NS	NS	NS	38	26	32	
9	Oil & Grease	mg/l	NS	NS	NS	NS	NS	Traces	Traces	Traces	
10	Zinc	mg/l	1.5	NS	1.5	NS	NS	0.02	0.006	0.009	
11	Copper	mg/l	1.5	NS	1.5	NS	NS	0.01	Nil	Nil	
12	Manganese	mg/l	NS	NS	NS	NS	NS	Nil	0.029	Nil	
13	Total Coliform	MPN/100ml	50	500	5000	NS	NS	>1600	>1600	>1600	
14	Faecal Coliform	MPN/100ml	NS	NS	NS	NS	NS	220	220	210	
	Classification of Inland Surface waters as per CPCB Standards :										
A	Drinking water source without conventional treatment but after disinfection										
B	Out door bathing (organised)										
C	Drinking water source with conventional treatment followed by disinfection										
D	Propagation of wildlife, fisheries										
E	Irrigation, industrial, cooling controlled waste disposal										

Source: NKC

The results of water quality analysis in post-monsoon season survey which was conducted on 10 October, 2011, are summarized in Table 6.4.11. DO ranged between 7.2 and 8.4 mg/l, BOD showed below detection limit or 3mg/l and Total Coliform ranged between 14 to 17 MPN/100ml. They were corresponding to water classes A or B. As for the other parameters, COD ranged showed below detection limit or 12mg/l, TDS between 348 to 416 mg/l, while TSS, Oil & Grease, and metals were almost nil or insignificant. The overall results indicate that water quality was slightly better in the post-monsoon season than the monsoon season, except TDS.

Table 6.4.11 Results of Water Quality Survey of the Balaram River (Post-Monsoon Season)

Parameters with CPCB Standard								Surface Water Sampling Location (River)			
Sr. No.	Parameters	Unit	Classification for Inland Surface Water (CPCB)					SW - 1 Nr. Railway Bridge Core Stream 10th October 2011	SW - 2 Nr Balaram Temple Up stream 10th October 2011	SW - 3 Nr Balaram Bridge Down stream 10th October 2011	Remark
			A	B	C	D	E	Results			Detection Limits
1	pH	pH Scale	6.5 to 8.5	6.5 to 8.5	6.0 to 9.0	6.5 to 8.5	6.0 to 8.0	7.86	7.19	7.10	0.01
2	Total Dissolved Oxygen	mg/l	6.0	5.0	4.0	4.0	NS	7.9	8.4	7.2	0.1
3	Temperature	°C	NS	NS	NS	NS	NS	24	24	24	1
4	Turbidity	NTU	NS	NS	NS	NS	NS	N.D.	N.D.	N.D.	0.1
5	BOD	mg/l	2.0	3.0	3.0	NS	NS	N.D.	N.D.	3	1
6	COD	mg/l	NS	NS	NS	NS	NS	N.D.	N.D.	12	4
7	Total Dissolved Solids	mg/l	500	NS	1500	NS	2100	408	348	416	4
8	Total Suspended Solids	mg/l	NS	NS	NS	NS	NS	N.D.	N.D.	N.D.	1
9	Oil & Grease	mg/l	NS	NS	NS	NS	NS	N.D.	N.D.	N.D.	0.4
10	Zinc	mg/l	1.5	NS	1.5	NS	NS	0.503	N.D.	N.D.	0.004
11	Copper	mg/l	1.5	NS	1.5	NS	NS	N.D.	N.D.	N.D.	0.02
12	Manganese	mg/l	NS	NS	NS	NS	NS	N.D.	N.D.	N.D.	0.01
13	Total Coliform	MPN/100ml	50	500	5000	NS	NS	14	17	14	2
14	Faecal Coliform	MPN/100ml	NS	NS	NS	NS	NS	4.5	4.0	4.5	2
15	Conductivity	µmhos/cm	NS	NS	NS	NS	NS	624	530	630	0.002
16	Flow Velocity	m/s	NS	NS	NS	NS	NS	13/17	13/12	13/18	-
	Classification of Inland Surface waters as per CPCB Standards :										
A	Drinking water source without conventional treatment but after disinfection										
B	Out door bathing (organised)										
C	Drinking water source with conventional treatment followed by disinfection										
D	Propagation of wildlife, fisheries										
E	Irrigation, industrial, cooling controlled waste disposal										

Source: NKC

6.4.3 Impact Assessment

(1) Impact

The most significant impact anticipated from bridge construction activities would be increased siltation due to earth works and increased turbidity in the Balaram River. In addition, organic and bacterial loads from labour colonies may impact the Balaram River water quality.

Pre-construction Phase: During pre-construction phase, no negative impact is predicted on river water quality.

Construction Phase: A number of activities associated with the construction of bridges over the river could have potential negative impacts on surface water quality. The activities include:

i) Site clearance
ii) Earthwork including embankment and cutting
iii) Demolition activities
iv) Construction of approach road, footpath, associated facilities and services
v) Construction materials handling, storage, use of fuels, oil and other potentially polluting construction materials
vi) Spillage and uncontrolled release of construction materials such as cement, concrete, diesel, hydraulic fluid, paint.

Silt and spillage of materials into the river bed (and sometimes in river water) may arise from earthwork, exposed ground, water collection in excavations, stockpiled material and site roads. Soil compaction may also occur as a result of construction vehicles and heavy vehicles passing over previously undeveloped land. Soil compaction causes a reduction in the volume of water penetrating into the ground, ultimately affecting the groundwater regime of the area. The deterioration of water quality during construction phase is also expected due to wastewater disposal from workers camp and sullage generated from construction sites.

Operation Phase: Maintenance from sub-depos at intervals along the alignment will maintain and repair track, catenary and other elements. This work would pollute river water with residual oil, grease and iron fillings etc.

(2) Evaluation

Water pollution impacts during construction phase will occur over a short duration and are temporary. The impact during operation would be localized and minimized. It is therefore concluded that water pollution impact can be considered to be minor especially where mitigation measures and site management practices are applied.

6.5 WASTE

Under the existing planning phase, type of construction waste which is expected to generate are asphalt or concrete chunks, surplus soil, construction scrap materials and others. Although the amount and percent composition of construction waste is not clear in this phase, surplus soil is planned to be reused as much as possible in construction of the DFC embankment. In addition, all other construction waste is also planned to comply with relevant Center or State laws pertaining to the waste management. According to DFCCIL's Corporate Environment Policy, concept of waste utilization will be promoted by encouraging recycling and reuse. The project therefore will inbuilt such measures to reduce overall volume of waste generated from different construction sites linearly along the proposed alignment.

In principle, most of metal scrap and other saleable wastes are received by authorized dealers. However, concrete and masonry wastes which constitute a major part of construction waste is currently not recycled. At present, private contractors remove this waste to privately owned low-lying land for a price or more commonly, dump it in an unauthorized manner along roads or other public land. Small quantities of construction waste usually get mixed with domestic waste due to lack of segregated storage and collection facilities. These improper practices shall be improved in the Project by promoting separate collection, site storage and disposal of debris and bulk wastes. Some part of these wastes can be used in embankment and in road making along the embankment. Other non-usable part of such concrete and masonry waste shall be disposed of in only designated low-lying sites which have been already identified by the local municipal council or committee of falling along the alignment.

Burning of debris, vegetation, rubber or any other form of construction waste is prohibited as per the existing legislation and no such practice shall be allowed in the project.

Other form of waste such as non-recyclable waste, packaging waste, e-waste (used cartridges, toners, wires, computers, printers etc.) generated from the site offices and labour camps shall be disposed of as per the existing laws.

CHAPTER 7 NATURAL ENVIRONMENT

7.1 Flora and Fauna, Biodiversity

7.1.1 General

The objective of the flora, fauna and biodiversity assessment was to assess and confirm the presence of fauna/flora species along the proposed alignment and in nearby/immediately surrounding areas. This assessment of species and habitats is viewed as essential in order to avoid, minimise or reduce and compensate for any potential project impacts on biodiversity. For this purpose, the natural environment study including the following items were conducted:

i. Biodiversity assessment where the project may impact important conservation habitats and species of flora and fauna of conservation concern (particularly in designated forest and protected areas); and
ii. Enumeration of trees to be removed along the proposed alignment.

The alignment has been adjusted on environmental, social and economic grounds. The proposed DFC alignment should require less land acquisition and therefore reduced social impacts and costs as well as less impact on natural and recorded forest areas. Throughout much of the alignment, the DFC runs parallel to and within the RoW of the existing railway track. As such, there is now no recorded forest area along the alignment of the DFC in the section and the alignment runs outside the buffer zone of the TLBS and for this reason a detailed field survey was conducted only for the necessary area where the DFC project may impact upon species and habitats of conservation concern and thus were confined to the sites where the alignment intersects a protected area or recorded forest area. The only area in this section of the alignment fitting this description is the short section of the alignment which passes through the BAWS.

Overall, the Wamaj - Iqbalgarh section of the DFC passes through four districts - Banaskantha, Patan, Mehsana and Gandhinagar (north to south) in northern - central Gujarat. Within this section, more than 90% of the proposed alignment passes through cultivated agricultural areas, scrub and wasteland generally characterised by relatively poor soils (except in Gandhinagar). Agricultural land is interspersed by settlements, small patches of highly fragmented forest and areas of rocky scrub and dry temporal rivers. The most important rivers include the Sabarmati, Saraswati, Balaram and Banas. The Narmada Canal should also be noted as an important water channel. The fact that the proposed alignment section between Wamaj and Iqbalgarh is relatively short in comparison to other sections of the alignment means there is generally less ecological variation. Generally, the Wamaj - Iqbalgarh section can be described as being semi-arid to arid with a gradual transition of lands and soils becoming less fertile, more arid and rocky moving northwards along the alignment.

7.1.2 Study Methodology

(1) Survey Area

The proposed alignment in northern Banaskantha follows the existing railway track. As such the RoW is not a part of the BAWS and no further land is to be acquired from the BAWS. Nonetheless, the construction and operation of the DFC is expected to present

certain negative environmental impacts primarily on the immediately adjacent areas on the edge of the BAWS. Therefore, field survey was conducted focusing on the alignment which runs through the BAWS between Chitrasani and Jethi. However, since there is a wide ecological landscape between BAWS and JSBS, a broad ecological approach such as taking ecological condition in JSBS into consideration was adopted for biodiversity assessment.

The field survey areas regarding trees, forests and biodiversity were identified on the basis of interviews with the State forest authorities and are shown on the Final Location Survey Map and Land Plan for the DFC. Although BAWS was the target of biodiversity assessment, fauna condition was also recorded incidentally during tree census surveys in non-forest areas such as village areas, fields and/or other places.

The fact that the proposed DFC alignment intersects the BAWS means that even though the alignment will be within the RoW of the existing railway track, a biodiversity assessment is required as part of the environmental safeguards. It should also be noted that an assessment of the impacts of infrastructure projects on wildlife and their habitats inside or on the periphery of protected areas is also required by Indian environmental legislation, namely the Wildlife (Protection) Act, 1972. In addition, there will be a parallel process undertaken by the State and National Wildlife Board to assess impacts and produce binding compensatory and mitigation measures to be approved and enacted ultimately by the Central Empowered Committee and the Supreme Court.

Table 7.1.1 outlines the main contents of the natural environment study for the Wamaj - Iqbalgarh section.

Table 7.1.1 Outline of the Flora, Fauna and Biodiversity Study (Wamaj – Iqbalgarh)

Contents	Assessment Methods	Field Survey Area	Number of Sites	Survey Period
Biodiversity Assessment (Fauna/Flora, Ecological Connectivity)	Field survey Analysis of secondary data Expert interviews	Protected areas: BAWS and JSBS	1 forest section	Pre-monsoon (June) Monsoon (August)

Source: NKC

(2) Survey Method and Period

Literature Review: A number of relevant documents and published literature were reviewed (Appendix 7a), providing useful background information on the BAWS and the JSBS (such as the protected area management plans, wildlife census data and biodiversity reports), on the behaviour and ecology of key species of conservation concern (e.g. studies on the sloth bear), as well as other environmental impact studies such as the initial studies carried out under the ESIMMS and the S-ESIMMS as well as an environmental impact study for NH14 which also runs parallel to the existing railway track and bisects the two protected areas.

Stakeholder Consultations: Interviews and meetings were conducted with various relevant stakeholders including protected area managers and their field staff and local people. Such consultations were a useful means of extracting local knowledge on the presence of key species and in identifying ecological hotspots within the BAWS-JSBS landscape.

Field Surveys: Biodiversity assessments were carried out during the pre-monsoon and monsoon seasons as mentioned above to confirm the presence of fauna/flora species along the DFC alignment inside the BAWS. Flora surveys involved plot sampling at regular intervals along the alignment inside the BAWS whilst fauna surveys consisted of faunal counts and observations (direct/indirect) along a transect in the alignment. Additionally, site visits were also made to JSBS and key ecological hotspots along the western boundary of the BAWS to qualitatively assess habitat quality as well as potential impacts resulting from construction and operation of the DFC. However vegetation sampling and fauna surveys were not carried out at these locations.

Expert Interviews: Interviews were conducted with selected local experts from NGOs and research institutions with knowledge and specialisation in relevant topics such as the ecology and fauna/flora of the specific area and its resident and migrant species. The opinion of experts was sought to identify particular issues affecting and/or impacts on specific ecological communities or species and to confirm appropriate compensation/mitigation measures and recommendations. Expert opinions have been recorded and summarised (Appendix 7b).

Survey Periods: Biodiversity assessments were carried out in the field over two seasons in accordance with standard procedures and as a matter of good practice with respect to the conduct of biodiversity surveys for an environmental impact assessment. Biodiversity assessments are conducted over two seasons to take into account the fact that species occurrence in specific areas may vary throughout the year. This is particularly true of migratory avian fauna or mammals dependent on water sources or salt licks for example. The study area is situated in an arid biogeographic zone, hence substantial changes occur between seasons with respect to ground flora, which differs significantly between dry season and during monsoon. For this reason field surveys were conducted in the pre-monsoon (June) and monsoon (August) periods. Table 7.1.2 summarises the field survey schedule implemented. Two season surveys were conducted in the pre-monsoon (June) and monsoon (August) seasons the objective being to assess the biodiversity and confirm the presence of key species of fauna and flora in the part of the BAWS to be directly affected by the DFC. The biodiversity assessment also considered the broader impacts of the DFC on the BAWS-JSBS ecological landscape (although a field biodiversity survey was not conducted in JSBS). In carrying out the assessment, a variety of primary and secondary information collection methods were employed:

Table 7.1.2 Field Survey Schedule

Season	Period	Surveyed Forest
Pre-monsoon	21 Jun 2011	Balaram Ambaji Wildlife Sanctuary (Chitrasani – Jethi)
	22 Jun 2011	Balaram Ambaji Wildlife Sanctuary (Chitrasani – Jethi)
Monsoon	25 August 2011	Balaram Ambaji Wildlife Sanctuary (Chitrasani – Jethi)
	26 August 2011	Balaram Ambaji Wildlife Sanctuary (Chitrasani – Jethi)

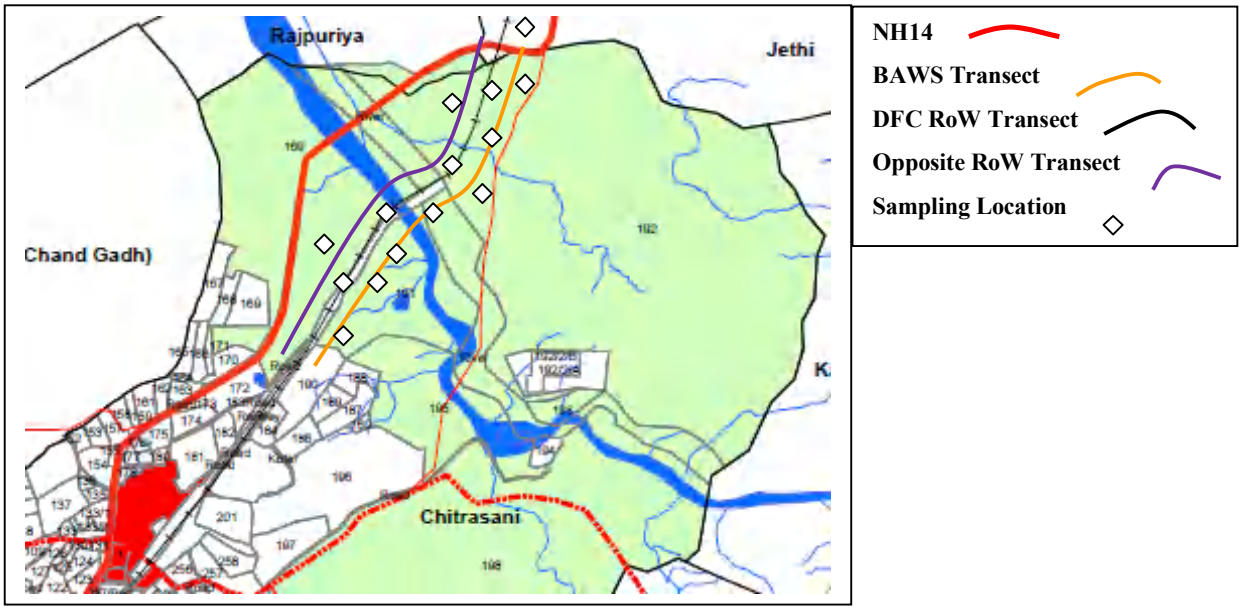
Source: NKC

(3) Field Survey Methodology (Flora)

A quadrate sampling method was followed for vegetation sampling and analysis. Square sample plots (10m x 10m) were laid for detailed analysis of the trees and shrubs and 1m x 1m quadrate plots were laid for grass/herb species within the larger quadrate (at the same corner of the 10m x 10m quadrates each time for consistency) in order to determine the floral composition along the proposed corridor.

Sampling plots were laid in three linear transects along the alignment i.e. the BAWS transect, the DFC RoW transect and the transect lying on the other side of the existing railway tracks. A total of 45 quadrates were laid at 19 sample plot locations. Figure 7.1.1 presents an approximation of the transects and sampling locations. It should be noted that the survey team attempted to use the same sampling locations (as close as possible) during both seasons in order to make a comparative analysis. The liner transect method is suitable for assessing the general vegetation characteristics and patterns along the proposed alignment, whilst the use of quadrates allows for assessment of density and abundance of vegetation species in the study area.

The encountered vegetation in the sample plots was recorded using common, local and scientific names along with number and coverage data within both types of quadrate.



Source: NKC

Figure 7.1.1 Transect and Sampling Locations

Vegetation data analysis primarily followed Curtis & McIntosh (1950). This quantitative method involves the calculation of each vegetation species' frequency, abundance, density and dominance which in themselves provide useful information for the analysis of particular habitats. However, once these values are calculated and relative values worked out, the subsequent calculation of a given species' Importance Value Index (IVI) becomes possible. The formulas required for this analysis including the calculation of IVI are provided below.

$$\text{Frequency} = \frac{\text{Total number of quadrats in which species occurred}}{\text{Total number of quadrats studied}}$$

$$\text{Abundance} = \frac{\text{Total number of individuals of species in all quadrats}}{\text{Total number of quadrats in which species occurred}}$$

$$\text{Density} = \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrats studied}}$$

IVI = Relative Density + Relative dominance + Relative frequency

Where:

$$\text{Relative frequency} = \frac{\text{Frequency of a species}}{\text{Total frequency of all species}} \times 100$$

$$\text{Relative density} = \frac{\text{Density of a species}}{\text{Total density of all species}} \times 100$$

$$\text{Relative dominance} = \frac{\text{Dominance of a species}}{\text{Total dominance of all species}} \times 100$$

For further analysis of vegetation species diversity and richness, the Shannon-Wiener function was applied (Shannon and Wiener, 1963), which is:

$$\bar{H} = \sum_{i=1}^{S} \left(\frac{Ni}{N}\right) log_{10}\left(\frac{Ni}{N}\right)$$

Where, Ni is the total number of individuals of species i and N is the total number of all species in a given forest area.

Simpson's Index (Simpson, 1949) is a measure of diversity which considers both richness and evenness:

$$CD = \sum_{i=1}^{S} \left(\frac{Ni}{N}\right)^2$$

Where, Ni and N were the same as for Shannon-Wiener function (above). This index ranges from zero to one. In the analysis here the figure closest to zero represents the area with higher diversity (acknowledging that some studies counteract the counter-intuitive nature of the Simpson's Index).

(4) Field Survey Methodology (Fauna)

Fauna surveys were conducted over two seasons (pre-monsoon and monsoon) in tandem with the flora surveys along the proposed alignment between Chitrasani and Jethi stations (plus 300 m at each end), where the alignment falls within the BAWS. The findings are limited to only the areas directly affected by the DFC project and therefore are not

representative of the entire protected area landscape. The affected area is on the western edge of the BAWS and is characterised by significantly degraded habitat.

Visits were also made to other sites identified based on assessments of maps, satellite images and consultations with DFO staff as potential or actual ecological hotspots (generally areas with permanent waterholes and particularly those with dense surrounding vegetation) along the western boundary of the BAWS and the JSBS to assess potential impacts on areas which are known to be used by wildlife species but surveys were not undertaken. In almost all cases such hotspots are at least 1 km from the proposed alignment, therefore the direct impact is minimal.

The specific methodology involved conducting a linear trek and visual count/observation along the proposed alignment inside the BAWS plus 300 m at each end (north and south). Evidence of fauna species (including birds, mammals and reptiles) was recorded using common, local and scientific names. Fauna species were recorded on the basis of direct observation, tracks (e.g. footprints) and/or other signs (e.g. dung, scat, claw marks etc) on both sides of the alignment. Experts, local forest officers and villagers were also consulted to confirm the presence of particular species.

7.1.3 Findings from Field Survey (Flora, Fauna, Biodiversity Survey)

(1) Flora Survey Findings

Overall a total of 66 flora species were recorded over two survey seasons at sample plots along the proposed DFC alignment, including 16 species of tree, 7 shrub species, 4 climbers and 39 grass/herb species (a full species list is presented as Appendix 7c). Although endangered species were recorded in the national regulation and IUCN Red List, no endangered or otherwise protected flora species were recorded during the field surveys at either pre-monsoon or monsoon seasons.

Table 7.1.3 shows tree species in the area along the proposed alignment inside the BAWS. As a whole, the exotic *Prosopis juliflora* is dominant species. Acacia *nilotica* and *Balanites aegyptica* (another exotic) also constitute a considerable proportion of the tree species composition. All three of these species have been widely used and introduced for reforestation in the past in this part of India. This composition of tree species and the limited abundance and frequency of other native species is indicative of a habitat that has been significantly disturbed by anthropogenic influences. Some native species with flowers and fruits that make up an important part of local wildlife species' diet such as *Cassia fistula* and *Butea monosperma* do remain in the area and were recorded during the survey.

Another sign that the area is significantly degraded is the lack of an understorey - only 7 species of shrub were recorded and their abundance, coverage and frequency were extremely low. Successful invasive species such as *Prosopis juliflora* tend to wipe out the understorey.

Groundcover represented by grasses and herbs shows greater diversity but here still, species that are specifically native to the area and that dominate more intact or undisturbed areas of the BAWS, in the study area are dominated by species such as *Achyranthus aspera* (although not an exotic species, it is an extremely invasive weed) and *Tephrosia purpurea* (a common wasteland weed that grows in poor soils). *Cenchrus setigerus, Crotolaria lutescens* and others are still found in parts but are secondary species.

Table 7.1.3 Flora Survey Summary Data Pre-monsoon Season (June 2011) and Monsoon Season (August 2011)

No	Name of Species			Total No. of Species recorded		Conservation Status
	Scientific Name	Common Name	Local Name	P	M	
Tree Species – Total Species Recorded: 16						
1	*Prosopis juliflora*	-	Vilayati Babool	155	48	Not threatened
2	*Acacia nilotica*	Gum Arabic/Babul	Babool	45	95	Not threatened
3	*Balanites aegyptica*	-	Aniyar	63	19	Not threatened
4	*Butea monosperma*	Flame of the forest	Palas	13	10	Not threatened
5	*Cassia fistula*	Golden shower tree	Amaltas	8	4	Not threatened
Shrub Species – Total Species Recorded: 7						
1	*Cassia auriculata*	Avaram Senna	Aval	8	13	Not threatened
2	*Zizyphus mauritiana*	Indian Plum	Ber	0	8	Not threatened
3	*Calotropis procera*	Apple of Sodom	Akda	3	3	Not threatened
3	*Capparis sepiearia*	Caperbush	Kanthar	0	6	Not threatened
Climbers – Total Species Recorded: 4						
1	-	-	Bhinda vel	0	62	Not threatened
2	*Luffa acutangula*	Ridged luffa	Turiya	0	11	Not threatened
2	*Momordica dioica*	Spiny gourd	Kankoda	0	11	Not threatened
Grasses & Herb Species – Total Species Recorded: 39						
1	*Achyranthus aspera*	Prickly Chaff flower	Apmarga	1	920	Not threatened
2	*Tephrosia purpurea*	Wild Indigo	Sarpankhi	645	142	Not threatened
3	*Digitaria adscendens*	Summer grass	Tarodi grass	0	407	Not threatened
4	*Commelina benghalensis*	Bengal dayflower	Kush pushpi	0	263	Not threatened
5	*Xanthium strumarium*	Cocklebur	Gorkhru	0	212	Not threatened
6	*Eragrostis tenella*	-	Chiar	0	118	Not threatened
7	*Cynodon dactylon*	Indian Doab	Dharo grass	72	23	Not threatened
8	*Cenchrus setigerus*	Birdwood grass	Dhaman	0	93	Not threatened
9	*Boerhavia elegans*	-	Vasedo	0	88	Not threatened
10	*Crotolaria lutescens*	-	-	58	0	Not threatened

Note: P-Pre-monsoon season, M-Monsoon season
Source: NKC field survey

The most obvious difference between pre-monsoon and monsoon seasons is in terms of groundcover and this is also shown to some extent in the table above. This is unsurprising for such an arid region, and many species of grasses/herbs could not be found in the dry season. The photos below provide a telling comparison between pre-monsoon/dry and monsoon season groundcover in the area.

Photo 7.1.1 Chitrasani Forest Survey Area (Pre-Monsoon and Monsoon Seasons)

Table 7.1.4 compares floral composition of the three line transects i.e. the BAWS transect, the DFC RoW transect and the Opposite RoW transect (referring to the transect on the opposite side of the existing railway track to the proposed DFC alignment). The

comparative analysis is shown for the monsoon season only since ground coverage and floral diversity is at its peak during this season.

Table 7.1.4 Monsoon Season Flora Composition Analysis (Comparison between 3 Line Transects)

Species	Opposite RoW				DFC RoW				BAWS			
	Freq	RF	Ab	IVI	Freq	RF	Ab	IVI	Freq	RF	Ab	IVI
Trees												
A. nilotica	**0.6**	**5.8**	1.7	9.4	0.4	4.2	**21.7**	13.9	0.1	1.2	0.6	2.5
P. juliflora	0.5	4.7	**4.8**	**57.3**	0.6	7.0	5.4	**39.7**	0.5	**5.4**	2.0	12.7
A. tortilis									0.1	0.6	**7.0**	**22.6**
Shrubs												
C. sepiearia	0.1	0.5	2.0	1,0	**1.0**	**0.1**	**1.0**	**1.6**				
C. procera	0.1	0.5	3.0	1.2								
Sp.?	0.1	1.0	**5.0**	2.0					0.2	1.8	1.0	5.7
Sp.?	**0.2**	**2.1**	1.3	**3.7**					**0.2**	0.6	**1.0**	**12.8**
Climber												
Sp.?	**0.5**	**4.7**	**6.2**	**8.2**	0.5	**5.6**	8.0	**6.9**	**0.2**	**2.4**	**1.5**	**3.1**
Sp.?	0.2	2.1	1.5	4.1	0.4	4.2	**46.8**	**5.3**				
Grass												
D. adscendens	**0.3**	**3.1**	**14.7**	8.9	**0.4**	**4.2**	**15.0**	**11.3**	**0.8**	**7.8**	21.1	**25.8**
C. setigerus	0.1	0.5	10.0	**9.4**					0.1	1.2	**35.5**	8.8
E. tenella	0.1	0.5	10.0	1.6	**0.4**	**4.2**	11.3	9.2	0.4	4.2	10.6	9.8
Herbs												
T. purpurea	0.6	5.8	11.9	14.3	0.4	4.2	3.3	6.8	0.6	5.8	11.2	14.3
A. aspera	**1.0**	**10.5**	**15.7**	**64.5**	**0.9**	9.9	**37.5**	**75.8**	0.8	8.4	**23.4**	**44.7**
X. strumarium	0.9	8.9	7.2	17.0	0.8	8.5	9.0	18.6	**1.0**	**10.2**	11.0	23.6

Note: Freq-Frequency, RF-Relative Frequency, Ab-Abundance, IVI-Importance Value Index
Source: NKC field survey

The fact that the three line transects ran parallel to each other and in close proximity (i.e. all three transects within a 50-100m belt or strip running along/next to the existing railway track), means that it is somewhat difficult to discern significant variation in the vegetation composition between transect both in the field and in the analysis of the results. If anything the RoW transect does exhibit slightly less biodiversity value in terms of the fact that the relative frequency, abundance and important value index of planted species such as *A. nilotica* and *P. juliflora* are higher and in terms of groundcover, *A.aspera*, the intrusive weed appears more prominent, whilst other species are less than the two transects outside the existing railway RoW. It is speculated that this is the result of vegetation clearance and greenbelt planting/reforestation in the area along the existing railway track, however overall there is not a significant amount of variation between the three transects.

One of the more apparent variations in comparative floral composition in the area lies between the forest area on the Chitrasani (south) side of the Balaram River and the Jethi (north) side. The apparent visual differences between the habitat types can be observed in the

Photo 7.1.2 Open Scrub Forest Chitrasani Area (Monsoon Season)

Photo 7.1.3 *Prosopis juliflora* Forest Jethi Area (Monsoon Season)

two monsoon season photos on this page and are also reflected in the analysis of the floral composition of the two areas as shown in Table 7.1.5.

The vegetation analysis along the alignment revealed that in the Chitrasani area the habitat is significantly degraded open scrub (desert thorn) forest. In terms of trees, the most common trees in the area are *A. nilotica* and *P. cineira*. Forest cover in the Balaram River to Jethi section is much denser but the area is dominated by the exotic *Prosopis juliflora*. Certain individual keystone trees with edible fruits and flowers (such as *Butea monosperma, Cassia fistula, Ficus Sp*) also appeared to be slightly more abundant in Chitrasani. It is evident that these species are important as foraging and nesting sites and there are concentrations of wildlife, especially birds around these trees. The fruits of *Ficus sp.* and *Cassia fistula* are also known to represent an important part of the sloth bear's diet (*Ficus sp.* during the summer and *Cassia fistula* during the winter, Mewada & Dharia (2010). A *Stercularia urens* tree was observed in the Jethi area however, during the fauna survey. Known as the 'ghost tree' on account of the thin transparent/white outer coat of its bark making it appear a ghostly white at night, this beautiful tree is listed as globally threatened by IUCN. This particular tree did not fall within the RoW and should not be affected by the alignment. However, this species is known to occur in the Chitrasani forest area and care should be taken during the construction phase to ensure that such trees are not harmed where possible.

Meanwhile in terms of shrubs, *Cassia auriculata* and *Caloptris procera* were found in contrast to *Zizyphus Mauritania* and *Capparis sepiearia.* With respect to groundcover, the invasive weed, *Achyranthus aspera* dominates on the Jethi side but was not recorded on the Chitrasani side where the coverage and range of grasses and herbs is somewhat more diverse.

Table 7.1.5 Monsoon Season Flora Composition Analysis (Comparison between Chitrasani and Jethi Forest Areas)

Species	Chitrasani					Jethi				
	Freq	RF	Ab	RD	IVI	Freq	RF	Ab	RD	IVI
Trees										
A nilotica	**0.52**	**4.53**	**7.33**	2.38	10.52	0.2	2.8	**12.0**	8.4	2.1
P cineira	0.43	3.77	1.80	**8.31**	**12.82**					
P juliflora						**0.6**	**7.0**	5.0	**22.3**	**11.8**
B aegyptica						0.2	2.8	3.0	5.8	2.1
B monosperma	0.17	1.51	5.67	5.67	7.38					
Shrubs										
C. auriculata	**0.22**	**1.89**	2.0	**5.0**	2.64					
C. procera	0.04	0.38	**3.0**	1.63	1.13					
Z mauritania	0.04	0.36	1.0	3.64	**3.02**	**0.2**	0.9	1.2	1.9	0.7
C. sepiearia						0.1	**2.8**	**3.0**	**10.9**	**7.6**
Climber										
Bhinda Vel	**0.43**	**3.77**	**4.70**	**6.0**	0.38	**0.4**	**4.7**	**2.4**	**6.2**	0.4
Cucumis	0.13	1.13	**1.33**	1.86	**0.57**	0.2	2.3	1.2	6.1	**3.5**
Momordica d	0.13	1.13	**3.33**	1.52	0.35					
Grass										
Dactyloctenum	0.30	2.64	5.29	4.54	0.38	0.12	1.4	5.0	**24.7**	0.38
Digitaria	**0.74**	**6.41**	**19.71**	**20.92**	0.70	**0.31**	**3.72**	**14.63**	10.06	0.71
Ergrostic	0.52	4.53	10.17	10.67	**1.13**	0.15	1.86	10.25	**4.89**	**1.06**
Herbs										
Xanthium	**1.00**	**8.68**	10.30	**20.29**	1.89	0.8	9.8	8.0	19.6	1.8
Commelina	0.96	8.30	**10.82**	19.58	1.52	0.9	11.2	11.5	25.5	1.4
Indigofera t	0.65	5.60	1.07	10.47	**4.16**					
Acryanthus						**1.0**	**11.6**	**36.4**	**76.7**	**21.2**

Note: Freq-Frequency, RF-Relative Frequency, Ab-Abundance, RD-Relative Density, IVI-Importance Value Index
Source: NKC field survey

Comparative analysis of biodiversity indices for these two areas during the monsoon season (see Table 7.1.6), also supports the general observation that although still somewhat degraded and having been substantially influenced by anthropogenic activities (including livestock grazing and quarrying), the open scrub forest area on the Chitrasani side is more representative of the natural habitat of the area and exhibits a higher biodiversity value.

Table 7.1.6 Biodiversity Indices
(Comparison between Chitrasani and Jethi Forest Areas – Monsoon Season)

No	Parameter	Chitrasani		Jethi	
		Mean	SE	Mean	SE
1	Shannon-Wiener Diversity Index	1.76	0.09	1.4	0.1
2	Species Richness	11.52	0.69	8.3	0.7
3	Total Abundance	105.96	6.95	79.9	5.1
4	Simpson Diversity Index	0.26	0.03	0.4	0.0
5	Evenness	0.73	0.02	0.7	0.0

Note: SE-Standard Error
Source: NKC field survey

Overall, however it can be concluded that with the exception of a few particular individual mature keystone trees, the habitat along the proposed alignment on both sides of the Balaram River is considerably degraded and dominated by exotic and invasive species and as such the flora may be considered unexceptional. The proposed alignment will cut through this degraded fringe area of the BAWS and is surrounded by a considerable area of similar habitat. Therefore the DFC will not create a significant impact on important flora or threatened habitat types. Moreover, these forested areas have already been bisected by the existing track and therefore the additional or cumulative impact of the DFC in terms of habitat continuity is assessed as relatively minor and nor significant.

(2) Fauna Survey Findings

The biodiversity assessments have confirmed the presence of numerous fauna species known to inhabit the BAWS along the alignment between Chitrasani and Jethi, including several protected species during both season surveys.

Photo 7.1.4 Starred Tortoise Found next to Existing Railway Track (Monsoon Season)

Overall, wildlife is more difficult to observe directly during the monsoon season for two main reasons; (i) the majority of fauna species prefer the denser forest habitat found in the more remote, inaccessible regions of the protected area and will generally only range further towards the poorer, degraded forests on the sanctuary periphery (and beyond into the surrounding agricultural fields) in the dry season when food and especially water are scarce – this is particularly true of the sloth bear, and; (ii) during the monsoon season groundcover, the under canopy and overall vegetation cover is considerably enhanced making it more difficult to make direct sightings or find other evidence such as tracks and droppings/scats. For example, during the pre-monsoon survey blue bull and wild boar were observed directly, meanwhile the only

wildlife observed during the monsoon season (with the exception of palm squirrels and the starred tortoise) was either dead specimens found along the existing railway track or other track and sign observed near to underpasses (where there is no groundcover). Major findings are described below:

(a) Mammals

Although no evidence of the elusive sloth bear and leopard was found in the area, the surveys did recorded the presence of numerous protected species of cats and small carnivores. The most significant find being the identification of hyena *Hyaena hyaena* tracks during the pre-monsoon survey. Common langur *Presbytis entellus*, wild boar *Sus scrofa*, Indian hare *Lepus negricollis* and palm squirrels *Funambulus palmarum* were also observed.

(b) Reptiles

Several species of reptile were also recorded during both season surveys including the Indian cobra *Naja naja*, a dead specimen of which was found on the existing railway track and had clearly been hit by a passing train.

(c) Birds

More than fifty species of bird were recorded over the two seasons, which is a reasonably high count for such an area of degraded forest. The avian fauna species lists were very similar during the two seasons, indeed the monsoon season survey reconfirmed the presence of most of the species recorded during the dry season. The majority of species recorded are smaller common frugivorous and insectivorous forest species (babblers, crows, drongoes, laughing doves, mynas, red vented bulbuls, rose-ringed parakeets, swallows etc) that have adapted to survive and indeed thrive in degraded forest fringe areas. In fact, the surrounding agricultural landscape provides an attractive source of food to such species. A few smaller birds of prey (e.g. Oriental honey buzzard *Pernis ptilorhynchus*, Shikra *Accipter badius* and Eurasian sparrowhawk *Accipiter nisus*) were also observed and it can be concluded that they too are attracted to the forest fringe area where they may hunt smaller bird species and smaller mammals such as rodents. The only protected species recorded was the ubiquitous Indian Peafowl *Pavo cristatus* (protected due to its status as national bird rather than being endangered).

The avian fauna species recorded did not include any migratory water bird species chiefly. However, it should be noted Gujarat is considered an important destination on the North Western migratory flyway. A branch of this flyway, the Indus flyway, enters Gujarat in the Great Rann of Kutch, in the Banni area. The flyway becomes active around the 2nd week of October and the inflow of migratory birds reaches a peak towards the 3rd week of November. The flyway is active both during the winter migration (incoming) and the spring migration (return migration). The major concentrations of ducks and waders occur along the coastline and in the wetlands in the Great Rann of Kutch and Saurashtra. Some of the important wetlands of Gujarat such as the Chhari Dhand, Nal Sarovar and the mudflats of the Gulf of Cambay, lie well beyond the present study area. Concentrations of migratory Common Cranes *Grus grus,* and Demoiselle Cranes *Grus virgo* occur in the Great Rann of Kutch, especially the Banni grasslands and the Saurashtra region of Gujarat. The Great Rann of Kutch also hosts breeding colonies of the Greater Flamingo *Phoenicopterus ruber* and Lesser Flamingo *Phoenicopterus minor*. These areas are a considerable distance from the BAWS and the proposed DFC alignment.

Whilst some species do flyover or even stopover briefly in the BAWS and surrounding landscape (explaining their presence on the sanctuary's species lists), direct impacts on migratory birds resulting from the construction and operation of the DFC are widely considered to be minimal. The habitat along the alignment in the BAWS is significantly degraded desert thorn and dry deciduous forest and predominantly used by forest bird species and as such does not provide important habitat for wintering water birds. Critical habitat for these birds is found in and around large permanent water bodies, perhaps the closest being the TLBS but this is also some distance from both the alignment and the BAWS. During the winter season small pockets of permanent surface water do remain at the BAWS and some may be used briefly by wintering birds however they are some distance away from the alignment, not core or critical habitat and it was unanimously concluded that the area along the alignment is not attractive habitat for migratory birds and the impact on these species will be negligible in this section.

Table 7.1.7 presents the wildlife species recorded during the pre-monsoon and monsoon surveys.

Table 7.1.7 Fauna Species Recorded During Pre-monsoon and Monsoon Surveys

SN	Name of Species Recorded		Evidence		Conservation Status (WPA-1972)	Conservation Status (IUCN)
	Scientific Name	Common name	P	M		
Mammals						
1	*Boselaphus tragocamelus*	Blue bull	S		Schedule III	Least Concern
2	*Hyaena hyaena*	Hyena	T		Schedule III	Near Threatened
3	*Canis aureus*	Jackal	T	T	Schedule II	Least Concern
4	*Felis chaus*	Jungle cat	T	T	Schedule II	Least Concern
5	*Herpestes edwardsii*	Common Mongoose		T		Least Concern
6	*Presbytis entellus*	Common Langur	S		Schedule II	Least Concern
7	*Funambulus palmarum*	Palm Squirrel	S	S	Schedule IV	Least Concern
8	*Lepus nigricollis*	Indian hare	S		Schedule IV	Least Concern
9	*Sus scrofa*	Wild boar	S	T	Schedule IV	Least Concern
Reptiles						
1	*Geochelone elegans*	Starred tortoise		S	Schedule IV	Least Concern
2	*Naja naja*	Indian cobra		S	Schedule I	
3	*Calotes versicolor*	Garden lizard	S		Schedule IV	Least Concern
4	*Sitana ponticeriana*	Fan-throated lizard	S		Schedule IV	Least Concern
Birds						
1	*Prinia socialis*	Ashy Prinia	S		Schedule-IV	Least Concern
2	*Eudynamys scolopaceus*	Asian Koel	S		Schedule-IV	Least Concern
3	*Terpsiphone paradisi*	Asian Paradise-flycatcher	S		Schedule-IV	Least Concern
4	*Dicrurus macrocercus*	Black Drongo	S		Schedule-IV	Least Concern
5	*Dinopium benghalense*	Black-rumped Flameback	S	S	Schedule-IV	Least Concern
6	*Columba livia*	Blue rock pigeon	S		Schedule-IV	Least Concern
7	*Sturnia pagodarum*	Brahminy Myna	S	S	Schedule-IV	Least Concern
8	*Bulbulcus ibis*	Cattle egret	S		Schedule-IV	Least Concern
9	*Petronia xanthocollis*	Chestnut-shouldered Petronia	S	S	Schedule-IV	Least Concern
10	*Aegithina tiphia*	Common Iora	S	S	Schedule-IV	Least Concern
11	*Acridotheres tristis*	Common myna	S	S	Schedule-IV	Least Concern
12	*Orthotomus sutorius*	Common tailor bird	S	S	Schedule-IV	Least Concern
13	*Tephrodornis pondicerianus*	Common Woodshrike	S	S	Schedule-IV	Least Concern
14	*Megalaima haemacephala*	Coppersmith Barbet	S		Schedule-IV	Least Concern
15	*Streptopelia decaocto*	Eurasian collared dove	S	S	Schedule-IV	Least Concern

SN	Name of Species Recorded		Evidence		Conservation Status (WPA-1972)	Conservation Status (IUCN)
	Scientific Name	Common name	P	M		
16	*Oriolus oriolus*	Golden Oriole	S		Schedule-IV	Least Concern
17	*Centropus sinensis*	Greater couckal	S	S	Schedule-IV	Least Concern
18	*Merops orientalis*	Green bee eater	S	S	Schedule-IV	Least Concern
19	*Francolinus pondicerianus*	Grey francolin	S	S	Schedule-IV	Least Concern
20	*Prinia hodgsonii*	Grey-breasted Prinia	S		Schedule-IV	Least Concern
21	*Corvus splendens*	House crow	S	S	Schedule-V	Least Concern
22	*Passer domesticus*	House sparrow	S		Schedule-IV	Least Concern
23	*Pavo cristatus*	Indian Peafowl	S	S	Schedule-I	Least Concern
24	*Saxicoloides fulicata*	Indian robin	S	S	Schedule-IV	Least Concern
25	*Coracias benghalensis*	Indian Roller	S	S	Schedule-IV	Least Concern
26	*Lonchura malabarica*	Indian Silverbill	S	S	Schedule-IV	Least Concern
27	*Streptopelia senegalensis*	Laughing dove	S		Schedule-IV	Least Concern
28	*Pernis ptilorhynchus*	Oriental Honey Buzzard	S		Schedule-IV	Least Concern
29	*Copsychus saularis*	Oriental magpie robin	S		Schedule-IV	Least Concern
30	*Zosterops palpebrosus*	Oriental White eye	S		Schedule-IV	Least Concern
31	*Pied Crested Cuckoo*	Pied Crested Cuckoo	S	S	Schedule-IV	Least Concern
32	*Prinia inornata*	Plain Prinia	S	S	Schedule-IV	Least Concern
33	*Psittacula cyanocephala*	Plum-headed Parakeet	S		Schedule-IV	Least Concern
34	*Nectarinia asiatica*	Purple sunbird	S		Schedule-IV	Least Concern
35	*Pycnonotus cafer*	Red vented bulbul	S	S	Schedule-IV	Least Concern
36	*Vanellus indicus*	Red wattled lapwing	S	S	Schedule-IV	Least Concern
37	*Psittacula krameri*	Rose ringed parakeet	S	S	Schedule-IV	Least Concern
38	*Dendrocitta vagabunda*	Rufous treepie	S		Schedule-IV	Least Concern
39	*Accipiter badius*	Shikra	S		Schedule-IV	Least Concern
40	*Pericrocotus cinnamomeus*	Small Minivet	S	S	Schedule-IV	Least Concern
41	*Halcyon smyrnensis*	White throated kingfisher	S	S	Schedule-IV	Least Concern
42	*Dicrurus macrocercus*	Black drongo		S	Schedule-IV	Least Concern
43	*Phylloscopus collybita*	Common chiffchaff		S	Schedule-IV	Least Concern
44	*Hierococcyx varius*	Common hawkcuckoo		S	Schedule IV	Least Concern
45	*Accipiter nisus*	Eurasian Sparrowhawk		S	Schedule-IV	Least Concern
46	*Sylvia curruca*	Lesser whitethroat		S	Schedule-IV	Least Concern
47	*Hirundo smithii*	Wire tailed swallow		S	Schedule-IV	Least Concern
48	*Cecropis daurica*	Red Rumped Swallow		S	Schedule-IV	Least Concern
49	*Turdoides caudata*	Common Babbler		S	Schedule-IV	Least Concern
50	*Turdoides striata*	Jungle Babbler		S	Schedule-IV	Least Concern
51	*Turdoides malcolmi*	Large Grey Babbler		S	Schedule-IV	Least Concern
52	*Sturnus roseus*	Rosy Starling		S	Schedule-IV	Least Concern

Note: P-Pre-monsoon season, M-Monsoon season
S- Seen, T-Track
Source: NKC field survey

(3) Ecological Hotspots in the Protected Area Landscape

In addition to the fauna and flora surveys undertaken along the line transect between Chitrasani and Jethi, the team visited a number of "ecological hotspots" identified during discussions with the protected area manager and the field staff. Wildlife appears to be concentrated around these particular ecological hotspots which are characterised mainly as areas where surface water remains throughout the year and particularly those sites where dense vegetation cover remains. Some of them are sites used for the wildlife census. These sites are shown in Table 7.1.8 and Figure 7.1.2.

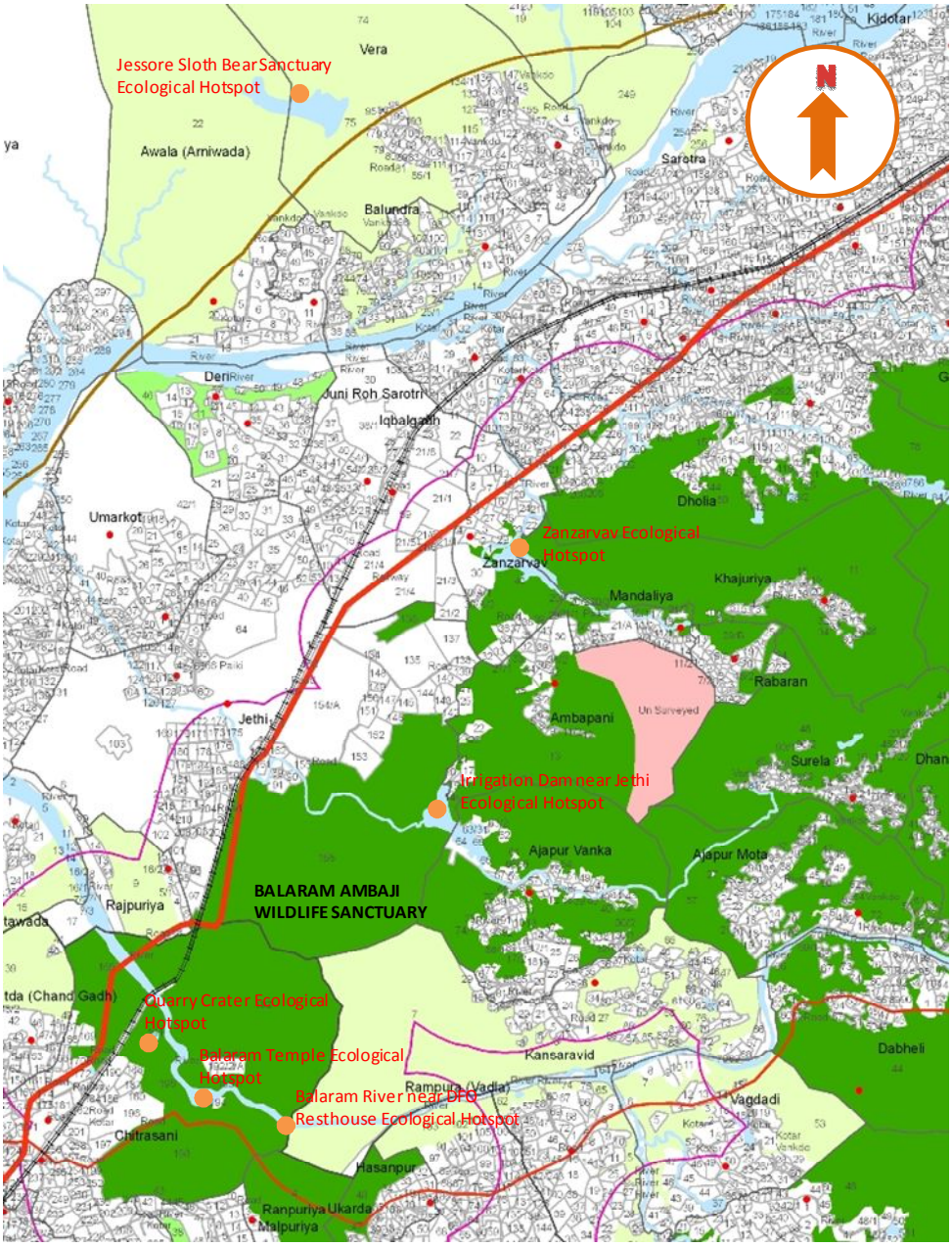
Several permanent water holes lie on the western periphery of the BAWS and some of the above-mentioned key mammal species have been observed at those sites. A sloth bear was observed at a water hole in Chitrasani during the 2011 census. Overall the Balaram River course is the most important ecological corridor with its sequence of waterholes and wildlife movement along this course which may be restricted due to disturbance and noise during the construction phase. However the specific permanent waterholes observed by the survey team were generally some distance from the proposed DFC alignment itself and the direct environmental impact can be assumed to be relatively low and temporary in nature. Once the construction phase is completed, wildlife movement along its course is likely to return to normal.

Table 7.1.8 Summary of Ecological Hotspots in the BAWS-JSBS Landscape

SN	Area	Feature
1	Balaram River Near DFO Resthouse, Chitrasani:	This is a densely forested riverine area on the course of the Balaram River. The river is dry for the majority of the year but this spot has a permanent water hole. A sloth bear was sighted here during the 2011 census and the surrounding habitat is suitable for leopards. Troupes of Common langur were observed in the surrounding forest area. The site is approximately 3.5 km from the alignment and extremely unlikely to be directly affected by the alignment
2	Balaram Temple, Chtirasani	A permanent water hole in a wide and open section of the Balaram River where the river passes in front of the Balaram Temple and Balaram Palace resort. The river meanders and bifurcates at this section and an oxbow lake is being formed. Local people use the area substantially on a daily basis for livestock drinking, grazing and washing as well as extracting water for domestic use. Human use of the area means that wildlife is unlikely to use this waterhole as much as others. The site is approximately 1.2 km from the alignment and there will not be any significant impacts on wildlife here.
3	Mine/Quarry Crater, Chitrasani	A large crater created by mining/quarrying activities has been formed just 150m south of the Balaram River and approximately 400m east of the proposed alignment. The crater is filled with water throughout the year. The rocky and rugged landscape appears to be suitable for leopards, smaller cats and snakes/reptiles and as a water source it may be suitable as a brief/temporary stopover for migrant birds during the winter season. This is the closest permanent waterhole to the proposed alignment. Construction works and trains are audible from this location but there is unlikely to be significant additional disturbance to wildlife.
4	Irrigation Dam, near Jethi	A small irrigation dam has been constructed at this site and although water levels are restricted to being little more than a small pond by the end of the dry hot summer, the area is still used by wildlife and it is a wildlife census survey site. The site is on the western periphery of the BAWS and approximately 2.6 km from the proposed DFC alignment. It will not be affected by the DFC.
5	Zanzarvav, near Iqbalgarh	Located approximately 2.4 km east of the alignment and right on the western boundary of the BAWS, which is marked by a man-made embankment. At this point the valley plain begins to rise into the hills and piedmont zones of the BAWS. A small lake has been formed and is fed by a small temporary river running down from the hills of the BAWS. Habitat is extremely fragmented at this location and much of the surrounding area is agricultural land or land used for livestock grazing. Trains are audible from this location but environmental impacts from the DFC can be presumed to be negligible.
6	Jessore Sloth Bear	It was observed from the site survey and discussions with DFO staff that the hilly piedmont zones of the eastern edge of the JSBS provides good

SN	Area	Feature
	Sanctuary (JSBS)	habitat (dense dry deciduous forest on rocky hills) for species such as leopard and sloth bear and that both species are known to move outside the protected area and into the surrounding agricultural landscape. Usually they will follow natural drainage channels down towards the Banas. When river levels are low they may cross the river and move towards the BAWS. The JSBS is approximately 7 km west of the proposed alignment and there will be no direct impact from the DFC on this area. The only issue is ecological continuity between the two protected areas, which is connected by the Balaram River.

Source: NKC



Source: NKC

Figure 7.1.2 Location of Ecological Hotspots in the BAWS-JSBS Landscape

7.1.4 Tree Census

(1) Survey Area and Segment

Tree census was carried out along the entire alignment between Wamaj and Iqbalgarh. The purpose of the tree census was to record the number of trees to be removed along the alignment and therefore the census includes both forest and non-forest areas. In fact, with the exception of the 2.4 km section bisecting the BAWS, almost the entire alignment passes either through agricultural areas or RoW of the existing railway. There are also occasional short sections where the alignment passes through urban settlements such as at Palanpur, Sidhpur, Unjha, and Mahesana towns. The tree census segments and the DFC alignment are outlined in Table 7.1.9.

Table 7.1.9 Tree Census Segments and DFC Alignment Synopses

Segment	District	Village		Chainage	DFC Alignment	Land Use	Remarks
A	Banaskantha	from	Iqbalgarh	28.800	Parallel to the existing track	Agricultural land/ Urban settlement (Palanpur tow).	1)
		to	Sadarpur	8.697			
		from	Sadarpur	116.580			
		to	Dharewada	89.558			
B	Patan	from	Sajjanpur	89.558	Parallel to the existing track.	Agricultural land/ Urban settlement (Sidhpur town)	1)
		to	Khali	78.040			
C	Mahesana	from	Kamali	78.040	Parallel to the existing track	Agricultural land Urban settlement (Unjha town)	1)
		to	Unjha	66.625			
D	Mahesana	from	Ithor	66.625	Parallel to the existing track	Agricultural land	1)
		to	Bhandu	58.458			
E	Mahesana	from	Moti Dau	58.458	Parallel to the existing track from Moti Dau to Talenti except branch track from Nani Daue to Talenti.	Agricultural land	1)
		to	Talenti	51.449			
		from	Nani Daue	4.387			
		to	Talenti	0.000			
F	Mahesana	from	Ramosana	51.449	Parallel to the existing track	Agricultural land/ Urban settlement (Mahesana town)	1)
		to	Kukas	44.390			
G	Mahesana	from	Shobhasan	44.390	Not parallel to the existing track (38.6-42.5), but becomes parallel to the existing track at Shobhasan.	Agricultural land	
		from	Jagudan	36.798	Parallel to the existing track	Agricultural land	1)
H	Mahesana	from	Ditasan	36.798			
		to	Ambliyasan	30.034			
I	Mahesana	from	Jornang	30.034	Parallel to the existing track	Agricultural land	1)
		to	Navi Sedhavi	25.905			
J	Mahesana	from	Kaiyal	25.905	Parallel to the existing track and alignment diverges along a curve (24.5-25.7).	Agricultural land	
		to	Tankiya	23.105			
		from	Anadpura	23.105	Parallel to the existing track	Agricultural land	1)
		to	Julasan	14.010			
K	Gandhinagar /Mahesana	from	Panasar	14.010	Running independently and joining the existing track just before Panasar.	Agricultural land	
		to	Vansjara	0.000			

Note: 1) Plantation was done by Social Forestry Department along ROW of the existing track.
Source: NKC

For a major part of the proposed DFC alignment north of Mahesana (including Mahesana, Patan and Banaskantha districts), the alignment runs parallel to the existing railway track and falls within the existing RoW on the east side of the existing railway track. In the southern part of the section in Gandhinagar, the proposed alignment runs (for a total of 14 km) independently of any existing railway track, predominantly across agricultural lands and land acquisition will be required. There are also a couple of shorter sections in Mahesana where the proposed alignment does not run parallel to the existing track and where land acquisition, again primarily agricultural land will also be required.

There is a 23 km section of the alignment which runs parallel to the existing railway track in Mahesana district between Panasar and Jagudan but on the west side of the existing track and between Jagudan and just before Shobhasan (approximately 5 km) where the alignment runs independently and makes "S" like shape. At Shobhasan the proposed alignment joins the existing railway track on the east side of the existing track. With the exception of a small divergence along a curve approximately 1.5 km north of Shobhasan, the proposed alignment subsequently runs parallel to and on the east side of the existing track and within the existing RoW all the way north to Iqbalgarh.

The Social Forestry Departments of the relevant districts have planted trees (mainly *Azadirachta indica*, *Acacia sp*. and *Prosopis juliflora* along the existing railway RoW during the 1980s and early 1990s for aesthetic and pollution reduction purposes as well as for the purpose of forming a hedgerow which effectively demarcates the RoW. Many of these sections were planted over 20 years ago and thus many of the trees to be removed for the construction of the DFC are found within this greenbelt of mature planted hedgerow whilst agricultural fields with generally few trees lie on either side of the existing railway RoW. As has been mentioned above, the proposed alignment does not pass through any recorded forest areas between Wamaj - Iqbalgarh.

(2) Survey Methodology

The first step in carrying out the tree census was to confirm the alignment route and whether the alignment would pass through any recorded forest areas. Once the alignment route was confirmed, a field team was dispatched to record the trees to be removed along the alignment. The team worked closely with the DFOs and Social Forestry Departments of the districts concerned. The overall approach was to work together with the forestry staff using an adapted methodology from that typically employed by the State forestry agencies in carrying out tree enumeration.

The forestry agencies in Gujarat are experienced in carrying out tree enumeration for infrastructure projects and the methodology necessarily follows Gujarat State legislation i.e. The Saurashtra Felling of Trees (Infliction of Punishment) Act, 1951 which defines and categorises trees to be removed. It also provides the criteria for removal of trees. Forest department has a procedure for tree enumeration. Trees are classified according to species, height and girth at breast height (gbh). Under this act trees are classified as reserved and non-reserved categories given in Table 7.1.10. Reserved category requires approval from deputy conservator of forests for cutting. As a matter of fact the exercise of cutting and sale of timber is done by the Forest Department and net proceeds go to the owner. In case of non-reserved trees the permission is given by Mamlatdar (a revenue authority).

Table 7.1.10 Tree Species Listed in Saurashtra Felling of Trees (Infliction of Punishment) Act, 1951

Category	Local (Vernacular) Name	Scientific Name
Reserved	Saag / Teak	*Tectona grandis*
	Seasam	*Dalbergis latifolia*
	Mahudo	*Madhuca latifolia*
	Chandan	*Santalum Album*
	Kahair	*Acacia catechu*
Non-Reserved	Timru	*Diospyros melanoxylon*
	Simlo / Semul	*Bombax Ceiba*
	Sadad	*Terminalia tomentosa*
	Karanj	*Pongomia pinnata*
	Kanji	*Holoptelea integrifolia*
	Sevan	*Gmelina arborea*
	Biyo	*Pterocarpus marsupium*
	Eboni	*Diospyros ebenum*
	Rohan	*Soymida febrifuga*
	Kadayo	*Sterculia urens*
	Kalam	*Mitrogynae parviflora*
	Haldarvo / Haldu	*Adina cardifolia*
	Harde	*Terminalia chebula*
	Dhavado	*Anogeissus latifolia*
	Aambo	*Mangifera indica*
	Taad	*Borassus flabelifer*
	Khajuri	*Phoenix sylvestris*
	Jambu	*Syzygium cuminii*
	Desi Baval	*Acacia nilotica*
	Limdo / Neem	*Azadirachta indica*
	Khijado	*Prosopis cineraria*

Source: Gujarat Forest Department

The Saurashtra Act also specifies that any vegetation with a gbh of less than 21 cm are classed as bushes or shrubs and not counted as trees. Trees are then categorised into 7 girth classes as shown in Table 7.1.11.

Table 7.1.11 Girth Classes for Tree Census

Girth Class	Girth at Breast Height (cm)
G1	21-30
G2	31-45
G3	46-60
G4	61-75
G5	76-90
G6	91-110
G7	>111

Source: The Saurashtra Act

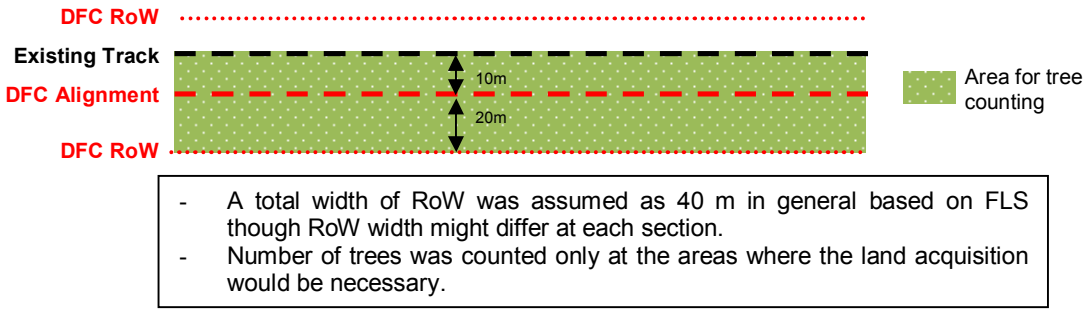
Forest officers also estimate timber volumes for each tree (timber species) in cubic metres and weight (firewood species).

Generally the Forest Department uses tape for measuring the distance and documenting the location of trees to be removed along the alignment. However, for the purposes of this tree census, GPS points were also noted for the location of site. The methodology also differed from that typically employed by forest agencies by recording all tree species (with a girth of 21 cm or more) and all protected species. Therefore the final methodology endorsed can be considered an adaptation of the standard tree enumeration methodology utilised by the forestry agencies. Trees are enumerated for removal once land is acquired. The criteria is used for either permission or NOC for sanction by Mamlatdar.

Photo 7.1.5 Tree Census Survey Team in Action (measuring gbh)

The tree census survey team (including forest officers) walked along the proposed DFC alignment in the field recording the number of trees to be removed with gbh above 21 cm, height, species and vernacular name and any fauna track and sign incidentally observed for each chainage section. Photos were also taken.

It should be noted that not all trees in the RoW were enumerated because not all trees will be removed. For the majority of the 140 km section between Wamaj - Iqbalgarh, the proposed DFC alignment runs parallel to the existing track. Although trees on the opposite side of the existing track to the proposed alignment may fall within the RoW of the proposed alignment, they will not be removed and therefore were not counted. Figure 7.1.3 illustrates the approach followed for the tree census in the parallel section. In general, the DFC RoW was assumed as 40 m since there are roughly 10 m between the DFC alignment and the existing track. In fact according to the FLS, the width of the RoW varies at different points, but where the DFC alignment runs parallel to the existing track, this width would safely include all trees to be removed along the alignment. In this case, overestimation is not believed to be excessive since almost all land falling outside of the existing railway RoW is agricultural land with relatively few trees.

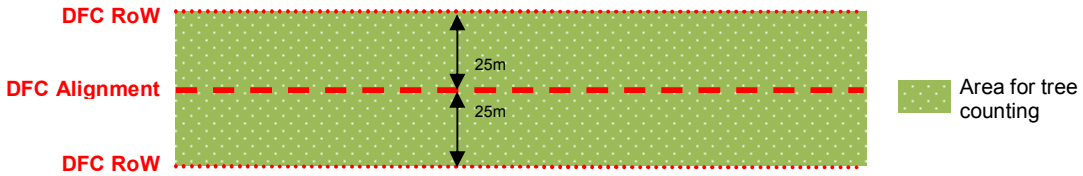


Source: NKC

Figure 7.1.3 Tree Enumeration Methodology of the Parallel Section

As for the detour section, the DFC RoW was assumed as 50 m. In this case, trees falling within 25 m on either side of the proposed DFC alignment will be removed as illustrated in Figure 7.1.4. Since the boundary stones demarcating the alignment and RoW have been

removed by local people, the survey was conducted by using a GPS and guidance from DFCCIL surveyors.



- A total width of RoW was assumed as 50 m in general based on FLS though RoW width might differ at each section.
- Since the boundary stones demarcating the alignment and RoW are not available, the survey was conducted by using a GPS and guidance from DFCCIL surveyors.

Source: NKC

Figure 7.1.4 Tree Enumeration Methodology of the Detour Section

(3) Summary of the Result of Survey

Table 7.1.12 provides summary information on the total number of recorded trees to be removed in the Wamaj - Iqbalgarh section and respective districts. In Table 7.1.13, main tree species to be removed are outlined for each district (a full list of the recorded trees to be removed is attached as Appendix 7d).

Table 7.1.12 Recorded Number of Trees to be Removed

District	Recorded Number of Trees to be Removed
Banaskantha	2,952
Patan	590
Mahesana	9,884
Gandhinagar	2,730
Total	16,156

Source: NKC

Table 7.1.13 Top 10 Recorded Tree Species to be Removed

No.	Tree Species	Vernacular Name	District				Total
			Banaskantha	Patan	Mahesana	Gandhinagar	
1	*Azadrakhta indica*	Limdo/Neem	1,038	169	2,153	1,167	4,527
2	*Acacia tortolis*	Israeli Baval	879	12	1,564	245	2,700
3	*Prosopis cineraria*	Khijado	76	51	1,806	113	2,046
4	*Acacia nilotica*	Desi Baval	125	6	1,476	393	2,000
5	*Ailanthus excelsa*	Arduso	108	45	468	37	658
6	*Zizyphus mauritiana*	Bordi	6	5	463	59	533
7	*Holoptelia integrifolia*	Kanji	56	45	211	217	529
8	*Acacia lecophlea*	Aniyar	73	3	413	0	489
9	*Prosopis juliflora*	Gando Baval	84	8	283	63	438
10	*Salvedora oleides*	Pilu	6	0	45	370	421

Source: NKC field survey

(4) Findings from Tree Census

Total 61 species as shown in Table 7.1.14 were found in the tree census survey. Among them, *Madhuka latifolia* is listed as reserved trees and other 11 species as non reserved trees in the Saurashtra Felling of Trees (Infliction of Punishment) Act, 1951. The Social Forestry Department of the relevant districts planted tree of useful, productive, hardy and relatively quick-growing along the existing RoW during the 1980s and early 1990 for the purposes of aesthetic, pollution reduction and demarcation of RoW. The majority of tree species identified through the tree census was same as the ones planted over 20 years ago. Furthermore, tree species found in the tree census was similar study result conducted by Gujarat Forestry Department in 2009, and represented cross-section of North Gujarat. Thus, it was observed from the tree census result that the tree species in the proposed RoW is neither exceptional nor habitation of endangered/protected species stipulated in the WPA or IUCN Red List.

Table 7.1.14 Species Found in Tree Census Survey

No.	Tree Species	Vernacular Name	Counted Area*		Category**
			Existing	Proposed	
1	*Acacia nilotica*	**Desi Baval**	○	○	Non-Reserved
2	*Acacia lecophlea*	**Aniyar**	○	○	
3	*Acacia tortolis*	**Israeli Baval**	○	○	
4	*Aegle marmelos*	**Bili**		○	
5	*Ailanthus excelsa*	**Arduso**	○	○	
6	*Albizzia lebbec*	**Siras**	○	○	
7	*Alisonia scholaris*	**Saptparni**		○	
8	*Anona squamosa*	**Sitafal**	○	○	
9	*Azadrakhta indica*	**Limdo/Neem**	○	○	Non-Reserved
10	*Balanites roxburghii*	**Angora**	○	○	
11	*Bambusa arundinacia*	**Vans**		○	
12	*Bauhina racemosa*	**Aasitro**		○	
13	*Bauhinia tomentosa*	**Champo**		○	
14	*Belanites aegyptica*	**Ingoriya**		○	
15	*Bombax ceiba*	**Simado**	○	○	Non-Reserved
16	*Butea monosperma*	**Khakhara**	○	○	
17	*Callistemon viminalis*	**Brush**	○	○	
18	*Cassia fistula*	**Garmalo**	○	○	
19	*Cassia siamia*	**Kasid**	○	○	
20	*Casuarina equisitifolia*	**Saru**	○	○	
21	*Citrus limon*	**Nimbu**		○	
22	*Cordia dichotoma*	**Vadgundo**	○	○	
23	*Cordia mixa*	**Gunda**	○		
24	*Cordia gharaf*	**Gundi**		○	
25	*Dalbergia sissoo*	**Sissoo**	○		
26	*Delonix regia*	**Gulmahor**	○	○	
27	*Diaspyros cordifolia*	**Makrodi**		○	
28	*Emblica officinalis*	**Amala**	○	○	
29	*Eucalyptus hybrid*	**Nilgiri**	○	○	
30	*Ficus benghalensis*	**Vad**	○	○	
31	*Ficus racemosa*	**Umaro**	○	○	
32	*Ficus religiosa*	**Pipal**	○	○	
33	*Gmelina arborea*	**Sevan**	○	○	Non-Reserved
34	*Holoptelia integrifolia*	**Kanji**	○	○	Non-Reserved
35	*Leucaena lecocephala*	**Subaval**	○	○	

No.	Tree Species	Vernacular Name	Counted Area*		Category**
			Existing	Proposed	
36	*Limonia acidissima*	**Kotha**	○		
37	*Madhuca latifolia*	**Mahudo**	○	○	Reserved
38	*Mangifera indica*	**Ambo**	○	○	Non-Reserved
39	*Manilkara hexandra*	**Rayan**	○	○	
40	*Manilkara zapota*	**Chiku**		○	
41	*Melia azadarakht*	**Bakam Limdo**	○	○	
42	*Moringa oleifera*	**Sargavo**	○	○	
43	*Morus australis*	**Setur**		○	
44	*Nerium indicum*	**Karan**		○	
45	*Parkinsonia aculeata*	**Rambaval**		○	
46	*Peltophorum pterocarpum*	**Peltaform**	○	○	
47	*Phoenix sylvestris*	**Khajuri**		○	Non-Reserved
48	*Pithecellobum duice*	**Goras ambali**		○	
49	*Polyalthia longifolia*	**Asopalav**		○	
50	*Pongomia pinnata*	**Karanj**	○	○	Non-Reserved
51	*Prosopis cineraria*	**Khijado**	○	○	Non-Reserved
52	*Prosopis juliflora*	**Gando Baval**	○	○	
53	*Psidium guajava*	**Jamfal**		○	
54	*Salvedora oleides*	**Pilu**	○	○	
55	*Salvedora persica*	**Vakhado**	○	○	
56	*Sapindus emerginatus*	**Aritha**		○	
57	*Seraca asoca*	**Ashoka**	○		
58	*Syzygium cuminii*	**Jambu**	○	○	Non-Reserved
59	*Tamarindus indica*	**Amali**	○	○	
60	*Techomella undulata*	**Roydo**		○	
61	*Tectona grandis*	**Sag**		○	
62	*Terminalia cattapa*	**Badam**	○	○	
63	*Terminalia tomentosa*	**Sadad**	○	○	Non-Reserved
64	*Thespesia populnea*	**Paras Piplo**		○	
65	*Zizyphus mauritiana*	**Bordi**	○	○	
66	*Zizyphus xylopyra*	**Ghatbor**		○	
67	*UNK*	**Jeji**	○		
68	*UNK (garden plant)*	**Tagadi**		○	
Total			45	63	12

Note: * Existing: Trees in RoW of the existing track and proposed RoW of the DFC in the parallel section
Proposed: Trees in proposed RoW of the DFC but outside RoW of the existing track in the parallel section, and trees in proposed RoW of the DFC in the detour section.
** Categoriy under the Saurashtra Felling of Trees (infliction of Punishment) Act, 1951, Gujarat Forest Department.
"UNK" stands for "unknown".
Source: NKC field survey

7.1.5 Impact Assessment

The field survey of flora showed that overall the alignment passes through an area of degraded open scrub forest on the Chitrasani side of the Balaram River and denser forest on the Jethi side dominated by the exotic *Prosopis juliflora*. As such therefore the alignment will not disturb or remove any threatened habitat or important flora species. In compensating for the necessary removal of vegetation along the proposed alignment, the project could have a positive impact by improving and regenerating the natural habitat of the area.

Occasional keystone trees of native species can be found however along the propsoed alignment and these continue to provide foraging and nesting sites particularly for birds. Care should be taken with regard to avoid the removal of these particular individuals if possible. If this is not possible efforts might be made to transplant such trees.

In spite of the fact that the habitat/vegetation along the proposed alignment is unexceptional and significantly degraded the fauna survey has indicated that the area continues to be used by key fauna species and that there is wildlife movement across the alignment and outside the protected area. The survey has also shown that accidental collisions between trains and wildlife do occur and that protected species may be killed in this manner. The concentration of evidence of fauna tracks and signs (dung/scats) around the underpass in the Balaram River - Jethi section is however encouraging as it suggests that such features are effective and used by wildlife.

Species counts for avifauna were reasonably high and demonstrate that the area is used by a wide range of mainly frugivorous and insectivorous forest species as well as the protected Indian peafowl. This demonstrates tolerance of degraded habitats and the impacts of the DFC on resident avifauna are anticipated to be relatively low since there are abundant habitats of similar degraded/open scrub type in the wider landscape. The impact of the DFC on potential migrant birds during the winter season was considered but ultimately it was deemed that the impact would be minimal due to the fact that the specific area along the alignment does not provide suitable habitat for such species of wintering water birds.

Specific impacts and suggested mitigation measures for avoiding, compensating for, or reducing impacts on the biodiversity, fauna and flora along the proposed alignment bisecting the BAWS and the wider ecological landscape are discussed in greater detail in Chapter 10.

7.2 Other Aspects

7.2.1 Soil Erosion

The clearing of land, cutting of trees, excavation of borrow areas are likely to trigger soil erosion. The movement of vehicles/machinery/equipment and work forces is also likely to cause soil erosion. Loosening of top soil and loss of vegetative cover from the ROW along the detour and parallel section due to excavation, land cut and back filling could lead to soil erosion.

Most sections of the DFC track are on embankments. During construction of the embankments, loose soil for the embankment preparation could result in silt run-off if exposed to wind or rain and appropriate compaction or stabilization measures are not adopted immediately.

Borrow areas (pits) will be required for the DFC project. The borrow areas are likely to cause soil erosion and affect agricultural areas. Loss of productive soil may result from uncontrolled opening up of borrow pits. However, embankment slopes made from earthen material as well as exposed surfaces of hills will be protected for preventing soil erosion in areas which have high soil erodability or high intensity rainfall. As far as practicable, top soil removed from the construction sites will be used for construction of embankment to enhance growth of vegetation on the embankment surface and its consolidation. Besides, adequate temporary or permanent drainages are planned to be provided before slope construction begins with lagoons to allow silt to settle out. As for the borrow areas, appropriate measures for the management of borrow areas will be taken. Top soils of the borrow pit sites will be conserved and restored after excavation is over.

Considering the above measures, the DFC will not create a significant impact on soil erosion.

7.2.2 Disaster

No disaster was noted in the areas where the proposed alignment passes in the Wamaj to Iqbalgarh section and anthropogenic hazards due to industries and accidents was also not reported in this area.

Firstly, the impacts on topography and geology were assessed for assessment of impacts on disaster by the DFC project n the Wamaj to Iqbalgarh section. The DFC alignment has been planned to minimize the impacts on topography by avoid specific topographic features such as hilly areas because changes in topography are envisaged due to the clearing of land, cutting and filling, and the construction of structures. Especially, filling and cutting of land will be required, where the track traverses through undulating topography. However topographic changes will be limited mainly within the RoW hence overall impact could be localized. Although the embankment is constructed, slope protection measures are envisaged to avoid the collapse.

On the other hand, since the alignment runs on the high embankment, issues of blockage of storm water are anticipated. However, these impacts could be minimized by providing adequate rearrangement of storm water drainages and installation of enough number of culverts.

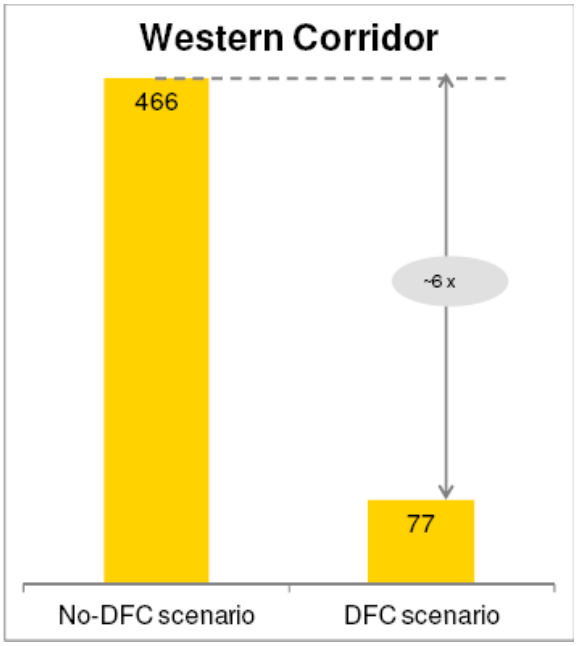
7.2.3 Global Warming

India's economic growth has placed considerable pressure on the rail freight transportation network, one of the most affordable modes of transport in the country. It will be difficult for Indian Railways, even under the ambitious growth plan to achieve the required freight transportation capacity. At the same time global endeavour for a low carbon economic growth is emphasising on low carbon infrastructure and energy efficient transport system. Considering the ever increasing freight traffic movement, Indian Railways is mulling to introduce the DFC. The introduction of DFC is expected to generate two major impacts on freight movement - shift of freight from road to low carbon intensive mode rail transport and inherent improvement in energy efficiency of freight rail through adoption of improved technologies. In this context DFC has taken a detailed study on GHG emission for forecasting for 30 year period under two scenarios - presence of DFC (DFC scenario) and absence of DFC (No-DFC scenario). The objectives of the study were:

- to establish that DFC is a climate-friendly way of freight transportation; and,
- to develop a long-term low carbon road-map which enables to adopt more energy efficient and carbon friendly technologies.

This GHG emission quantification, monitoring and reporting has been performed as per International Guidelines of GHG Accounting Protocol of World Business Council of Sustainable Development and ISO 14064. GHG emission quantification includes construction, implementation and operation of DFC and associated infrastructure and 2016-2017 was considered as base year for forecasting and modelling of GHG emission for 30 years period.

The study revealed that in 2016-2017, in no-DFC scenario GHG emission would be 8.7 million ton CO_2 while in DFC scenario it would be 2.59 million ton CO_2. As per projection for 2041-2042, GHG emission under no-DFC scenario would be 33.2 million ton CO_2 and in case of DFC scenario would be 5.97 million ton CO_2 (3.83 million ton CO_2 from Western Corridor). The GHG emission gap between no-DFC and DFC scenario increases from 6.11 million ton CO_2 in 2016-2017 to 27.23 million ton CO_2 in 2041-42. The cumulative emission over 30 years period in no-DFC scenario would have been 582 million ton while in DFC scenario it is 124.5 million ton CO_2.



Source: DFCCIL

Figure 7.2.1 Cumulative GHG Emission (2016-17 to 2041-42) (in million ton CO_2)

The DFC project intends to follow low carbon path adopting various technological options which can help to operate in a more energy efficient fashion and at the same time explore options to offset its own GHG emissions by investing in low carbon assets such as solar power, wind power and afforestation.

CHAPTER 8 SOCIAL ENVIRONMENT

The DFC project is intended to produce a range of positive impacts for people and society as a whole including economic benefits and a better living environment. However the project may also adversely affect certain groups of people, especially those residing within the proposed alignment and immediately adjacent to it in terms of land acquisition and resettlement. The Social Impact Assessment (SIA) helps in identifying positive and negative impacts and provides a basis for the development of appropriate mitigation measures. Such measures will then be included in a management and monitoring plan as for environmental aspects.

In the Wamaj (Mehsana district)- Iqbalgarh (Banaskantha district) section, it is expected that 68 villages in 4 districts in Gujarat State will be affected by land acquisition of the DFC project. This chapter mainly describes (1) the scale of land acquisition according to the Notification 20A/Draft Notification 20E or Notification 20E, the list of Project Affected Persons (PAPs) provided by DFCCIL and (2) the socio-economic status of the project affected villages based on the existing statistics of the Census of India. More detailed data on the PAPs to be affected by land acquisition and resettlement will be separately described in the Baseline Survey and Census report and the Rehabilitation and Resettlement Plan (RRP).

8.1 SCOPE OF LAND ACQUISITION AND RESETTLEMENT

Based on the basic design of the project corridor, the land acquisition requirement has been estimated through preparation of the Land Plans. As per the Land Plans for 4 districts, the Competent Authority (CA) has prepared notifications for land acquisition under Railway (Amendment) Act 2008 of the Wamaj to Iqbalgarh section.

Based on the 20A Notification published under the Act, the total land to be acquired for the section between Wamaj and Iqbalgarh is around 396.44 ha which consists of 348.40 ha (88%) of private land and 48.04 ha (12%) of government land. District-wise land acquisition details are given in Table 8.1.1. The district-wise summary of the status of issuance of 20A and 20E Notification is also shown in Appendix 2.

Table 8.1.1 Summary of Land Acquisition for the Project

Sl No	District	District-wise Details				Competent Authority	20A Notification Details				20E Notification Details			
		Length (km)	Private Area (ha)	Govt Area (ha)	Total Area (ha)		Length (km)	Area (ha)	Gazettee Issue Date	Newspaper Issue Date	Length (km)	Area (ha)	Gazettee Issue Date	Newspaper Issue Date
1	Gandhinagar	13.95	78.05	4.24	82.29	SLAO	13.95	82.29	31.07.08, 12.07.11	13.02.09, 22.07.11	13.95	82.29	05.02.10, 04.04.12	11.04.12
2	Mehsana	64.10	165.24	23.69	188.93	SLAO	64.10	188.93	25.07.11, 19.10.11	18.08.11, 10.11.11	45.30	91.88	20.07.12, 24.07.12	
3	Patan	11.00	18.45	3.27	21.72	Prant Officer	11.00	21.72	12.07.11	24.07.11	11.00	21.72	22.02.12	17.03.12
4	Banaskantha	46.64	86.66	16.84	103.50	Deputy Collector Palanpur	46.64	103.50	12.07.11, 11.08.11, 19.10.11	24.07.11, 08. 11.11	39.94	54.59	22.02.12, 30.03.12	16.03.12, 11.05.12
Total		**135.69**	**348.40**	**48.04**	**396.44**		**135.69**	**396.44**			**70.25**	**195.89**		

Note: 1. SLAO: State Land Acquisition Officer
2 As 20E Notification is not issued in all villages. Length and area as per 20E are only for those villages where 20E Notification was issued.
Source: Progress of Land Acquisition for the month of August 2012 received from SEMU/DFCCIL/HQ

As for the affected villages, a total of 1,540 plots and 6,026 titleholders in 68 villages of these 4 districts will be affected by the Project as summarized in Table 8.1.2.

Table 8.1.2 Summary of Numbers of Affected Plots and Titleholders

Sl No	CPM	State	District	Taluk / Tahsil	Name of Village	No. of Plots as per 20E*/ Draft 20E#	No. of Titleholders as per 20E*/ Draft 20E#
1	Ahmadabad	Gujarat	Gandhinagar	Kalol	Vansjada (K)*	2	4
2	Ahmadabad	Gujarat	Mehsana	Kadi	Wamaj [1]*	16	96
3	Ahmadabad	Gujarat	Gandhinagar	Kalol	Ramnagar*	26	179
4	Ahmadabad	Gujarat	Gandhinagar	Kalol	Piyaj*	19	173
5	Ahmadabad	Gujarat	Gandhinagar	Kalol	Borisana*	14	137
6	Ahmadabad	Gujarat	Gandhinagar	Kalol	Kalol*	9	71
7	Ahmadabad	Gujarat	Gandhinagar	Kalol	Pratappura*	18	127
8	Ahmadabad	Gujarat	Gandhinagar	Kalol	Chhatral*	31	156
9	Ahmadabad	Gujarat	Gandhinagar	Kalol	Ola*	16	83
-	Ahmadabad	Gujarat	Gandhinagar	Kalol	Chhatral [2]	-	-
10	Ahmadabad	Gujarat	Gandhinagar	Kalol	Isand*	2	6
11	Ahmadabad	Gujarat	Gandhinagar	Kalol	Vadavswami*	37	155
12	Ahmadabad	Gujarat	Gandhinagar	Kalol	Pansar*	27	190
Total 11 villages in Gandhinagar district (except. Wamaj in Mehsana)						***201***	***1,281***
13	Ahmadabad	Gujarat	Mehsana	Kadi	Jhulasan#	40	83
14	Ahmadabad	Gujarat	Mehsana	Kadi	Ghumasan#	30	66
15	Ahmadabad	Gujarat	Mehsana	Kadi	Dangarava#	51	162
16	Ahmadabad	Gujarat	Mehsana	Kadi	Anandpura*	5	7
17	Ahmadabad	Gujarat	Mehsana	Kadi	Tankiya*	14	47
18	Ahmadabad	Gujarat	Mehsana	Kadi	Kaiyal*	8	36
19	Ahmadabad	Gujarat	Mehsana	Mahesana	Navi Sedhavi*	13	58
20	Ahmadabad	Gujarat	Mehsana	Mahesana	Jornang*	14	65
21	Ahmadabad	Gujarat	Mehsana	Mahesana	Ambliyasan*	2	5
22	Ahmadabad	Gujarat	Mehsana	Mahesana	Chaluva*	3	11
23	Ahmadabad	Gujarat	Mehsana	Mahesana	Dholasan*	31	173
24	Ahmadabad	Gujarat	Mehsana	Mahesana	Geratpur*	2	2
-	Ahmadabad	Gujarat	Mehsana	Mahesana	Dholasan [2]	-	-
-	Ahmadabad	Gujarat	Mehsana	Mahesana	Geratpur [2]	-	-
25	Ahmadabad	Gujarat	Mehsana	Mahesana	Ditasan*	5	23
26	Ahmadabad	Gujarat	Mehsana	Mahesana	Jagudan#	34	95
27	Ahmadabad	Gujarat	Mehsana	Kadi	Mevad*	31	162
28	Ahmadabad	Gujarat	Mehsana	Mahesana	Hebuva*	8	18
29	Ahmadabad	Gujarat	Mehsana	Mahesana	Punasan*	3	6
-	Ahmadabad	Gujarat	Mehsana	Kadi	Mevad [2]	-	-
30	Ahmadabad	Gujarat	Mehsana	Mahesana	Shobhasan#	33	90
31	Ahmadabad	Gujarat	Mehsana	Mahesana	Kukas*	9	30
32	Ahmadabad	Gujarat	Mehsana	Mahesana	Heduva Hanumant*	15	102
33	Ahmadabad	Gujarat	Mehsana	Mahesana	Mehsana#	36	211
34	Ahmadabad	Gujarat	Mehsana	Mahesana	Ramosana*	1	5
35	Ahmadabad	Gujarat	Mehsana	Mahesana	Taleti*	21	127
36	Ahmadabad	Gujarat	Mehsana	Mahesana	Nani Dau#	74	362
-	Ahmadabad	Gujarat	Mehsana	Mahesana	Taleti [2]	-	-
37	Ahmadabad	Gujarat	Mehsana	Mahesana	Palodara [Govt. land]	1	1
-	Ahmadabad	Gujarat	Mehsana	Mahesana	Nani Dau [2]	-	-
38	Ahmadabad	Gujarat	Mehsana	Mahesana	Moti Dau*	27	87
39	Ahmadabad	Gujarat	Mehsana	Visnagar	Bhandu*	50	163
40	Ahmadabad	Gujarat	Mehsana	Visnagar	Jethal Vasana*	17	52
41	Ahmadabad	Gujarat	Mehsana	Unjha	Aithor*	63	136
42	Ahmadabad	Gujarat	Mehsana	Unjha	Unjha#	101	360
43	Ahmadabad	Gujarat	Mehsana	Unjha	Maktupur*	41	133
44	Ahmadabad	Gujarat	Mehsana	Unjha	Kamali*	45	110
Total 33 villages in Mehsana district (incl. Wamaj in Mehsana)						***844***	***3,084***

Sl No	CPM	State	District	Taluk / Tahsil	Name of Village	No. of Plots as per 20E*/ Draft 20E#	No. of Titleholders as per 20E*/ Draft 20E#
45	Ahmadabad	Gujarat	Patan	Sidhhpur	Khali*	18	75
46	Ahmadabad	Gujarat	Patan	Sidhhpur	Lalpur*	17	47
47	Ahmadabad	Gujarat	Patan	Sidhhpur	Sidhhpur*	59	200
48	Ahmadabad	Gujarat	Patan	Sidhhpur	Sujanpur*	13	40
Total 4 villages in Patan district						***107***	***362***
49	Ahmadabad	Gujarat	Banaskantha	Vadgam	Dharewada*	17	43
50	Ahmadabad	Gujarat	Banaskantha	Vadgam	Manpura*	22	96
51	Ahmadabad	Gujarat	Banaskantha	Vadgam	Pasvadal*	15	44
52	Ahmadabad	Gujarat	Banaskantha	Vadgam	Kotadi*	11	32
53	Ahmadabad	Gujarat	Banaskantha	Vadgam	Chhapi*	9	26
54	Ahmadabad	Gujarat	Banaskantha	Vadgam	Majadar*	23	186
55	Ahmadabad	Gujarat	Banaskantha	Vadgam	Malosana*	21	95
-	Ahmadabad	Gujarat	Banaskantha	Vadgam	Majadar [2]	-	-
-	Ahmadabad	Gujarat	Banaskantha	Vadgam	Malosana [2]	-	-
56	Ahmadabad	Gujarat	Banaskantha	Palanpur	Jaslani*	10	33
57	Ahmadabad	Gujarat	Banaskantha	Palanpur	Sedrasana#	13	30
58	Ahmadabad	Gujarat	Banaskantha	Palanpur	Jagana#	30	63
59	Ahmadabad	Gujarat	Banaskantha	Palanpur	Palanpur#	96	205
60	Ahmadabad	Gujarat	Banaskantha	Palanpur	Sadarpur#	14	36
-	Ajmer	Gujarat	Banaskantha	Palanpur	Sadarpur [2]*	10	39
61	Ajmer	Gujarat	Banaskantha	Palanpur	Karjoda*	17	85
62	Ajmer	Gujarat	Banaskantha	Palanpur	Surajpura*	1	1
63	Ajmer	Gujarat	Banaskantha	Palanpur	Hebatpur*	23	50
64	Ajmer	Gujarat	Banaskantha	Palanpur	Chitrasani*	14	39
65	Ajmer	Gujarat	Banaskantha	Palanpur	Jaspuriya*	26	90
-	Ajmer	Gujarat	Banaskantha	Palanpur	Chitrasani [2]#	-	-
-	Ajmer	Gujarat	Banaskantha	Palanpur	Chitrasani [2]#	-	-
66	Ajmer	Gujarat	Banaskantha	Palanpur	Rajpuriya [3]	-	-
67	Ajmer	Gujarat	Banaskantha	Amirgadh	Jethi *	9	16
68	Ajmer	Gujarat	Banaskantha	Amirgadh	Iqbalgarh*	20	119
Total20 villages in Banaskantha district						***388***	***1,299***
Grand Total 68 villages for 4 districts						***1,540***	***6,026***

Note: 1. Wamaj is listed under Gandhinagar district to follow the order of the affected villages as per the alignment in the FLS and Land Plans even though a village under Mehsana district in terms of the administrative boundary.
2. Some villages are repeated in the above-table due to the order of the affected villages as per the alignment in the FLS and Land Plans.
3. Rajpuriya was initially included as one of the villages affected by land acquisition. However, it was later identified and clarified by CPM Ajmer that Rajpuriya is not affected by land acquisition in the Joint Measurement Survey (JMS).
4. The number of the affected plots and titleholders are under review and provisional only.
*. The number of affected plots and titleholders were given as per published 20E Notification as of August 2012.
#. Since 20E Notification was not published yet, the number of affected plots and titleholders were given as per draft 20E Notification.

Source: 20E and Draft 20E Notifications as of 31 August 2012.

8.2 DEMOGRAPHIC AND SOCIO-ECONOMIC FEATURES OF THE AFFECTED VILLAGES

The demographic and socio-economic features of the affected villages are summarised in Tables 8.2.1 - 8.2.4. There are 68 villages in the Wamaj to Iqbalgarh section. The total population varies from 1,298 persons in Vadavswami village to 112,013 persons in Kalol village in Gandhinagar district, from 258 persons in Geratpur village to 141,453 persons in

Mehsana village of Mehsana district, 2,069 persons in Sujanpur to 58,194 persons in Sidhhpur of Patan district, and from 316 persons in Rajpuriya village to 122,300 persons in Palanpur village in Banaskantha district, respectively.

The Scheduled Caste (SC) population varies from 0.9% to 16.0% in Gandhinagar district, 0.0% to 18.6% in Mehsana district, from 3.8% to 11.8% in Patan district, and from 0.0% to 22.0% in Banaskantha district. A relatively high rate observed in Banaskantha district (e.g. 22.0% in Malosana village and 21.9% in Sedrasana village of Banaskantha village, respectively.

The Scheduled Tribes (ST) population varies from 0.0% to 6.6% in Gandhinagar district, from 0.0% to 5.4% in Mehsana district, from 0.0% to 7.9% in Patan district, and from 0.0% to 97.8% in Banaskantha district, respectively. A higher rate is observed in Banaskantha district (e.g. 97.8% in Rajpuriya village).

The literacy rate ranges from 50.7% to 72.8% for Gandhinagar district, from 41.3% to 76.0% in Mehsana district, from 56.2% to 72.1% in Patan district, and from 27.8% to 69.40% in Banaskantha district, respectively. A relatively lower literacy rate is observed in Banaskantha and Mehsana districts (e.g. 27.8 % in Rajpuriya village and 40.6% in Jethi village of Banaskantha district) and (41.3% in Chaluva village and 41.5% in Nani Daue village of Mehsana district.

Finally, the work participation rate varies from 30.6% to 56.9% in Gandhinagar district, from 28.9% to 67.3% in Mehsana district, from 28.9% to 42.7% in Patan district, and from 27.1% to 52.3% in Banaskantha district, respectively. A relatively lower rate is observed in Banaskanta and Patan district (27.1% in Majadar village and 27.3% in Chtirasani village of Banaskantha district) and (e.g. 28.9% in Sidhhpur village of Patan district).

Table 8.2.1 Demographic and Socio-economic Features of the Affected Villages (Gandhinagar District)

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Gandhinagar**	**269,440**	**1,334,455**	**697,999**	**636,456**	**8.7**	**1.3**	**65.9**	**41.5**
Taluka	**Kalol**	**62,381**	**310,081**	**162,845**	**147,236**	**10.5**	**0.4**	**65.2**	**41.1**
Village/ Town	Pansar	1,731	7,953	4,131	3,822	12.8	0.2	67.1	34.8
	Isand	726	3,556	1,900	1,656	8.9	6.6	56.6	47.2
	Vadavsvami	251	1,298	661	637	8.6	1.9	67.0	54.8
	Chhatral	2,111	9,744	5,451	4,293	7.7	1.6	63.0	41.6
	Ola	320	1,607	826	781	10.2	0.0	64.9	52.6
	Pratappura	326	1,734	906	828	0.9	0.0	59.5	56.9
	Piyaj	718	3,766	1,955	1,811	10.8	0.0	51.7	50.9
	Borisana	1,742	8,700	4,569	4,131	5.3	0.0	70.1	39.3
	Ramnagar	372	1,965	1,024	941	6.9	0.0	69.0	48.9
	Vansajada	456	2,356	1,194	1,162	2.4	0.0	50.7	55.9
	Kalol	22,194	112,013	59,539	52,474	16.0	0.3	72.8	30.6

Source: Census of India, 2001

Table 8.2.2 Demographic and Socio-economic Features of the Affected Villages (Mehsana District)

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Mahesana**	**364,447**	**1,837,892**	**953,842**	**884,050**	**8.1**	**0.5**	**64.7**	**45.1**
Taluka	**Unjha**	**35,064**	**174,303**	**90,235**	**84,068**	**7.6**	**0.2**	**70.7**	**44.6**
Village/ Town	Kamli	1,365	6,508	3,347	3,161	3.7	0.1	73.4	49.3
	Maktupur	1,037	5,138	2,662	2,476	9.4	0.2	67.6	48.7
	Aithor	1,769	8,509	4,372	4,137	7.3	0.0	66.9	40.5
	Unjha (M)	10,734	53,876	28,396	25,480	7.7	0.7	75.6	36.1
Taluka	**Visnagar**	**49,906**	**253,179**	**131,809**	**121,370**	**7.4**	**0.4**	**69.5**	**43.8**
Village	Jetalvasana	723	3,417	1,739	1,678	15.9	0.0	74.7	51.9
	Bhandu	1,432	7,186	3,733	3,453	5.5	0.2	66.9	44.2
Taluka	**Mahesana**	**90,920**	**461,320**	**241,115**	**220,205**	**8.2**	**0.9**	**67.4**	**41.6**
Village/ Town	Motidau	948	4,901	2,492	2,409	10.5	0.0	65.2	52.8
	Nanidau	581	3,051	1,541	1,510	0.0	0.0	41.5	50.9
	Palodar	831	4,225	2,217	2,008	7.4	0.0	66.9	56.5
	Ramosana	565	3,097	1,583	1,514	9.0	0.5	62.9	36.2
	Taleti	331	1,785	918	867	15.1	0.0	64.8	42.0
	Kukas	499	2,640	1,366	1,274	9.8	0.1	67.4	50.9
	Heduva Hanumat	316	1,480	782	698	14.5	0.9	52.4	48.6
	Sobhasan	433	2,230	1,138	1,092	10.2	0.0	61.2	38.1
	Hebuva	258	1,514	781	733	2.1	0.0	71.0	49.1
	Punasan	426	2,186	1,125	1,061	9.8	0.0	61.4	38.1
	Mevad	362	2,093	1,091	1,002	3.7	0.0	68.9	43.5
	Jagudan	1,104	5,502	2,902	2,600	8.1	0.3	68.3	36.6
	Geratpur	50	258	140	118	6.6	0.0	55.8	53.1
	Ditasan	204	1,114	576	538	3.1	0.0	41.8	63.8
	Dholasan	591	3,267	1,684	1,583	3.2	0.3	64.4	39.4
	Chaluva	635	3,671	1,915	1,756	4.2	0.0	41.3	67.3
	Jornang	1,181	5,945	3,099	2,846	7.2	0.0	68.8	49.2
	Navi Sedhavi	319	1,638	871	767	13.4	0.0	62.6	41.9
	Mahesana	28,161	141,453	74,866	66,587	9.6	1.6	76.0	28.9
	Ambaliyasan	1,382	6,739	3,617	3,122	12.2	5.4	65.2	40.5
Taluka	**Kadi**	**59,882**	**296,921**	**154,947**	**141,974**	**9.2**	**0.4**	**62.9**	**45.1**
Village	Kaiyal	694	3,608	1,850	1,758	6.2	0.0	65.7	49.1
	Tankiya	218	1,098	556	542	18.6	0.0	58.0	42.3
	Dangarva	1,167	5,716	2,959	2,757	9.5	0.1	66.5	39.0
	Anandpura	225	1,167	618	549	7.5	0.2	74.2	36.6
	Ghumasan	875	4,222	2,197	2,025	10.2	0.0	66.5	41.7
	Jhulasan	1,046	4,892	2,555	2,337	5.7	0.0	63.3	46.3
	Vamaj	846	4,357	2,448	1,909	8.2	0.1	73.6	56.2

Source: Census of India, 2001

Table 8.2.3 Socio-economic Features of the Affected Villages (Patan District)

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Patan**	**222,630**	**1,182,70**	**612,100**	**570,609**	**9.9**	**1.1**	**50.7**	**45.1**

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
			9						
Taluka	**Sidhpur**	**35,640**	**190,937**	**98,063**	**92,874**	**11.7**	**0.9**	**61.1**	**39.6**
Village/ Town	Sujanpur	389	2,069	1,095	974	3.8	0.0	72.1	42.7
	Lalpur	446	2,294	1,191	1,103	6.9	7.9	56.2	38.7
	Khali	429	2,696	1,394	1,302	7.9	0.0	59.9	31.8
	Sidhpur	11,060	58,194	30,138	28,056	11.8	1.7	68.6	28.9

Source: Census of India, 2001

Table 8.2.4 Socio-economic Features of the Affected Villages (Banaskantha District)

District/ Taluka/ Village	Name	Total No. of Households	Total Population			SC Population (%)	ST Population (%)	Literacy Rate (%)	Work Participation Rate (%)
			Person	Male	Female				
District	**Banaskantha**	**426,781**	**2,504,244**	**1,297,404**	**1,206,840**	**10.8**	**8.2**	**41.4**	**43.6**
Taluka	**Amirgarh**	**17,026**	**101,133**	**52,148**	**48,985**	**3.2**	**53.2**	**27.0**	**39.7**
Village	Iqbalgarh	983	5,211	2,751	2,460	3.6	4.5	55.2	38.7
	Jethi	714	3,669	1,935	1,734	8.9	33.8	40.6	52.3
	Rajpuriya	63	316	169	147	0.0	97.8	27.8	51.9
Taluka	**Vadgam**	**40,735**	**205,992**	**104,967**	**101,025**	**16.6**	**2.4**	**57.7**	**39.6**
Village	Malosana	417	2,140	1,093	1,047	22.0	0.0	60.0	43.5
	Majadar	1,396	7,585	3,847	3,738	14.4	0.1	65.2	27.1
	Chhapi	1,412	7,592	4,014	3,578	12.3	5.7	64.4	31.0
	Kotadi	301	1,443	716	727	21.6	3.5	59.4	43.2
	Pasvadal	557	2,682	1,354	1,328	14.2	8.4	57.0	39.3
	Manpura	332	1,534	778	756	18.6	0.0	59.3	34.3
	Dharewada	209	1,066	542	524	14.2	0.0	54.2	34.3
Taluka	**Palanpur**	**72,765**	**380,707**	**196,956**	**183,751**	**11.2**	**3.8**	**59.5**	**37.2**
Village/ Town	Chitrasani	603	3,591	1,877	1,714	10.6	13.0	57.3	27.3
	Jaspuriya	207	1,068	562	506	8.5	8.1	56.8	40.3
	Hebatpur	140	732	381	351	13.8	1.9	55.6	40.6
	Karjoda	391	1,990	1,000	990	21.3	12.2	55.5	37.1
	Sadarpur	608	3,116	1,592	1,524	11.3	12.6	60.1	41.6
	Jagana	1,417	6,802	3,517	3,285	14.1	0.4	69.4	36.8
	Sedrasana	243	1,336	695	641	21.9	3.3	60.6	34.1
	Jasleni	491	2,507	1,280	1,227	16.7	2.6	62.9	44.1
	Palanpur	23,832	122,300	64,365	57,935	10.8	2.8	68.5	28.5
	Surajpura	NA	NA	NA	NA	NA	NA	NA	NA

Source: Census of India, 2001

8.3 SOCIAL IMPACT ASSESSMENT

The most significant potential impacts on the social environment are land acquisition and involuntary resettlement, though it is expected that impact on resettlement is relatively smaller considering the scale of land acquisition since the majority of affected area is agricultural land in the study area and wherever in urban areas, the land required for the project was accommodated within the existing ROW as much as possible by demolishing the existing railway structures. However, the adverse impacts of land acquisition and Rehabilitation & Resettlement (R&R) need to be minimised through adequate mitigation measures, and they are further discussed in the RRP separately.

Other than land acquisition and R&R, there are some more concerns in the survey area, such as regional severance by the railway and access to existing social infrastructures (e.g. irrigation facilities). These issues were raised during consultations as part of the field work in the Baseline Survey and Census and PCMs on ESIA scoping. These impacts will be specifically further studied in the RRP.

The results of impact assessment of social environment is tabulated in Table 8.3.1.

Table 8.3.1 Impact Assessment of Social Environment

No.	Likely Impacts	Assessment			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
1	Involuntary Resettlement	A-	-	-	**Planning/ Design Phase** *<Land acquisition>* Most of the alignment in this section is proposed to be parallel to the existing railway as well as within the designated land of MOR as much as possible in order to minimize involuntary resettlement. However, since land acquisition of private land is still necessary, a certain degree of involuntary resettlement including squatters and encroachers is inevitable. In addition, governmental/public facilities such as railway offices, and governmental quarters would be affected and shifted in some sections (i.e. Sidhpur, Unjha, Mehsana, Palanpur, Jethi and Chhapi).
2	Local economy such as employment and livelihood	A-	B-/ B+	A+	**Planning/ Design Phase** *<Land acquisition>* There are some sections passing through agricultural land. Acquisition of the agricultural land would affect the livelihoods of farmers whose farmland will be acquired. In addition, there is a possibility that income of those who do not depend on land such as vendors would be also affected by land acquisition. **Construction Phase** *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Overall construction activities together with traffic restrictions would affect local economic activities to some extent due to disturbance in smooth operation of commercial/public transportation during the construction phase. On the other hand, it is also expected that local business opportunities would be temporarily improved by the construction activities. **Operation Phase** *<Operation of trains>* During the operation phase of the DFC, the regional economy particularly the industrial sector in major industrial locations is expected to be improved due to smooth freight transportation. Besides, employment and business opportunities would be created by the DFC operation.
3	(Surrounding) Land use and utilization of local resources	-	-	C-	**Operation Phase** *<Change of land use>* Land use could be changed due to induced development along the proposed alignment and around new stations unless the land use is property planned by the local government.
4	Social institutions (including regional severance)	-	B-	B-	**Planning/Design Phase** No impact is expected. **Construction Phase** *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* During construction, if access to the rest of the community is disturbed, social institutions could be disturbed. People's movements would be restricted and they would face inconveniences (ex. visiting temples in Sidhhpur and Palanpur) along or near to the proposed alignment. **Operation Phase** *<Appearance of the tracks and related facilities>* Accessibility and connection among communities would be affected due

No.	Likely Impacts	Assessment			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
					to the new freight tracks and other related facilities, Local people have particular concerns how to cross the proposed railway during the operation phase.
5	Social infrastructures and services	B-	B-	C-	**Planning/ Design Phase** *<Land acquisition>* Land acquisition involving the relocation of public and/or community facilities could affect local communities to some extent. In addition, the project requires relocation of station facilities such as station buildings and platforms in some areas.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Construction works and traffic restriction would disturb access to the existing social infrastructures and services. In some areas, the proposed alignment is likely to disturb accessibility to water sources for domestic use and irrigation.
					Operation Phase *<Appearance of the tracks and related facilities>* Unless affected existing social infrastructure is replaced in a proper manner, nearby residents' access to existing social infrastructure would be affected. For instance, in some areas, the proposed alignment will disturb the accessibility of water sources for domestic use and irrigation according to PAPs.
6	Socially vulnerable groups such as poor, indigenous and ethnic people	B-	B-	B-	**Planning/ Design Phase** *<Land acquisition>* There is a possibility that the proposed alignment passes through certain areas of socially vulnerable populations. For instance, according to the Census of India, a relatively high SC rate is observed in Banaskantha district (e.g. 22.0% in Malosana village and 21.9% in Sedrasana village), and also a relatively high ST rate is observed in Banaskantha district (e.g. 97.8% in Rajpuriya village, 33.8% in Jethi village, 13.0% in Chitrasani village, 12.6% in Sadarpur village, 12.2% in Karjoda village). In these villages, the actual PAPs need to be identified through the Baseline Survey and Census, and mitigation measures including need to be examined further through public consultation with these PAPs in the course of RRP preparation.
					Construction Phase *<Construction of track, station, viaduct/bridges & other related facilities>* *<Traffic restriction in construction area>* Construction works, traffic restriction and design layout of proposed DFC plan (construction in front of station, track passing through or near residential or market area etc.) could cause inconveniences especially to the disabled, children, the elderly and women in the construction areas.
					Operation Phase *<Appearance of the tracks and related facilities>* The project could cause inconveniences to the physically disabled, children, the elderly and women in both the parallel and detour areas unless the alternative passage to the other side of the proposed railway is secured.
7	Inequitable or unfair distribution of benefits and damages	C-	C-	C-	**Planning/Design, Construction, Operation Phases** *<Land acquisition>* *<Construction works>* *<Operation of trains>* Inequality among the stakeholders may occur, since some may benefit from the project and others would be affected negatively by the project
8	Local conflict of interests	C-	C-	C-	**Planning /Design Phase, Construction Phase, Operations Phase** *<Land acquisition, etc.>* The project implementation might cause conflict between beneficiaries and PAPs in all phases (i.e. land acquisition at planning phase, inconveniences during constriction, reduced land prices at planning,

No.	Likely Impacts	Assessment			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
					construction and operation phases due to the alignment passing, etc.) unless the adequate RRP and public consultation are arranged.
9	Water usage or water rights and rights of common	-	B-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Some of the overhead water tanks such as at Sidhpur and Pallanpur will have to be dismantled in affected railway stations. This will create water deficiencies during the period until they are re-constructed in nearby areas. There would be inconvenience to the railway station water users. In some areas, the proposed alignment may restrict accessibility to water sources for domestic use and irrigation.
					Operations Phase *<Appearance of the tracks and related facilities>* In some areas, the proposed alignment may restrict the accessibility of water sources for domestic use and irrigation unless appropriate measures are arranged.
10	Historical and cultural heritage (including religious matters)	B-	B-	B-	**Planning/Design Phase** *<Land acquisition>* The proposed alignment will require some land acquisition in religious places such as a temples in Sidhpur, Palanpur, and Unjha
					Construction Phase *<Operation of construction equipment and vehicles >* *<Traffic restriction in construction area>* Religious places which usually require silence might be affected by noise and vibration from operation of construction equipments and vehicles in some areas such as Sidhpur, Palanpur, and Unjha. In addition, access to religious places might be disturbed by construction works and traffic restrictions.
					Operation Phase *<Operation of trains>* Religious places near the proposed DFC alignment and relevant facilities might be affected by noise and vibration due to operation of the trains.
11	Sanitation	-	B-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Sanitary issues such as hygiene, health and environmental sanitation in and around labor camps and construction areas could be problematic in cases where sanitary facilities such as toilets and septic tanks are not adequately installed.
					Operation Phase No impact is expected.
12	Hazardous (risk) infectious diseases such as HIV/AIDS	-	B-	-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* There is a risk of laborers spreading infectious diseases including sexually transmitted diseases (STD), sexually transmitted infections (STI), and HIV/AIDS during construction due to the inflow of the many and various construction workers from outside.
					Operation Phase No impact is expected.
13	Occupational health and safety (OHS)	-	B-	B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Construction works>* Minor negative impacts on occupational safety can be expected during construction; however, it will be ensured in accordance with the domestic laws and regulations during construction.
					Operation Phase

No.	Likely Impacts	Assessment			Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Planning/ Design Phase	Construction Phase	Operation phase	
					Minor negative impacts on occupational safety can be expected during operation; however, it will be ensured in accordance with the domestic laws and regulations during operation.
14	Accident and public safety	-	B-	B+/ B-	**Planning/Design Phase** No impact is expected.
					Construction Phase *<Operation of construction equipment and vehicles>* Increased risk of accidents is expected due to the operation of heavy equipment and heavy vehicles during the construction.
					Operation Stage *<Operation of trains>* Increased risk of accidents is expected due to the trains. On the other hand, in the long run, with the change of transport mode from freight trucks to railway system, a reduction of accidents overall would be expected particularly as the tracks will be fenced off from both sides.

Note: * Regarding the impacts on "Gender" and "Children's Right", might be related to all criteria of Social Environment.

<Assessment>

A-: Serious impact is expected, if any measure is not implemented to the impact.
B-: Some impact is expected, if any measure is not implemented to the impact.
C-: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses.)
-: No impact is expected.
A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.
B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.

Source: NKC

CHAPTER 9 PUBLIC CONSULTATION MEETING AND INFORMATION DISCLOSURE

Public consultation meetings (PCMs) for ESIA were conducted at two different stages to collect opinions of the public and also to disseminate information on the Project. The first stage of the PCMs for ESIA was conducted during environmental scoping in the initial stage of the ESIA study. Information on the Project and draft scope of the ESIA study was disseminated to the public that are directly or indirectly affected by the Project and then comments and opinions were collected. The second stage of the PCMs for ESIA was conducted when finalizing the ESIA report. The findings of the environment and social impact assessment and proposed mitigation measures were also disseminated to the public to collect their feedback and reflect their comments and opinions in the final ESIA report.

9.1 APPROACH AND METHODOLOGY

9.1.1 Approach of PCM

DFCCIL has engaged in extensive consultations with PAPs, communities and other stakeholders potentially affected by the project. Public consultation is a continuous activity in the ESIA process as a critical component of a comprehensive ESIA. Thus, the PCMs were not the end of the public consultation process but rather the initiation of discussions among the participants whose opinions have been incorporated in the ESIA report. With this objective in mind, stakeholders were identified and invited to attend the meetings. The PCMs were held at venues convenient to PAPs and timings were arranged to suit their preferences. It was kept in mind to invite stakeholders from all villages of affected areas so that opinions from all concerned could be addressed.

The major objectives of the PCMs are to incorporate the opinions and suggestions of the public and all other stakeholders at the project planning stage to ensure the wider acceptability of the project. The specific objectives are to;

- Provide information on the economic, environmental and social benefits as well as potential negative impacts from the project.
- Ensure that the potential PAPs, stakeholders and local communities are engaged in a meaningful dialogue and well informed prior to the decision of DFCCIL, as to the nature and extent of social and environmental impacts attributable to the proposed project in respect to the alignment, schedules and plans.
- Ensure that the concerns and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the ESIA study.
- Engage in a participatory exercise with PAPs, stakeholders and local communities and obtain local, traditional wisdom and knowledge from them in order to plan mitigation measures.
- Facilitate periodic opportunities for the principal stakeholders to offer their inputs on all key components of the proposed project.

9.1.2 Methodology of PCM

(1) Target Area

The PCMs for environmental scoping were scheduled at one time (one venue)/district in the 4 affected districts namely Gandhinagar, Mehsana, Patan and Banaskantha districts.

The PCMs for draft ESIA were in principle organized by sub-district in the 4 affected districts.

(2) Topics of Discussion

The following are the main topic of discussions:

1) PCM for Environmental Scoping

- Introduction about DFCCIL and proposed alignment for Wamaj - Iqbalgarh Section
- Objectives of the ESIA study
- Provisional scoping results
- Outline of environment study (TOR)
- Contact information of the project proponent
- Question and answer session

2) PCM for Draft ESIA

- Outline of the Project
- Outline of draft ESIA
- Summary of Impact Assessment results with proposed mitigation measures
- Environment and social monitoring plan
- Information disclosure of draft ESIA
- Outline of draft RRP
- Relevant legislation
- Brief explanation of important section of RAA 2008
- Proposed compensation package
- RR assistance
- Grievance redress
- RRP information disclosure
- Contact information of the project proponent
- Question and answer session

(3) Stakeholder Identification

Invitees to the PCMs were mainly project affected persons along the proposed alignment or boundaries of the relevant facilities. Different categories of stakeholders such as PAPs, Government officials, Competent Authority, Prant Officer, Taleti, representatives from housing society, civil society, agriculture marketing federation were identified in order to seek opinions on the project as well as to discuss environmental and social impacts.

The stakeholders who were invited to attend the first stage PCMs were as follows;

- Project Affected Persons (PAPs)
- Government officials from the local administration, revenue department, land acquisition officer, forest officers, railway officials and police officers.
- Representatives from Gram Panchayat, such as Sarpanch (Village head) and Gram Pradhan, and Village Talati
- Local municipal bodies of the area
- Residents/merchants/businessman, farmers/senior citizen
- NGOs
- Civil societies
- Media

(4) Facilitators

Suitable field staff were appointed to carry out the PCMs. It was deemed preferable to appoint a field staff with a good track record and experience in social work. Their acquaintance with different sections of society and the ability to mobilize the stakeholders to attend the meeting were also preferable attributes in their selection. The ability to facilitate the following activities was taken into consideration;

- Assisting in publicity in local languages, Gujarati
- Sending of invitations to stakeholders and motivating them to participate in the meeting
- Maintenance and compilation of meeting records
- Other logistical arrangements such as identification of suitable venues for the meetings, arrangement of food, stationery distribution and public address system, transport and security

(5) Method of Information Dissemination

The facilitation team visited all the affected villages and informed local people of the purpose of the meeting and invited stakeholders to attend the meeting. The following methods were used for notifying participants;

- Invitation letters were translated into local language namely Gujarati and were sent to the Gram Panhchayat, and Government officers.
- Public notices were also prepared in local language namely Gujarati and stuck/ pasted on the notice board of Panchayat office for public display to all interested in the DFC project
- A handout containing information about the DFC project Phase 1 (Wamaj - Iqbalgarh section) was prepared in local language namely Gujarati, and was distributed to participants in the PCMs.

(6) Records of the Meetings

Information on participants and the content of the meetings were recorded in each PCM. Beside, a feedback form was distributed to collect further comments and suggestions from the participants.

- Record of the participants: Name, gender, occupation, village to which the participants belong and other appropriate features was recorded at the entrance.
- Record of the content of meeting: The contents of the discussions in the PCM were recorded by an electronically recordable device and reproduced by transcribing the contents in the report.
- Feedback Form: Feedback forms were distributed to collect further comments and suggestions from the participants, especially targeting comments and suggestions from vulnerable groups. Assistant(s) who help the participants to fill out the form was arranged when assistance in writing is required.

9.1.3 Schedule of PCM

(1) PCM for Environment Scoping

As a total, 7 PCMs for environment scoping were organized in September and October 2011 as shown in Table 9.1.1. After holding the 6 PCMs in 4 districts, the necessity of holding additional PCMs in Mehsana was found since public notification was not properly ensured. Therefore, it was decided to re-hold the meeting by calling stakeholders from two villages Jagudan and Ditasan in Mehsana.

Table 9.1.1 PCM for Scoping Stage

District	Sub-District/Taluka	Location/Venue	Date	Villages Covered
Banaskantha	Palanpur	Ajamata Temple Hall, Sedarasana Village, Palanpur	20 September 2011	Jagana, Sedarsana, Majadhar, Jasleni, Kamalpur, Malosana
Patan	Sidhpur	Hotel Siddharth, Tavadiya Cross Road, Sidhpur Highway, Sidhpur	21 September 2011	Khali, Lalpur, Sidhpur, Sujanpur, Dharewada, Manpura, Pasvadal, Kotdi, Chappi and Majadar
Mehsana	Mehsana	Science Collage, Nagalpur, Mehsana	22 September 2011	Sobhasan, Kukas, Hedua, Mehsana, Ramosana, Taleti, Nani dau, Motidau, Palodar, Bhandu, Jetalvasana, Hethor, Unjha, Maktpur, Kamli.
Mehsana	Mehsana	Oxford School of Management, Julasan, Mehsana	23 September 2011	Ghumasan, Dandarva, Anandpura, Tankiya, Kaiyal, NaviShdhavi, Jornang, Ambaliyasan, Chaula, Dholasan, Garetpur, Mevad, Punasan, Hebuva
Gandhinagar	Kalol	Hotel Amrit, Mehsana-Ahmedabad Highway, Ambikanagar, Kalol	26 September 2011	Kalol, Vanchjera, Vamaj, Ramnagar, Piyaz, Borisana, Pratappura, Chattral, Ola, Insand, Vadavswami, Pansar, Jhulsasn
Banaskhantha	Palanpur	Agrawal Hall, Iqbalgadh Village, Amirgadh Block, Banaskantha	27 September 2011	(Sardarpura, Karjoda, Surajpur Hebatpur, Chitrasani, Jaspuriya, Jethi, Iqbalgadh.)
Mehsana	Mehsana	Cooperative Dairy Hall, Jagudan Village	12 October 2011	Ditasan, Jagudhan

Source: NKC

(2) PCM for Draft ESIA & RRP

The PCMs for ESIA and RRP are generally organized separately since the target and purposes of each PCM are different. This time, however, the PCMs for draft ESIA and draft RRP were combined into one meeting for the purposes of explaining the results of the draft ESIA and the framework of land acquisition and compensation together in order to avoid any confusion of participants attending several PCMs in a short interval.

In each sub-district, one PCM was organized in the Gandhinagar, Mehsana, and Patan districts except Banaskhantha District.

Table 9.1.2 PCM for Draft ESIA and RRP Stage

District	Sub-District/Taluka	Location/Venue	Date	Villages Covered
Banaskhantha	Sedrasana	Ajmata Mandir Hall, Doodh Mandli, Palanpur, Banaskantha	14 November 2011	Sadarpur, Sedrasana, Jagana, Jasleni and Palanpur
Banaskhantha	Vadgam	Ramapir Mandir, Near Bus Stand, Majadar, Vadgam, Banaskantha	15 November 2011	Majadar, Malosona, Dharewada, Manpura, Pasvadal, Kotadi, Chhapi, Jasleni and Palanpur
Patan	Sidhpur	Hotel Siddharth, Tavadiya Cross Road, Sidhpur Highway, Sidhpur,Patan	16 November 2011	Sidhpur, Khali, Lalpur and Sujanpur – Sidhpur is a Municipality
Mehsana	Unjha	Umiya Mata Mandir, Unjha, Mehsana	17 November 2011	Unjha, Kamli, Jetal Vasna, Bhandu, Maktupur and Ithor – Unjha is a Municipality
Mehsana	Mehsana	Vigyan Bhavan Hall 3rd floor, Urban Bank Science College, Nagalpur, Mehsana Highway, Mehsana,	18 November 2011	Moti Dau, Hebova, Punasan, Shobhasan, Kukas, Hedua Hanumant, Mehsana, Ramosana, Taleti, Nani Dau and Palodara
Mehsana	Ambaliyasan	Oxford School of Management, Sanku Water Park, Ahmedabad-Mehsana Highway, Mehsana	19 November 2011	Navi Sedhavi, Jornang, Ambliyasan, Chaluva, Dholasan, Geeratpur, Ditasan, Jagudan and Mevad
Mehsana	Julasan	Julasan Community Hall, Julasan At Julasan Kadi, Mehsana	21 November 2011	Julasan, Ghumasan, Dangarva, Anandpura, Tankiya, Kaial, Wamaj and Vansajara
Banaskhantha	Palanpur	Agrasan Bhavan, Iqbalgarh, Mehsana	22 November 2011	Sadarpur, Karjoda, Chitraseni, Jaspuriya, Jethi, Iqbalgarh, Hebatpur and Surajpura). Later on one more village i.e. Rajpuriya was also invited.
Gandhinagar	Kalol	Jainwadi, Near Vardhman Nagar, Kalol, Gandhinagar	31 July 2012	Ramnagar, Piyaz, Borisana, Kalol, Pratapura, Chattral, Ola, Isand, Vadaswami, Pansar

Source: NKC

9.1.4 Results of PCM for Environmental Scoping

(1) Participants

The participants of the PCMs were mainly PAPs, other villagers, Gram Sarpanch, Village Patwari, administrative officers, and DFCCIL officers. The female participants were limited.

(2) Opinions and Issues Raised in the PCMs and Actions Taken

During the discussions in the PCMs, the main issues and concerns raised were compensation-related issues such as compensation by market rates, land for land, and employment opportunities although the PCMs were organized to discuss on overall environmental and social impacts. Other important issues were the reasons for the alignment modification, land acquisition area, impacts on pipelines for domestic water supply and irrigation systems, access to the field, provision for the under bridge, a rehabilitation package for disabled and widows, provision for landless farmers, disclosure

of survey findings, and socio-cultural impacts. These issues were discussed and were answered by the DFCCIL officers, and Competent Authority.. The main issues discussed and concerns and requests raised b the participants are described as follows:

a) Compensation and Employment Opportunities

- Discontent on the compensation rate: Compensation proposed to be paid by DFCCIL is 160% of the circle rate (official rate). There was a high resentment as the rates being paid as compensation does not correspond with the market rates; DFC should allow PAPs to decide rates for their plots;
- Concern about Jantri Rate (Stamp Duty) which is always being kept as low and how the Government considers it as the market rate. It was suggested not to consider the land registration value for deciding base for compensation, and requested explanation on criteria for calculation of compensation rate;
- Concern about paying compensation according to new land acquisition bill;
- Request on an explanation on DFC's provision and amount of compensation to PAPs according to revenue records;
- Demand on providing jobs to one member of every land losing household;
- Demand on land-for-land compensation or provision of constructed house instead of giving compensation amount;
- Concern about the rehabilitation package for disable people, widow etc.;
- Request on clarifications on the DFC's provision to provide support in procurement of basic household items such as fans, cupboards, electric fitting, water and sewerage line;
- Request on issue of a card like BPL to the PAPs for enjoying any schemes the government provides; and
- Demand on providing pension to affected families.

b) Clarification of Aspects Related to Land Acquisition

- Clarifications on the reasons for the change of the alignment from west to east;
- Concern about the impact on the structure(s) due to the proposed alignment;
- Request on change of the alignment from their graveyard; and
- Request on provision of service roads on both sides of the alignment and adequate ROB/RUB to reduce hardship to farmers.

c) Displacement and Land Acquisition

- Request on consideration of PAPs as business partners since DFCCIL is likely to use land for business or industry purpose;
- Request on an explanation of the necessary area for land acquisition;
- Suggestion on construction of the DFC railway line on Government land in order to minimize acquisition of private land;
- Concern about the severe impacts resulting from land acquisition. In some cases there may even be losses of homestead land leading to subsequent displacement; and
- Concern about income losses due to land acquisition and concomitant livelihood impacts.

c) Agriculture, Irrigation and Pipeline for Domestic Use and Irrigation

- Concern about growing fodder due to the reduced size of holding land and impacts on their income from milk production;
- Concern about the negative impact on social communication, petty trade, losing access to irrigation systems, etc. where the project might constitute an obstacle to efficient use of or access to resources;
- Concern about shifting of existing water supply pipelines, electrical lines etc. Cross drainage works such as bridges and culverts will be required; and
- Request on an explanation of the DFC's provision for compensation of a bore well existing near the border of land acquisition, construction of a new bore well, change in land status from irrigated to non-irrigated, and loss to cattle.

d) Access to Resources and Community Facilities

- Request on an explanation of the DFC plan to address loss of community assets;
- Concerns on situations where residential areas become separated from agriculture fields or other community assets such as temples, mosques, cremation grounds, community centers or markets, transport, electricity, communication and water, and public services such as medical service and education (areas which are easily accessible at present), or access to certain categories of land (e.g. pastures, sources of firewood or water);
- Request on securing of accessibility to linking roads, and keeping of provision for railway gates, underpass, etc.; and
- Concern on increased risk of accident for the residents.

f) Information Dissemination

- Request on disclosure of the findings of the Baseline Survey and Census; and
- Request on showing of documents/maps which reflect land acquisition, ROW, exact number of plots, distance between the proposed tracks and the existing line etc.

g) Environmental Impact

- Request on explanation of potential impacts on water course and structures nearby relating to vibration.

The summary of the PCMs for environmental scoping including information of the venues, language, number and type of participants, major comments made by the participants are shown in Table 9.1.3

Table 9.1.3 Summary of Public Consultation Meetings for Scoping

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/DFCCIL	Attendant from Local Authority/ DFCCIL
1	20 Sep 2011	Ajamata Temple Hall, Sedarasan Village, Palanpur	(1) 165 (2) Farmer, Residence, Sarpanch (3) 0/165	Gujarati	a) Explanation of the reason to modify the proposed alignment from the previous study is requested.	The alignment was modified based on the technical assessment and other requirements of the project.	[DFCCIL] - Deputy CPM - Assistant Project Manager (Engineering)
					b) Compensation should be done by "land for land".	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					c) Explanation of land acquisition area is requested.	ROW is approximately 35 to 40m from the centre of the main line, which will be the area to be acquired.	
					d) Compensation for structures to be affected is requested to be explained.	Compensation would be provided for each structure to be affected. The Government will pay costs for construction of new structures according to present market rate and relocation of public utilities such as electricity lines, water pipelines, bore wells, etc. In addition to this, crop compensation will be done after valuation. It was informed that DFCCIL will pay for the registration fees in case the PAFs purchase land within one year after acquisition.	
					e) The construction of ROB in place of road under bridge at Umardasi Railway Station. The participants ensured to give support required.	DFCCIL representative informed that separate site visit to the suggested location can be made to take necessary decisions.	
					f) Clarification and plan of DFC for disposal and use of soil after construction.	Soil will be used during construction of roads etc.	
					g) In some cases, water boring of PAPs are coming on other side of the plot/alignment. The participants requested for the	It was informed that the PAPs need to identify water pipeline, etc. coming under the alignment within PAP plot and inform DFCCIL. DFCCIL will take care of taking required permission	

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					explanation.	now otherwise later on receipt of PAP request DFCCIL need to take permission from concerned higher railway authorities for any pipeline or other utilities coming under alignment.	
					h) The participants requested for the current market rate as compensation.	Compensation would be given as per current circle rate. In addition 60% solatium on the compensation will be given. Detailed discussion will be done for provision of compensation for structures, public utilities, landless, encroachments, small and marginal farmers, etc.	
2	21 Sep. 2011	Hotel Siddharth, Tavadiya Cross Road, Sidhpur Highway, Sidhpur	(1) 325 (2) Farmer, Residence, Sarpanch (3)0/325	Gujarat	a) Compensation for structures to be affected is requested to be explained.	Compensation would be provided for each structure to be affected. The Government will pay costs for construction of new structures and relocation of public utilities such as electricity lines, and water pipelines.	[DFCCIL] - Deputy CPM (Finance), - Project Manager (Land), - Assistant Project Manager (Engineering) [Local Authority] - Deputy Special Police (Patan) - Prant Officer, Patan - Prant Officer, Sidhpur - Revenue Officer Sujanpur
					b) The participants requested DFCCIL to give land in exchange of land equivalent to the land acquired. This affects land use, decrease the size of landholding small and divide land in two parts.	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					c) It would be preferable for PAPs to be provided with a job opportunity in railways.	A job opportunity will not be provided as a method of compensation within the current legal framework. Unemployment allowance would be provided based on the national regulations.	
					d) Necessary area for land acquisition is requested to be	ROW is approximately 35 to 40m from the centre of the main line, which will be the area	

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					explained.	to be acquired.	
					e) There is a possible impact on public utilities such as electricity lines, and water pipelines.	It was informed that DFCCIL will give full cost for replacing public affected utilities such as water supply, sewerage, telephone line, and electricity.	
					f) Clarifications on the reasons for change in alignment from west to east were requested.	It was easier for the railway to lay down the track on the west side but as a large amount of farmers' fertile land was coming under the alignment. Therefore the alignment has been changed and brought to the east side. Due to the change in alignment to the east side, the MOR itself is facing the loss as a lot of railway buildings will be destructed.	
					g) The participants enquired about the criteria for calculation of compensation amount. They were of the opinion that farmers should be given an opportunity to decide and negotiate for the value of their own land. The participants requested for the current market rate as the compensation rate.	Compensation will be given as per the current circle rate. In addition 60% solatium on the compensation determined in will be given.	
					h) The participants requested clarifications regarding DFCCIL's provision alternative agriculture land elsewhere and provision for farmers a certificate becoming landless after land acquisition. The participants requested DFCCIL to provide such a certificate before land acquisition.	It was informed that at present DFC has no policy to give land for land. But certainly it will take responsibility to pay registration fees in case land is purchased within one year of acquisition. It was further informed that, the concerned Land Acquisition Officer will issue certificate to PAPs losing land due to land acquisition. The concerned PAPs can purchase land anywhere in Gujarat within two year after land acquisition.	
					i) The participants requested to	It was explained that DFC will repair all the	

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					explain the DFC plan to address loss of community assets.	community assets but still PAPs can inform in writing about such cases. This will help DFC to review and plan accordingly.	
					j) The participants informed that, there was a nala (drain) flowing along the highway, which was blocked due to construction of buildings on the highway site. This drain ultimately flows into river Saraswati. Now, this drain is blocked whole water flows on the highway. As a result, it floods the fields and parallel area of the railway line, especially near level crossing 191. Thus, farmers face lots of problems during rainy season because of water logging. Further, it was requested to make arrangement for diversion of rain water into nearby stream so that a field does not get flooded.	DFC officials ensured to take immediate corrective measures.	
					k) The participants are ready to cooperate with DFCCIL for development of the area and requested officials to develop a welfare program for the benefit of PAPs.	Suggestions noted by DFCCIL officials.	
3	22 Sep, 2011	Science Collage, Nagalpur, Mehsana	(1) 200 (2) Farmer, Residence, Sarpanch (3) 0/200	Gujarati	a) Explanation of the reason to modify the proposed alignment from the previous study is requested.	The alignment was modified based on the technical assessment and other requirements of the project. It was explained that DFC alignment starts from Jawaharlal port in Bombay, runs parallel up-to Surat, and Gotangaon, then goes towards the west side, due to Mandavi and Kandala	[DFCCIL] Project Manager (Land), Assistant Project Manager (Engineering) Assistant Project

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						ports nearby towards Vadodara, Makarpura, Anand and Sanand. It was also explained that DFC is a dedicated freight having separate alignment and not connected with regular passenger railway line. It goes to Nandasan, Moryabi and Palanpur from Sanand. It goes towards east from Palanpur. As per the earlier plan, the railway line was 6 to 6.5 metre high, crossing through more acres of cultivated land and villages, more structures in Sidhpur, Mehsana, Palanpur and Unjha were affected, and many villages were divided into two parts, many private buildings and housing societies were getting affected as compare to the proposed alignment. Thus, the earlier alignment were reviewed and changed to minimize the impact. However, there is a provision to provide support for development activities in the village which includes a community hall, school building, road, water supply, etc. In this concern, a written application duly signed by a village through Panchayat will be required.	Manager [Local Authority] Land acquisition Officer, Mehsana district Sub Divisional Magistrate, Mehsana district Police Inspector
					b) The participants requested to disclose the result of survey related to land acquisition caused by the project.	DFCCIL officials ensured to disclose the survey findings. Further it was informed that the land map is available for everyone at the	
					c) The participants informed that they are taking 3 crops and fodder from their land which supports their family and they also practice animal husbandry. If land will be acquired then PAPs will be marginalized. Due to insufficient availability of fodder it is most likely that	DFCCIL during the design phase has considered that the alignment which affect the least amount of land be taken for the purpose of laying track, and DFCCIL will only take piece of land which is necessary for the project implementation.	

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					the quantity of milk production can be reduced. Further it was informed that this is for the third time railway is taking land in their village.		
					d) The participants requested for the current market rate as the compensation rate.	It was informed that the socio-economic survey undertaken will help to understand the actual situation of the people and impacts of DFCCIL. Based on the survey findings, RRP will be prepared to safeguard interest of the PAPs In addition, as an Ex gratia settlement, each titleholder will get Rs, 20,000/- for up-to 1,500 sqm of land being acquired, and after this for each sq. meter Rs. 15/- will be paid. It was further explained that in one 7/12, if there are five titleholders then each of them will get Rs. 20,000/-. For marginal and small farmers, wages at the rate of Rs. 120/- per day for 750 days will be paid in the form of compensation for their wage loss.	
					e) The participants requested explanation on DFCCIL's provision to give compensation to the PAPs for plots not divided according to revenue records, and amount to be distributed amongst the family members	It was explained that the Competent Authority is likely to demarcate 7/12 on a map and identify the area which comes under acquisition. The titleholder of land under acquisition will get the compensation. It was further informed that details can be taken from DFCCIL or district office. The PAPs can decide for their remaining small piece of land left after acquisition to either take 25% of value of the land or give application for acquiring full land and get compensation accordingly.	
					f) The participants told that their water pipelines are passing through the land which DFCCIL wants to acquire. The PAPs need support and	DFC will ensure to minimise disturbance in existing water supply pipe lines. During construction, an alternative underground pipeline will be given, so that other side of land can get water easily.	

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					clarifications.	It was also informed that the PAPs need to inform authorities about the pipelines during the project implementation phase. For replacement of other services like electricity, phone etc. compensation will be given as per present market value.	
					g) Compensation should be done by "land for land". It was further suggested that, there are many fallow lands available within village which are not fertile. This can be can be utilised for the same purpose.	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					h) It would be preferable for PAPs to be provided with a job opportunity nearer to Mehsana.	It was informed that there is no such policy at present but Government decision in this concern is underway and will be informed accordingly.	
					i) Necessary area for land acquisition is requested to be explained. Farmers informed that this is for the third time railway is taking their land.	ROW is approximately 35 to 40m from the centre of the main line, which will be the area to be acquired. It was clarified that the proposed alignment is technically designed to ensure the minimum impact on residential and agriculture areas of the villages.	
					j) Explanation about any possibilities of the impact on accessibility within a community or to own land is requested	Bridges, ROBs, RUBs, etc. would be provided after evaluation of its necessity. Requests for providing such facilities would be conveyed to DFCCIL office.	
					k) The participants raised their concern that in some cases there is no proper record for the registry of purchased land.	It was informed that, in general people want to save amount of stamp duty for land registration, Which shows less price for land/house transaction. But, this is a problem when situation like land acquisition for Government project comes. In DFC, the PAPs would get 60% more amount as solitium which will take care of actual price of land to some extent.	

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					l) The participants were concern about the impact on structures due to the proposed alignment.	The PAPs were ensured that there is no loss to the residential structure.	
4	23 Sep. 2011	Oxford School of Management, Julasan, Mehsana	(1) 160 (2) Farmer, Residence, Sarpanch (3) 0/160	Gujarati	a) The participants requested to clarify the area of land acquisition.	ROW is approximately 35 to 40m from the centre of the main line, which will be the area to be acquired. It was clarified that this information can be explained on the basis of the plot number and land map. Further, it was also informed that all information will be published in newspaper. Illiterate PAPs can take support from any literate persons form the village or contact DFCCIL officials for more information. Technical design is such that least amount of land will be taken for the purpose of laying track, and DFCCIL will only take that much land which is necessary for the project implementation. It was explained that parallel to track only 5m of land is being taken, which could be used for the farmers as pavement for walking, he also gave example of Ambaliyasan station, where initially the pole of land acquisition was about 20m wide from the platform, but by changing the design railway has brought it inside the present track although it will lead to breaking of railway quarters and houses along with the platform.	[DFCCIL] Project Manager (Land), Assistant Project Manager (Engineering) Assistant Project Manager [Local Authority] Land Acquisition Officer, Mehsana district
					b) The participants requested the current market rate as compensation.	Each family member of legal title holder will get Rs 20,000. It was also informed that they will also be given 60% surcharge on the present market rate of that piece of land. In case the compensation amount is not paid within 10 months then DFCCL is liable to pay interest. DFCCIL will calculate the average of highest 50% of land transactions in village/town, or	

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						present land value decided by the Government, whichever is high. DFCCIL consider this as base for calculation of compensation amount. The PAPs who become marginal farmer or landless will get equivalent to 750 days wages at the rate of 120 per day (minimum wage as decided by Government of Gujarat. If a farmer becomes completely land less after land acquisition then along with the cost of land he will also be provided with a salary for 750 days at the current wage rate for agricultural labour. The rates of land acquired will be calculated depending on its location. In addition to this, Rs. 20,000 will be given for first 1,500 sqm and then subsequently at the rate of Rs. 15 per sqm for portion of land under acquisition. Compensation against structure loss and other assets will be paid as per present market value, irrespective of year of construction. It was also informed that, in old "Jantri", land value for whole village was considered the same, but now with new 'Jantri' land value is decided based on location of the plots. The value of PAPs land will be higher if located near highway, as compare to the land value situated interior in the village. Every plots survey number has different rate for their land.	

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					c) Clarifications on the reasons for the change in the alignment from west to east were requested.	It was easier for the railway to lay down the track on the west side but as a large amount of farmers fertile land was coming under the alignment, therefore the alignment has been changed and brought to the east side. Due to the change in the alignment to the east side, the MOR itself is facing the loss as a lot of railway buildings will be destructed.	
					d) In some cases, water boring of PAPs are coming on the other side of the plot/alignment. The participants requested for the explanation.	It was informed that the PAPs need to identify water pipeline, etc. coming under the alignment within the PAP's plot and inform DFCCIL. DFCCIL will take care of taking a required permission. DFCCIL need to take permission from concerned higher railway authorities for any pipeline coming under the alignment. PAPs were requested to submit an application through Gram Panchayat regarding the future plan for installation of basic infrastructure facilities such as water supply, sewerage, electricity, and phone within the village. This would help DFCCIL to take permission and keep provision for these basic services under railway line during construction work.	
					e) If a farmer becomes land less then deserving person of the household may be provided, employment in railway department. BPL card may also be issued to them?	It was informed that the PAPs can get benefits through NRRP scheme such as construction of community hall and school for development of the village. Gram Shabha can decide on the status of APL and BPL, in case there is any change in economic status of the PAPs after land acquisition under DFCCIL. Thereafter, the PAPs can take benefits from local government. It was also explained that landless. The PAPs were requested to submit their concerns in writing so that it can be included in	

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						RRP and the survey report. Government can take necessary decisions accordingly.	
					f) Compensation should be done by "land for land".	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					g) It is requested to disclose the results of surveys related to land acquisition such as the land map.	The land map is available for everyone at DFCCIL office and District Administration.	
					h) The participants requested clarification on the area to be acquired on both sides of the existing railway track for construction of the DFC railway line.	It was informed that DFC will first use the existing railway land and acquire minimum land from the PAPs. Land acquired may also be used for construction of road required for repair and maintenance of the track. It was further explained that the earlier railway line was constructed on both sides of the track and, 980 ha land were coming under within DFC. Now, both railway tracks will be constructed on one side, so only 450 ha land will be acquired. It is beneficial for the people but due to this change the DFC expenditure increased by Rs. 2,200 crores.	
					i) Explanation about any possibility for impacts on accessibility within a community or to own land is requested.	Bridges, ROBs, RUBs, etc. would be provided after the evaluation of its necessity through a technical feasibility study. Requests for providing bridges, ROBs, RUBs, etc. would be conveyed to DFCCIL office.	
5	26 Sep, 2011	Hotel Amrit, Mehsana-Ahmedabad Highway, Ambikanagar, Kalol	(1) 55 (2) Farmer, Residence, Sarpanch (3) 7/48	Gujarati	a) Explanation of the reason to modify the proposed alignment from the previous study is requested.	The alignment was modified based on the technical assessment and other requirements of the project.	[DFCCIL] - Deputy CPM (Electrical) - Project Manager (Land)
					b) It is requested to secure adequate accessibility to linking roads and keep	The PAPs were requested to submit a written application for the location for construction of a road, or passage for water supply, railway	- Assistant Project Manager (Engineering)

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					provision for railway gates, underpass etc.	underpasses, over bridge etc. through Gram Panchayat. If there are private pipelines, then each farmer needs to submit a separate application for the same. This would help DFCCIL to take permission and keep provision for these basic services under the railway line during construction work. DFCCIL need to take permission from concerned higher railway authorities for any pipeline and other utility shifting coming under the alignment. Further it was also explained that now there will be no railway gate with watchman and DFCCIL will keep provision for over bridge or under pass.	[Local Authority] Land Acquisition Officer, Mehsana district
					c) Explanation of potential impact to irrigation facilities is requested	Necessary actions will be taken by DFCCIL. For this purpose, information or maps of location of irrigation facilities is necessary to be provided by the PAPs.	
					d) Explanation of the possibility of increased risk of accident for residents around the DFC track is requested	Adequate access such as ROB or RUB would be provided to allow residents to cross over the DFC track.	
					e) Compensation should be done by "land for land".	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					f) It is requested that adequate compensation for the land to be acquired would be done at market price.	The participants were informed that the competent authority will calculate the average of highest 50% of land transactions within village/town or present government land value. This will be the basis for calculation of compensation rate. PAPs will be given additional 60% as solatium. DFCCIL will pay interest in case compensation is not paid within 10 months.	

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						PAPs who become a marginal farmer or landless will get equivalent to 750 days wages at the rate of 120 per day (minimum wage as decided by Government of Gujarat Govt). In addition to this, Rs. 20,000 will be given for first 1,500 sqm and then subsequently at the rate of Rs. 15 per sqm for portion of land under acquisition. Compensation against structure loss and other assets will be paid as per the present market value, irrespective of year of construction.	
					g) It would be preferable for PAPs to be provided with a job opportunity in DFCCIL.	It was informed that at present there is no such government policy. The PAPs will be informed if some decisions are taken in this concern. The PAPs were requested to give all relevant details to the survey team so that future decisions can be taken accordingly.	
					h) It is requested to disclose information on the project	Holding a meeting at a respective DFCCIL office is possible. For this purpose, villagers are kindly requested to inform of their visit in advance to avoid unnecessary expense.	
6	27 Sep, 2011	Agrawal Hall, Iqbalgah Village, Amirgadh Block, Banaskantha	(1) 167 (2) Farmer, Residence, Sarpanch (3) 25/142	Gujarati	a) It was requested to explain potential impacts relating to vibration. If the track will pass through their land, due to vibration of the high speed train, water course of their bore wells will change and it is possible they may not be able to draw water from that source.	It was clarified that DFC is technically designed to minimize impact due to vibration. It is designed such that the affect will go under the railway track and 3 feet land on both sides of the railway track is also kept to minimize the effect. It was also explained that the existing railway line is 100 years old, and have wells located on both sides of this railway line which have water at 50 feet from the ground. Earlier, the train speed was 50 km/h and now it will be 110 km/h. The increased speed of freight movement	[DFCCIL] - Deputy CPM (Electrical) - Assistant Project Manager [Local Authority] Land Acquisition Officer, Mehsana district

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						will not affect ground water level in the wells.	
					b) It was requested to explain any potential impact to the surrounding environment due to heavy traffic and construction of the DFC track	Environment impact assessment is in progress, and adequate counter measures recommended would be applied.	
					c) Compensation should be done by "land for land".	Compensation by "land for land" is difficult within the current legal framework. However, adequate compensation would be provided.	
					d) Necessary area for land acquisition is requested to be explained.	It was informed that ROW is approximately 35 to 40m from the centre of the main line. It was further clarified that the total area to be acquired was mentioned in the gazette notification. The copy of the gazette notification was given to all concerned Panchayat offices. The PAPs can raise an objection within 30 days of publication. Further, it was also informed that many people had raised objections against the notification released earlier because many assets were coming within the alignment. Later, measurement of land and assessment were again done and report was sent for valuation to the concerned department. The PAPs were requested to provide information to the survey team of the baseline survey to assess their present socio-economic status. This will support DFC to decide future support to be given to the PAPs.	
					e) It would be preferable for the PAPs to provide with a job opportunity in DFCCIL.	A job opportunity will not be provided as a method of compensation within the current legal framework.	
					f) Compensation for affected	It was informed that the PAPs can request	

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					structures is requested to be explained. The participants informed that within a new DFC railway line, about 100 houses in Iqbalgarh village will be affected. The participants were apprehensive to purchase another land nearby from the small amount of compensation given by Government. It was suggested to provide land or constructed house instead of compensation amount.	Gram Panchayat to give any vacant land if available for new construction. DFCCIL officials clarified that actual number of affected structure is 40 and DFCCIL will make efforts to minimize the destruction of structures. The details of structure loss can be collected from deputy collector's office. Further it was also informed that at present there is no provision to give compensation in form of land or a house. Further it was also explained that compensation will be provided for each structure to be affected. DFC will give the full amount as per present market rate for construction of a house and shifting allowance. The Government will pay the cost for relocation of public utilities such as electricity lines, and water pipelines.	
					g) The participants requested for the current market rate as compensation. The participants suggested paying compensation according to new land acquisition bill. The participants were of the opinion that DFCCIL will now acquire less land as compare to earlier proposed alignment. Thus, DFCCIL have saved	It was informed that each title holder will get Rs 20,000/- . Further it was informed that 60% surcharge on the present market rate of that piece of land. DFCCIL officials informed that if in case more than 1,500 sqm of land is coming within alignment then for every additional sqm. PAPs will be paid Rs. 15/sqm. If a farmer becomes completely landless after land acquisition then along with the cost of land	

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					amount against compensation. It was further suggested to pay the saved amount as compensation.	he will also be provided with a salary for 750 days at the current wage rate for agricultural labour. The rates of land acquired will be calculated depending on its location.	
					h) Request to inform the status of structure loss in Sidhpur.	It was clarified that in Iqbalgarh, DFCCIL is only taking 10-12m of land. The remaining land used under this project already belongs to DFCCIL. In Sidhpur, railway has enough land so there is no need to take private land. The situation of the area under acquisition is different at each location. It was informed that DFCCIL has fixed pillars everywhere with DFC written on one side and NWR on the other side. It was clarified that, DFCCIL will not go beyond these pillars for land acquisition.	
					i) Request to change the alignment through their graveyard.	PAP request noted by DFCCIL officials. nd it was ensured to raise this concern to higher authorities for alternative solutions.	
					j) Request to explain the proposed alignment of DFCCIL railway at Iqbalgarh station.	It was informed that DFCCIL proposed line will be constructed 26m away from main railway line of Iqbalgarh station and another 4m will be taken on both sides of DFC lines to construct road.	
					k) Explanation of the reason to modify the proposed alignment from the previous study is requested.	The alignment was modified based on the technical assessment and other requirements of the project.	
					l) The participants informed that they laid down a water pipeline in their field for the irrigation purpose and also taken a loan from bank.	DFCCIL officials informed that although extreme care is taken to decide the compensation of the farmer but if anyone feels that he haven't received the correct price for his belongings then he may further appeal for the re-evaluation of his assets.	

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					The cost which has been offered by the railway is very less and doesn't cover the cost of pipeline.	It was informed that each farmer needs to submit a separate application through Gram Panchayat for the private pipelines. This would help DFCCIL to take permission and keep provision for these basic services under the railway line during construction work. DFCCIL need to take permission from concerned higher railway authorities for any pipeline and other utility shifting coming under the alignment.	
					m) Request to explain DFC provision for compensation of an existing bore well near the border of land under acquisition, construction of a new bore well, change in land status from irrigated to non-irrigated, and loss to cattle.	It was informed that such plots/assets indirectly affected by the DFC can also claim for compensation against the assets loss. The compensation will be paid after assessment of the asset loss.	
					n) The participants informed that they are not ready for land acquisition. It was suggested that DFCCIL should allow the PAPs to decide rates for their plots. Further, it was also suggested that DFCCIL is likely to use land for business or industry purpose. Thus, consider the PAPs as partners.	It was informed that the railway line is constructed for social benefit and not for any business/industry. The railway is used by common public. There are instances where land value has increased after construction of railway line.	
					o) The participants suggested constructing the DFC railway line on government land in	DFC official suggested showing available government.	

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					order to minimise acquisition of private land.		
					p) The participants suggested providing pension to affected families.	It was informed that at present there is no pension scheme. It only exists in Haryana where each PAP get Rs. 33000/- per hectare per year for 30 years as part of compensation. It was further informed that the PAPs need to request State Government to make such provisions and on approval pension payment will be made.	
7	12 Oct, 2011	Cooperative Daily Hall, Jagdan Village, Mehsana	(1) 43 (2) Farmer, Residence, Sarpanch, (3) 1/42	Gujarati	a) It was requested to explain ROW, the exact number of plots, a map of land acquisition, the distance between the tracks proposed and the existing line etc.	It was also informed that in Jagudan village, DFCCIL railway line will be laid 35 m away in the west of existing railway line between railway gate number 208 and 207. Later, from the gate number 207, it will take a turn towards east which will not affect the village. The land map was shown to the PAPs and informed that the joint measurement survey is underway and on completion of the survey, DFCCIL will later inform the exact area of land under acquisition and the alignment passing through Jagudan and Ditasan. The information will be kept in Panchayat office for consultation by the villagers.	[DFCCIL] - Deputy Chief Project Manager (Electrical) - Assistant Project Managers
					b) Compensation package is requested to be explained.	It was informed that the competent authority will calculate the average of the highest 50% of land transactions within village/town or present land value as per government rate. This will be the basis for calculation of compensation rate. The PAPs will be given additional 60% as solatium. DFCCIL will pay interest in case compensation	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/DFCCIL	Attendant from Local Authority/ DFCCIL
						is not paid within 10 months. The PAPs who become small or marginal farmers will get equivalent to 750 days wages as per minimum wage decided by Government of Gujarat. In addition, Rs. 20,000/- will be given for first 1,500 sq.m and then subsequently at the rate of Rs. 15 per sq.m for portion of land under acquisition will be paid. Compensation against the structure loss and other assets will be paid as per the present market value, irrespective of its construction year. Compensation for the trees on acquired land will be given on the basis of evaluation done by the forest department. It was also informed that DFCCIL will pay for the registration fees if another piece of land is purchased within one year of land acquisition.	
					c) Clarifications on the reasons for the change in the alignment from west to east were requested.	It was easier for the railway to lay down the track on the west side but as a large amount of farmers' fertile land was coming under the alignment, therefore the alignment has been changed and brought to the east side. Due to the change in the alignment to the east side, the MOR itself is facing the loss as lot of railway buildings will be destructed	
					d) The participants had apprehensions about the link between Jagudan and Ditasan villages being blocked due to construction of the DFC.	DFCC Officials informed that all the links will remain intact and if there is any blockage, DFCC will provide an alternate route through ROBs or RUBs.	
					e) Request to explain any	Serious impacts would not be expected since	

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					potential impacts relating to vibration. If the track will pass through their land, due to vibration of the high speed train it is quite possible that direction of water in their bore wells will change. They were apprehensive that it is possible that they may not be able to draw water from that source. The participants raised their concern about possibility of cracks in individual houses or total collapse of house may also happen.	international standards and practices would be applied.	
					f) It is requested to explain the possibility of any impacts on accessibility within a community or to own land.	It was informed that DFCCIL will construct 3 m of road on both sides of the railway line which can be used to go to fields. It was also informed that DFCCIL will make efforts to minimize the disturbances in existing assets such as roads, link roads, bullock cart and camel cart roads, and water channels. But still if they get affected, DFCCIL will replace them. It was informed that bridges, ROBs, RUBs, etc. would be provided after evaluation of its necessity. Requests of providing such facilities would be conveyed to DFCCIL office.	
					g) Most of the participants were concerned whether the railway will provide employment for at least one person from each affected family, and landless	It was informed that at present there is no such government policy. The PAPs will be informed if some decisions are taken in this concern. The PAPs were requested to give all relevant	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/DFCCIL	Attendant from Local Authority/ DFCCIL
					PAPs.	details to the survey team and suggestions in the feedback form so that the PAPs' perceptions are compiled and future decisions can be taken accordingly.	
					h) The participants requested explanations on the DFC provision to minimize impacts on existing public utilities such as water supply pipe line.	The PAPs were requested to submit a written application for construction of a road, passage for water supply, etc. If there are private pipelines, then each farmer needs to submit a separate application. This would help DFCCIL to take permission and keep provision for these basic services under the railway line during construction work. DFCCIL need to take permission from concerned higher railway authorities for any pipeline and other utility shifting coming under the alignment. It was also explained that now there is no railway gate with watchman and DFC will keep provision for over bridge or under pass.	

9.1.5 Results of PCM for Draft ESIA and RRP

(1) Participants

Participants of the PCMs included the PAPs, other villagers, Gram Pradhan, Village Patwari, administrative officers, and DFCCIL officers. However, the female participants were limited.

(2) Opinions and Issues Raised in the PCMs and Actions Taken

During the discussions in the PCMs, the main issues and concerns raised were mostly compensation-related issues such as compensation by market rate, land for land and employment opportunities. Other important issues were the reasons for the alignment modification, the land acquisition area, impacts on pipeline for domestic water supply and irrigation systems, accessibility and socio-cultural impacts. These issues were discussed and answered by the railway officials and local authorities. Some environment related issues were discussed such as the loss of trees, disturbance due to noise and vibration. The main issues discussed and concerns raised are described as follows:

a) Compensation and Employment Opportunities

- Discontent on the compensation rate: Compensation proposed to be paid by DFCCIL is 160% of the circle rate (official rate). There was a very high resentment as the rates being paid as compensation do not correspond with the market rates;
- Concern about Jantri Rate (Stamp Duty) which is always kept as low so how the Government considers it as the market rate. PAPs informed that other agencies such as Oil and Natural Gas Corporation (ONGC) paid compensation as per market rates;
- Demands on providing jobs to one member of every land losing household;
- Demand on proper compensation;
- Request on that the Government should allow the PAPs to buy the government land by paying the Jantri Rate;
- Request on that the Government would pay to the premium over the Jantri Rate;
- Enquiry about the unit of a family in the context of compensation for land. In some cases the land title is with one person but virtually the land is fragmented and used by 8 to 10 persons;
- Request on providing of alternative livelihood for the PAPs;
- Concerns on that DFCCIL will not allow to harvest the grass from their own land. The PAPs have to pay fines and they are not sure whether these fines are really deposited to DFCCIL;
- Enquiry about disbursement of compensation if titleholder is dead; and
- Enquiry about compensation provision for people coming BPL category.

b) Displacement and Land Acquisition

- Demand on “land against land” compensation and request on DFCCIL to purchase land elsewhere and provide it to the PAPs;
- Request on DFCCIL to acquire a complete piece of land instead of leaving small piece of land with PAPs so that the PAPs can purchase land somewhere else;

- Suggestion on lease of land from the PAPs for construction of the DFC alignment instead of acquiring land;
- Confusion on 20A Notifications because the 20A was prepared based on the old revenue land records. The PAPs complained that the 20A Notification has included the survey number with a large chunk of land but the actual acquisition will be very less. According to PAPs there are a number of discrepancies in the current notification and requested for clarification. There were a lot of discussions on the 20A Notification for Unjha since there are discrepancies in the land records of Prant Office/Revenue Records and the Town Planning Records of Unjha Nagar Palika according to the PAPs;
- Request on knowing of the exact amount and width of land to be acquired from the existing railway track;
- Concerns on demolition of private structures such as cattle sheds, shops and flats.
- Complaint on change of its plans because of the influence of the political leaders. The track was supposed to go in the western side but now it has been changed to the eastern side;
- Request on clarification whether the PAPs can construct a house close to the railway track or not. More specifically, concerns on the issue of NOC for construction beyond 30 m and the issues associated with it;
- Concerns on rehabilitation packages for disabled people and famers who will lose/decrease their income due to land acquisition;
- Enquiry about the possibility of entering name of titleholders in 7/12 after release of 20A notification;
- Concern that after land acquisition farmer getting landless would not be able to purchase land elsewhere;
- Enquiry about compensation provision for remaining area after land acquisition;
- Concern on that the compensation amount proposed is not sufficient enough to purchase land and do construction of house elsewhere;
- Enquiry about total land availability for the railways in Delhi - Ahmedabad route; and
- Request from Bhandu village that the current plan for land acquisition in the village need to be changed to save the temple etc.

d) Access to Resources and Community Facilities

- Demand for ensuring access within the community or to their land by installing appropriate facilities;
- Complaint from villages such as Kamli and Nani Dau that the railway level crossing has been closed and necessary action has to be taken; and
- Onion on that passenger trains are beneficial for common public but freight corridor will only benefit industrialists.

e) Information Sharing

- Demands for explanation of reasons for modifying the alignment. Participants requested clarifications on the acquisition of land in case of detour;
- Request on clarification regarding housing societies coming within alignment;

- Request on consultation with the local farmers before the project was planned;
- Request on explanation of Government technical language of 20A and 20E;
- Suggestion to announce public consultation widely through media such as newspapers. Participants requested to organize it in each village so that the PAPs can attend meeting and share their concerns;
- Request on explanation about information in detail about the on-going baseline line survey and census in their villages;
- Request on disclosure of information such as where and how much land is going to be acquired, locations for the proposed ROB, RUB, railway crossing, changes in the existing stations, yards, and the start of construction work. at prominent locations; and
- Information on that PCM scheduled was not convenient to the PAPs due to agriculture season.

f) Socio-cultural

- Demand on that the graveyards should not be disturbed – the Kabaristhan of Iqbalgarh and the Samsan of Jaspuriya are going to be affected;
- Concern about that the DFCCIL officials always pass on the blame to the technical and engineering aspects for the alignment change; and
- Concern about the people's dependency on agriculture. The farmers will lose land and livelihoods. They will be socially ostracized. Once you lose land then no one will give their daughters in marriage to these families.

g) Environment

- Concern about loss of trees. Participants informed that they have to pay a penalty of Rs. 16,000 for cutting a tree long back. They requested to explain the basis for calculation of such penalty;
- Concern about increase of vibration impacts due to construction of DFC tracks;
- Concern about pollution and negative impact on the environment; and
- Requested to explain in case bore well water gets affected after construction.

Table 9.1.4 Summary of Public Consultation Meetings for Draft ESIA and RRP

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
1	14 Nov. 2011	Ajamata Temple Hall, Sedarasan Village, Palanpur	(1) 31 (2) Farmer, Residence, Sarpanch (3) 0/31	Gujarati	a) Compensation would be preferable in the shape of alternative land or on the basis of market rate since *Jantri* rate (stamp duty) is always lower than the market rate. The proposed compensation amount is not sufficient enough for PAPs to purchase land at other place nearer to native village.	Compensation by alternative land is difficult within the current legal framework. Modification of policies will be done by the central government if required. The market rate is decided based on Jantri Rate and sale deeds of similar land use within the same villages. DFCCIL officials informed that the competent authority will calculate the average of highest 50% of land transactions within village/town or present land value as per government rate. This will be the basis for calculation of compensation rate. The PAPs will be given additional 60% {more of total land value}, as solatium. DFCCIL will pay interest in case compensation is not paid within 10 months. Compensation provisions for vulnerable groups, etc. were discussed in detail.	[DFCCIL] - Deputy CPM, - Project Manager (Land) - Assistant Project Manager (APM) [Local Authority] - Prant Office, Palanpur
					b) It would be better to lease land instead of acquiring land. Let the DFCCIL purchase land elsewhere and provide it to the PAPs.	No explanation was given.	
					c) Some of the participants offered DFCCIL to acquire complete piece of land instead of leaving small piece of land with the PAPs after acquisition. So that the PAPs can purchase land somewhere else.	No response given.	
					d) The participants mentioned that	DFCCIL will follow the Government rates	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					the Jantri Rate (Stamp Duty) is always being kept as low and how the Government considers it as the market rate. It was further suggested not to consider the land registration value for deciding base for compensation. The participants informed that other agencies such as ONGC paid compensation as per market rates.	only. The PAPs can file compliant within 30 days after release of 20A in local newspaper.	
					e) The participants mentioned that if DFCCIL is going to acquire our land by paying the Jantri Rate then the government should allow to buy the government land by paying the Jantri Rate. Even some of them went to the extent of saying that they would pay to the Government a premium over the Jantri Rate.	No response given.	
					f) Some participants suggested to thePAPs take land on rent.	No response given.	
					g) Some farmers enquired about the unit of a family in the context of compensation for land. In some cases the land title is with one person but virtually the land is fragmented and used by 8 to 10 persons.	The PAPs were informed that only plot will be considered as one unit irrespective of number of the PAPs having their ownerships.	
					h) Explanation of land acquisition area is requested.	It may vary from place to place, but it would be between 16-30 m from the center of the	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
						track. Structures may be constructed 30 m away from the DFC track. In some places more land may be acquired for SSPs (sub section points), bridges, electric poles or other facilities. This is approximately 8-10 km in your area.	
					i) The participants raised the issue of access to road, farm land etc.	All necessary care would be taken to ensure the access of people to their habitation, farmland, market etc. The PAPs were informed to send their requests to CPM Ahmedabad for construction of foot over bridges, access roads/ road under bridges then DFCCIL will definitely consider them. PAPs should send their application immediately through their village panchayats.	
					j) The participants complained that the Government has fixed Rs. 15,000 for cattle shed. Requested to the Government was made to construct one such demonstration unit	The cost of cattle shed would be borne by the Government as per the market rate and in addition to it Rs. 15,000 would be paid as compensation. It was informed that DFCCIL will pay for the present market rate against loss of any structure/assets irrespective of year of construction. PAPs were requested to submit a written application for construction of a road, or passage for water supply, structures etc. through Gram Panchayat. Each PAP needs to submit a separate application for private structures. This would help DFCCIL to take permission and keep provision for basic services under railway line during construction work. DFCCIL need to take permission from concerned higher railway authorities from	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
						Zonal Railways for any pipeline and other utility shifting coming under the alignment.	
					k) The participants requested for the loss of trees.	Forest Department would assess the trees and determine the compensation amount.	
					l) One person from Sadarpur informed officials that he has received the notice for land acquisition but his land is located 500 m away from the railway track.	It was suggested do visit Prant office and see the maps and other records for clarifications.	
					m) The participants requested for clarification on issues related to pollution and negative impact on the environment due to the DFC two tracks.	DFCCIL officials ensured that, all technical measures will be taken to minimize the pollution and its impact on environment.	
					n) The participants were concerned whether the railway will provide employment for at least one person from each affected family.	It was informed that at present there is no such government policy. The PAPs will be informed if some decisions are taken in this concern. The PAPs were requested to give all relevant details to the survey team and write suggestions in the feedback form given so that the PAPs' perceptions are compiled and future decisions can be taken accordingly.	
					o) The participants requested clarification whether PAP can construct a house close to the railway track or not	DFCCIL official informed that the PAPs can get the permission to construct house beyond 30 metres from the track.	
2	15 Nov. 2011	Ramapir Mandir, Majadar, Vadgam, Banaskantha	(1) 102 (2) Farmer, Residence, Sarpanch (3) 1/102	Gujarat	a) Compensation through provision of alternative land would be preferable. The major contention of people was the acquisition of land by paying a meager amount as	DFCCIL officials informed that the competent authority will calculate the average of highest 50% of land transactions within village/town or present land value as per government rate. This will be the basis for calculation of compensation rate.	[DFCCIL] - Deputy CPM - Project Manager (Land), - APM

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					compensation. This is not acceptable to the PAPs.	DFCCIL requested public to cooperate for the national development project.	
					b) The participants mentioned that if DFCCIL will acquire land by paying Jantri Rate, the Government should allow us to buy the government land by paying the Jantri Rate.	No response given.	
					c) Explanation of the land acquisition area is requested.	DFCCIL officers explained land acquisition area with available data.	
					d) The participants enquired about disbursement of compensation if titleholder is dead.	It was explained that the PAPs need to transfer land in the name of inheritor and compensation will paid accordingly.	
					e) The participants enquired about the possibility of entering name of titleholders in 7/12 after release of 20A notification.	It was clarified that, addition of titleholder's names can be done before the release of the gazette notification.	
					f) The participants were concerned that after land acquisition farmer getting landless would not be able to purchase land elsewhere.	It was further informed that, the concerned Land Acquisition Officer will issue certificate to the PAPs losing land due to land acquisition. The concerned that the PAP can purchase land anywhere in Gujarat within two year after land acquisition.	
					g) The participants were concerned about increased possibilities of disturbances due to vibration.	DFC officials ensured that technical design is based on Japanese technology for reduction of vibration.	
					h) The participants complained that DFCCIL has been changing its plans because of the influence of the political leaders. The track was supposed to go in the western side but now it has been changed to the eastern side.	It was clarified that earlier the area of land under acquisition was more than the present alignment, and DFCCIL was having more land in the east therefore alignment was shifted to east for minimum acquisition of agricultural land.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					i) The participant suggested providing job to the PAPs.	It was informed that, at present there is no such government policy. The PAPs will be informed if some decisions are taken in this concern. The PAPs were requested to give all relevant details to the survey team and write suggestions in the feedback form given so that, the PAPs' perceptions are compiled and future decisions can be taken accordingly.	
					j) The participants raised the issue of compensation given in the past - participant informed that, previously land was acquired but they did not get proper compensation. They were not allowed to harvest the grass from the land. Sometimes people have to pay fines and they are not sure whether these fines are really deposited to the Railways	Officials noted the complaint and also informed that in DFCCIL compensation amount will be directly deposited in bank account. DFCCIL would help the PAPs in opening a bank account as well.	
					k) Ensuring access to social infrastructure or their land is requested.	All necessary care would be taken to ensure access of people to their habitation, farmland, market, etc.	
					l) Rehabilitation packages for disabled people and farmers who will lose or decrease their income source are requested to be explained.	The baseline survey and census is being conducted now to find out the current status, and accordingly the rehabilitation plan for each affected family will be determined.	
					m) The participants informed the cases of suicide, heat attack etc. after releases of the gazette notification. They were concern that more such	DFCCIL officials tried to convince people about the current policy and also cited the number of examples to explain the situation.	

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					incidences will happen if DFCCIL acquire land. People will start organizing and initiate movement against DFCCIL.		
					n) The participants demanded that the government should give "land against land" and let the Railways purchase land elsewhere and provide it to the PAPs.	No response given.	
					o) Some people complained that DFCCIL has been changing its plans because of the influence of the political leaders. The track was supposed to go in the western side but now it has been changed to eastern side.	It was explained that DFCCIL does not get carried away by political leaders. The change in the plan is because of less amount of land to be acquired for the purpose (the land acquisition would be reduced almost by 50 per cent).	
					p) The participant raised the issue of compensation by railways – previously his land was acquired but he did not get proper compensation. He was not allowed to harvest the grass from the land. Sometimes people have to pay fines and they are not sure whether these fines are really deposited to DFCCIL.	It was explained that once the Railways acquire the land, the harvesting of grass, fruits etc. from the area is restricted. Auctioning is being done for harvesting of such produces by Asst. Divisional Engineer, Mehsana. Local people can participate in the auction.	
					q) One person mentioned that he had to pay a penalty of Rs. 16,000 for cutting a tree long back. What was the basis for calculation? Whether similar kind of compensation is going to be given for the loss of trees?	For the compensation against trees the Forest Department will make the assessment and fix up the value. CPM representative mentioned that if DFCCIL also cut the tree without permission then it has to pay penalty to the Forest Department.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					r) The participant mentioned that he obtained permission to construct bandh in his own land but he did not get any compensation for the piece of land (40 feet area), which could not be used by him for last 15-16 years.	No specific response was given for this.	
3	16 Nov. 2011	Hotel Siddharth, Tavadiya, Sidhpur, Patan	(1) 44 (2) Farmer, Residence, Sarpanch (3) 3/41	Gujarat	a) It is requested to disclose information related to the DFC project such as land acquisition area, location of RUB/ROB, relevant facilities, RoW in detour sections, etc.	DFCCIL is not in a position to disclose any information related to land acquisition, which shall be notified by Competent Authority (i.e. Special Land Acquisition Officers/Prant Officers). In the case of Patan, there will not be detour sections. It was further informed that, if height of railway line is 0 m, than requirement of land for acquisition is 16 m. With an increase in height, width of land also increases. The maximum width is 25 m, except in one place where it is 35 m. However, in Sidhpur width is 16 m only. It was also informed that in Sidhpur under bridge with be provided. At present, it is difficult to information the exact location. It will be informed on finalization of the proposed plan. For construction of under bridge DFCCIL will try to first utilize their own land.	[DFCCIL] - Deputy CPM - Project Manager (Land), - APM [Local Authority] - Prant Office, Patan
					b) Some the participants complaint that, their plot is not within DFC alignment but still someone came to their land for marking. Requested to clarify the reason for doing the	No specific response was given for this.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					marking on their plots.		
					c) Rehabilitation packages for disabled people and farmers who will lose or suffer from reduced income sources shall be explained.	Assistance will be provided to vulnerable people in addition to the rehabilitation package.	
					d) Potential impacts especially of noise and vibration due to train operation is requested to be explained.	The ESIA study is ongoing, and mitigation measures will be proposed. The ESIA report will be disclosed to the public for review and receiving comments/suggestions from public.	
					e) The participants requested for clarification regarding housing society such as Adarsh Society coming within alignment.	They were informed that as per 20A one plot number is mentioned for one society but it does not means that, all housed will be coming within alignment. It was also informed that only boundary wall of one house will be affected.	
					f) The participants suggested that the PCM should be organized in all the project affected villages and all information relating to the project, land acquisition and environmental impact have to be shared with them. These meetings should not be organized as part of the formalities.	DFCCIL officials noted the suggestion.	
					g) The participants requested to explain in case bore well water get affected after construction.	It was informed that DFCCIL will give compensation, help to install another bore well or water source and pay the full amount for such installation. DFC expert will make a site visit and submit the estimated cost against such loss.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
4	17 Nov. 2011	Committee Hall of Umiya Mata Mandir, Unjha, Mehsana	(1) 37 (2) Farmer, Residence, Sarpanch (3) 0/37	Gujarati	a) Announcement of PCMs should be done more adequately including by notification in newspapers.	Steps will be taken for increasing the publicity of PCMs.	[DFCCIL] - Deputy CPM - Project Manager (Land), - APM [Local Authority] Inspector of Police, Mehsana
					b) Information related to the DFC project including land acquisition should be announced widely and locally.	Details related to land acquisition are available at the Prant Office.	
					c) Explanation of reasons for the change of the proposed alignment is requested.	DFCCIL has done the assessment and finally decided to lay the corridor on the eastern side because there is less land acquisition area and less damage to the existing infrastructure. There is also the plan for additional tracks for passenger trains on the western side.	
					d) There are several discrepancies between 20A and land records of Prant Office/Revenue Records.	Discussion for sharing land record was carried out between Nagar Palika and Prant Office. However further confirmation will be sought.	
					e) The participants questioned the relevance of the socio-economic baseline survey as it is yet to be clear who is going to be a PAP. According to participants 20-A notification is wrong.	DFCCIL officials explained the importance of socio-economic survey and requested to give support in filling the forms.	
					f) There is a RUB in Bhandu village and people have been using it for long. Now there is a board which displays that this road is not for common people. It was suggested to make provision for a RUB.	DFCCIL officials informed that, there is a provision for a service road along the railway line which can be used by village people also. Near each settlement there is a provision for a RUB (railway under bridge). The PAPs were requested to submit a written application for the same.	
					g) There was another request from	The PAPs were requested to submit a written	

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					Bhandu village that the current plan for land acquisition in the village need to be changed to save the temple etc.	application for the same.	
					h) There was a complaint from Kamli village that the railway level crossing has been closed and a necessary action has to be taken in this regard.	CPM Ahmedabad representative informed that they will be physically visiting the site and necessary actions will be taken thereafter.	
					i) The participants requested clarification on the issue of NOC for construction beyond 30 m and the issues associated with it.	Detail process of taking NOC were explained by DFCCIL officials.	
					j) The participants enquired about compensation provision for the remaining area after land acquisition.	It was informed that interested PAPs can either get full compensation for the remaining piece of land and give it to MOR or get 25% compensation and keep the land with them. The PAPs can submit their application for the same.	
					k) The participants enquired about compensation provision for people coming Below Poverty Line (BPL) category.	It was informed that the PAPs will get similar compensation like others. In addition to this, wages for 750 days at the rate of minimum wage decided by the state government will be additionally provided. Further, it was also informed that DFCCIL we will follow NRRP 2007 policy for giving compensation.	
5	18 Nov. 2011	Urban Bank Science Collage, Hagalpit, Mehsana	(1) 350 (2) Farmer, Residence, Sarpanch (3) 3/347	Gujarati	a) Explanation of reasons for the change of the proposed alignment is requested.	The proposed alignment was changed to minimize the land acquisition area and to avoid damage to existing infrastructure.	[DFCCIL] - Deputy CPM - Project Manager (Land), - APM [Local Authority] - Deputy
					b) The participants raised the issue of compensation based on	Detailed entitlement matrix regarding compensation explained.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					the market rate for land to be acquired. PAPs informed the existing market rate of land in their respective area. PAPs requested officials to inform the amount of compensation to be paid as per current Jantri Rate.		Superintendent of Police, Mehsana - Special Land Acquisition Officer, Mehsana
					c) The participants questioned 20-A notification for land acquisition. In some cases the plot close to the current alignment is not notified whereas another plot behind this one has been notified. This raises suspicion in the people on the activities of DFCCIL.	It was informed that, within one year after release of 20A, gazette notification for 20E will be released. After release of 20E, land is acquired by the Government and the PAPs have to apply to competent authority for compensation for their acquired land. In general within one year, compensation will be paid. In general, within one year, award money will be given to the authorized person. However, if is not paid within one year, then every month 5% interest on the compensation amount will be given by the Government. DFCCIL officials explained the complete procedure for land acquisition and compensation.	
					d) The negotiation suggested constructing DFC on the eastern side of the existing railway track parallel to it without taking a turn in Nani Dau village	It was clarified that DFC track takes a east turn from south of Mehsana. Gujarat's important ports are located in the western part of the State. Thus, it was important that DFCCIL track should pass through closest area from these ports. In order to take a turn from east to west small curve was technically designed for safety	

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						reasons. For taking turn from east to west, DFC track to go up and then come down (cross the highland), which cannot be done directly. So design is done with gentle slope. This is important for the safety of the train. The train which carries about 40-50 tons of good cannot go on the steep height. DFC trains will be 1,500 meter long against 750 meters long of normal passenger trains. So DFC trains need longer route to take turn DFC track in the east helped to avoid acquisition of roads etc. This is 50% less than previous alignment in the west.	
					e) The participants enquired about total land available with railways on Delhi - Ahmedabad rail route.	It was informed that, around 25m wide land is available with DFCCIL. The PAPs were requested to visit CPM office during office hours for any further detailed discussion.	
					f) The participants threatened that if DFCCIL will not listen to their request then they will start mass mobilization and movement.	No response given.	
					g) The participants requested the railway authority to keep the level crossing near their village open for 24 hours. The level crossing is closed in the evening till the next morning and the villagers face great difficulties in communication	It was clarified that in general gates with less traffic are closed at night for safety reasons. Further, the PAPs were requested to submit an application in this concern with proposed location for a ROB or RUB. DFCCIL can make provisions to open the gate at night or bridge for crossing the railway line. It was ensured that DFCCIL will not try blocking any roads for free movement.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					h) Clarification of affected flats is requested	Large flats or buildings will not be affected. DFCCIL is ready to visit the site to check.	
6	19 Nov. 2011	Oxford School of Management, Mehsana	(1) 39 (2) Farmer, Residence, Sarpanch (3) 7/32	Gujarati	a) The proposed DFC alignment should be changed to be parallel to the existing line.	Requirements on the proposed alignment will be conveyed to the higher authority for further actions. All villagers are requested to write issues to the Government for requesting a further technical review and modification of the proposed alignment.	[DFCCIL] - Project Manager (Land), - APM [Local Authority] Inspector of Police, Mehsana
					b) The participants blamed DFCCIL for favoring rich and politicians. In order to save the rich persons (doctors, businessmen, industrialists etc.) of Mehsana DFCCIL is making the detour/diversion/ turning near Mevad, Nani Dau – which will destroy the livelihoods of the poor farmers.	No response given.	
					c) The participants mentioned that DFCCIL is not sharing the information, maps of the Project.	DFCCIL official noted the complaints.	
					d) Some participants of Amblyasan and Mevad wanted to know whether the buildings and shops of their villages will be destroyed because of DFC.	Private structures in these villages will not be demolished.	
					e) Participants raised the issue of compensation based on the market rate for land to be acquired.	DFCCIL officials explained the entitlement matrix in detail and requested the PAPs to submit an application for any complaints.	
					f) The compensation given to farmers as per Jantri Rate is not sufficient enough to buy land elsewhere.	DFCCIL officials explained DFCCIL will follow Jantri Rate only.	
					g) Concerns were raised that the	Views noted.	

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					farmers will lose land and livelihoods. Once farmers lose land then no one will give their daughters in marriage to these families.		
					h) The participants argued that the DFCCIL officials always pass on the blame to the technical and engineering aspects.	It was informed that DFCCIL officials are available to inform all technical details and queries. It was ensured that officials will make a visit to the village for the joint measurement survey and best efforts will be made to minimise the land acquisition. Further, it was also informed that there is no possibility of officials running away after giving compensation. DFCCIL has to construct a railway line within the village which is not possible without PAPs cooperation.	
					i) Some participants threatened that farmers would commit suicide if the Government is not going to listen to their requests/demands.	The PAPs were requested to fill the feedback forms and share their grievances and suggestions.	
					j) PCM scheduled is not convenient to the PAPs due to agriculture season. It was requested to organize such important meeting as per convenience of the PAPs.	DFCCIL officials noted the complaints.	
					k) The participants enquired about DFCCIL provision to provide ROB or RUB within village.	PAPs were suggested to submit application in this concern through gram Panchayats.	
7	21 Nov. 2011	Julasan Community	(1) 72 (2) Farmer,	Gujarati	a) Compensation of land should be done by provision of	Current governmental policy on land acquisition and its limitation were explained.	[DFCCIL] - Project Manager

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
		Hall, Kadi, Mehsana	Residence, Sarpanch (3) 9/63		alternative land. Compensation by Jantri Rate is low compared with the market rate.		(Land) - APM
					b) Participants wanted to get information on the amount of land to be acquired.	Explanation to participants on impacts on their land was done individually. In addition, participants were requested to contact Prant office for further information on land acquisition.	
					c) Ensuring access within the community or their land is requested (e.g. A level crossing is not open 24 hours. Tractors could not pass through one of RUBs arranged in a community).	DFCCIL will investigate this issue.	
8	22 Nov. 2011	Agrasen Bhavan, Iqbalgarh, Banaskantha	(1) 109 (2) Farmer, Residence, Sarpanch (3) 3/106	Gujarati	a) The participants informed that all do not understand government technical language of 20A and 20E. Many of them mentioned that they don't want to give land to DFCCIL without proper compensation amount as per market rate and not Jantri Rate.	Current governmental policy was explained. In addition, position of DFCCIL (i.e. DFCCIL is not in a position to acquire land, but just operates DFC project) and efforts to minimize land acquisition area were explained.	[DFCCIL] - Project Manager - APM
					b) Some people objected to participate in the meeting. They mentioned that there was a PCM in Sep 2011 and many of them had given their representations but no action was taken.	DFCCIL noted the complaint.	
					c) It was suggested that the local farmers should be consulted before the project was planned. Now land is going to be acquired and DFCCIL is	DFCCIL is taking action to suggestions/ requirements raised by PAPs.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					coming to the people for public consultations.		
					d) Some participants raised the problem of accessibility because of the DFC project.	DFCCIL ensured that provision for a RUB or ROB will be kept.	
					e) Some participant living 500m away from the proposed DFC track requested to explain potential impacts due to vibration.	Railway track technically design to reduce vibration.	
					f) Some participants requested that the graveyard should not be disturbed.	DFCCIL will take necessary actions in case graveyard land might be acquired.	
					g) A participant from Iqbalgarh complained that after getting the notification – 20A his father passed away. He requested DFCCIL for additional compensation and job to one of the member of his family.	Complaint noted.	
					h) The participants were of the onion that passenger trains are only beneficial for common public but freight corridor will only benefit industrialists. Thus it is suggested to take land from industrialists instead of poor farmers.	DFC officials informed that at present there is no industry in this area and no industrial land available along the railway line. This is an agricultural area and certainly at present DFCCIL will help to transport agriculture goods.	
9	31 July, 2012	Jainwadi, Vardhman Nagar Sharda Circle, Kalol, Gandhinagar	(1) 33 (2) Farmer, Residence, Sarpanch (3) 0/33	Gujarati	a) The participants requested to explain whether the proposed DFC alignment is on parallel or detour	It was informed that, the proposed alignment has taken turn from Jagudan in the east and again from Pansar, it takes a turn again in the west.	[DFCCIL] - CPM - Deputy CPM - APM

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					b) The participants informed that they are already aware about DFC and issues relating to environmental impacts and will also read the brochure given for any other information. Thus, they requested to finish the presentation relating to environment quickly and have discussions related to land acquisition and compensation amount.	DFCCIL officials explained compensation for land and entitlement matrix.	[Local Authority] Competent Authority SDM cum Competent Authority, Gandhinagar
					c) The participants complained that, when DFCCIL had decided that compensation amount will be paid as per Jantri Rate then why PAPs are now invited for consultation? According to some of the PAPs the value of the land is Rs. 1.71 Crores and DFCCIL will only pay Rs. 50 lacs. If it is real public consultation then DFCCIL needs to pay the market price for the land.	It was informed that, DFCCIL cannot go against Government rules. The concerns of the PAPs during PCM will be submitted to DFCCIL higher authorities for necessary actions.	
					d) The participants requested to give two copies of statement made by DFCCIL officials regarding compensation amount with their signature	It was informed that, the objective of the PCM is to covey PAPs concerns to the higher authorities in DFCCIL. The PAPs were requested to fill the feedback form and their suggestions would be incorporated in RRP. DFCCIL have conducted many PCMs in Gujarat and compiled the concerns of people. PAPs' complaint about insufficient compensation would be conveyed to Government of India	

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						PCM is also organized to explain PAPs rights, project details, and the benefits so that, they are not exploited by anyone in near future.	
					e) The participants requested that JICA representatives should visit and discuss with PAPs directly.	It was further informed that the RRP will be prepared based on baseline findings and PCM outcomes will be kept at CPM Ahmedabad, concerned Competent Authority, and in each Panchayat office for reference. The participants' request noted about JICA representative to discuss with the PAPs directly.	
					f) The participants informed that they have presented their concerns to all important persons including Rahul Gandhi and informed him that, our land value is very high, so DFC railway line should be parallel to minimize land acquisition. Further The participants informed that, the market value of land on Wamaj Road is Rs.60 lakhs per bigha, on Mahsana highway, market value of land is about Rs.1.7 Crore, in Chhatral, and Isand many factories are coming up so their land value is about Rs. 44 lakh per bigha. In addition, Pansar village comes under Gujarat Industrial Development Corporation (GIDC) and the market value of land is Rs. 60 lakhs per bigha.	DFCCIL officials tried to convince the PAPs about reasons for change in alignment and Government limitation regarding compensation payment as per market rate. It was informed that, DFCCIL tried to make the alignment parallel. But parallel alignment was affecting many settlements, thus it was changed to minimize land acquisition. The proposed alignment is finalized after technical study and approval of the MOR. The PAPs were requested to visit CPM office Ahmedabad for any detailed information.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					The participants suggested taking average of aforesaid market price for deciding compensation amount.		
					g) The participants informed that at present it is monsoon time. Requested to provide time to the PAPs so that they can do harvesting of their crop	It was informed that time will be given to each PAP for harvesting of their crop.	
					h) The participants informed that, a major portion of their land is within alignment. The participants raised their concern that with the proposed compensation amount PAPs would not be able to purchase half the size of land within 50 km.	Concerns and suggestions noted.	
					i) The participants informed that if DFCCIL want to acquire land, additional payment of Rs. 5-7 crores is not a big amount for any big project	DFCCIL officials noted the suggestions.	
					j) The participants informed that on the both sides of village (east and west), many factories are constructed due to which land value has gone up. Requested to provide land at proposed price.	No response given.	
					k) The participants informed that, land from Viramgaon to Mahesana is less fertile. If DFCCIL construct parallel railway track along this belt, then DFCCIL will be required	DFCCIL officials noted the suggestions.	

No	Date	Venue	(1) No. of the participants; (2) Type of Participants (3) No of female participants/male participants	Language	Participants' Major Comments	Responses from Local Authority/ DFCCIL	Attendant from Local Authority/ DFCCIL
					to pay less compensation.		
					l) The participants requested to inform JICA and Ministry of Railways that, farmers are not ready to give their land as per Jantri Rate.	DFCCIL officials noted the suggestions.	
					m) The participants complained that the alignment design is prepared as per convenience of officials in HQ without realizing the field situation.	It was informed that the design was finalized after proper study and survey report.	
					n) The participants raised their concern that they were not consulted before finalization of alignment.		

9.1.6 Lessons Learned From the PCMs

During the PCMs of environmental scoping and the draft ESIA and draft RRP, various issues were raised and answered by the DFCCIL officials. However, peoples expect more frequent communication with project managers for clarifying their doubts at individual level. Since continuous consultation and communication is necessary, the following are lessons learned from the PCMs for ensuring effective public participation.

- Most concerns raised in the PCMs across the four districts generally revolved around adequate compensation and provision of jobs in spite of the fact that the PCMs were intended to focus on environmental and social scoping in the first stage and results of the draft ESIA as well as the draft RRP at the second stage.
- Sometimes the meetings were dominated by individuals/interest groups limiting opportunities for others to actively participate. So, a facilitator should politely intervene, summarize the issues raised by dominating individuals/group and encourage other PAPs to speak. Due to cultural barrier if women participant are not sharing their concerns in front of male PAPs, they should be especially requested to share their concern. Facilitators should also support illiterate PAPs in noting their concerns and suggestions in feedback forms.
- Enhancement of more women participants is necessary.
- Before starting any consultation meetings, minutes of previous meetings along with the actions taken should be presented before the participants as it actually builds confidence among people towards the project. People normally expect and wanted to know if whatever they had mentioned in previous meetings were taken into consideration or not.
- For ensuring effective public participation, the public/PAPs must be informed about the meeting well in advance.
- An effective feedback mechanism is required to ensure that public has not only been consulted but their opinions are valued and incorporated in the policy and project documents.
- There will be at least one woman member on the dais to encourage women to come forward and participate and articulate their concerns.
- The public will be given access to information which will be updated regularly and made accessible to them in an easy to understand format. Information centers or grievance redress mechanisms will be provided for on a continual basis.
- Proper meeting arrangements, careful preparation, positive response to people's queries and more ownership are some of the important elements for successful PCMs.
- Information about meetings should not only be given to Village Sarpanches but also to Talati, Chairman of local Associations/Federation, Chairman of Housing Societies, etc. who would ensure that information reaches to all affected persons in the village.
- Information about scheduled date, time and venue should be done through newspaper appeal, distribution of pamphlets, mike announcements, message through local TV channels etc.

9.2 INFORMATION DISCLOSURE

9.2.1 Objective of Information Disclosure

The objectives of information disclosure are as follows:

1) Disseminate information on findings of the study on environmental and social considerations of the DFC project, including environmental and social impacts, mitigation measures, and the general plan on the environmental management and monitoring in the study area.

2) Collection of comments and opinions from the public on environment and social issues on the DFC project so as to reflect in the final ESIA report.

9.2.2 Methodology of Information Dissemination and Collection of Comment

The process of information dissemination was arranged in a systematic, time bound and transparent manner ensuring widest possible public participation of the project. Methodology of the process in the first stage was as follows:

- The distribution of draft ESIA reports including summary in a vernacular language (Gujarati) and English as shown in Appendix-10b started from 4 to 7 December 2011 and comments were collected up-to 17 December 2011.
- The draft ESIA report had been distributed to DFCCIL Corporate Office, Chief Project Manager (CPM) Ahmadabad and Ajmer offices of DFCCIL, 4 District Collector (DC) offices and 6 major stations along the proposed DFC alignment. The main stations at Pansar, Mehsana, Unjha, Sidhpur and Palanpur were under CPM Ahmedabad and Chitrasani was under CPM Ajmer. Full Reports (Main Report and Appendix) were available there for public reviewing. All details are shown in Table 9.2.1
- The summary of the draft ESIA reports were distributed to Sarpanche offices of 68 project affected villages, 2 CPM offices, 4 DC offices, and 6 major stations along the proposed alignment. In addition to these copies, the summaries in English and Gujarati were also distributed to the Competent Authority of Gandhinagar, Mehsana, Patan, and Banaskhantha Districts. All details are shown in Table 9.2.2.
- In order to facilitate proper information dissemination of availability of draft ESIA reports as well as the summary and call for comments, public notices in a vernacular language (Gujarati) had been put up on notice boards of Sarpanch offices of respective villages. Letters in a vernacular language were also given to individual Sarpanch. Letters in English language were given to District Collector, Competent Authority and Station Masters of all Major Stations along with the reports and summaries. During PCMs, the PAPs were informed about the availability of the draft ESIA report and submission of comments at the scoping stage which were conducted from 20 September to 12 October 2011. The public notices and letters distributed in the information dissemination process are shown in Appendix-10b.
- The last date to receive comments was initially set as 17 December 2011 considering minimum 10 days for review by the public.
- Comments and opinions were accepted on the draft ESIA report only in writing through direct delivery, fax, or post and email (dfc.package3@gmail.com) to the respective CPM offices.

- After collection of all comments from CPM offices, it had been sorted out and summarized.
- Collection of the draft ESIA reports from major stations and District Collectorate offices will be done as much as possible at the time of distribution of final ESIA reports.
- Finalization of ESIA report by reflecting comments/opinion.

Table 9.2.1 Number of Distributed Draft ESIA Report

Sl No.	Location	Number of Set of Report
1	DFCCIL Head Office	1
2	DFCCIL CPM Offices (2)	2 (1 each)
3	District Collectorate Offices (4)	4 (1 each)
4	Major Railway Stations along the Corridor (6)	6 (1 each)
	Total	**13**

Note: A detailed list is shown in Appendix-10c.
Source: NKC

Table 9.2.2 Number of Distributed Summary of Draft ESIA Report

Sl.No.	Location	Number of villages	Number of Set of Report by Language	
			Gujarati	English
1	Village	68	1,020	340
2	DFCCIL Head Office	-	05	05
3	CPM Offices (2)	-	30	10
4	DC Offices (4)	-	60	20
5	Railway Stations (6)	-	90	30
6	Competent Authorities	-	40	20
Sub Total		**68**	**1,245**	**425**
Total			**1,670**	

Note: A detailed list is shown in Appendix-10c.
Source: NKC

The details of public dissemination process such as summary of the draft ESIA report, public notices, distribution letters and distribution list are shown in Appendices-10a to 10d.

9.2.3 Collection of Comment

All comments and opinions were expected to be received through post, fax, email, or by hand delivery by at both the CPM offices. No comments or opinions on the draft ESIA were received through any means of communication at DFCCIL Head Office and CPM offices.

CHAPTER 10 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

10.1 POLLUTION CONTROL

10.1.1 Noise and Vibration

(1) Noise

1) Impacts

The frequent train movements would generate a certain level of noise as it is designed to accommodate trains traveling at around 100 km/h as well as those with double-decker carriages. Since the proposed DFC alignment will passes through several semi urban - urban areas, the generated noise may cause sleep disturbance and mental instabilities of the residents living adjacent to the proposed alignment. In addition, careful attentions should be paid on noise impacts on sensitive receptors (SRs) located near the proposed alignment such as educational institution, hospitals and religious institutions.

The main impacts in terms of noise pollution are expected during the operation phase and it is predicted that noise levels may exceed the target standards. In addition, although it will be during the construction phase only as temporary impacts, noise will be generated by the operation of construction equipment and transportation vehicles. Therefore, the following mitigation measures are proposed for both construction and operation phases.

2) Mitigation Measures

- The construction yards should be located away from the residential areas and SRs. Where a construction yard is unavoidably located in or near to residential areas and SRs, the time of construction activities should be limited.
- The quarry sites should be also located away from the residential areas and SRs as much as possible.
- Local people should be notified prior to undertaking construction activities associated with higher noise levels such as blasting operations.
- Machinery and vehicles should be maintained regularly, with particular attention to silencers and mufflers, to minimise construction noise levels.
- Protection devices (ear plugs or ear muffs) should be provided to the workers operating in the vicinity of high noise generating machines.
- Securing buffer zone is an effective method for reducing the noise impacts. A vegetative barrier in the buffer zone should be planned as a green belt.
- Noise barriers should be erected at necessary locations such as the residential areas and SRs which are adjacent to the proposed alignment.

(2) Vibration

1) Impacts

The frequent train movements would generate a certain level of vibration. Although perceptible ground borne vibration is generally limited to the areas adjacent to the railway track, the following mitigation measures are proposed since higher levels of vibration have a potential to cause sleep disturbance and mental instability among the residents living adjacent to the proposed alignment and impacts on building and

structures.

2) Mitigation Measures

- Local people should be notified prior to undertaking construction activities associated with higher vibration levels such as activities using vibrating rollers.
- The vibrations could be reduced considerably by ensuring and keeping correct track geometry by advanced measurement.
- Securing buffer zone is an effective method for reducing the vibration impacts for both the residents and buildings.

10.1.2 Air Pollution

(1) Impacts

The earthmoving and construction activities are likely to generate dust. The impacts associated with generated dust would only be significant where work is taking place close to residential areas. Although dust generation would only be a temporary impact in the majority of cases, dust from the construction activities would be deposited on the nearby settlements. In addition, emissions from vehicles and machineries could also impact on air quality in and around construction sites. Considering these impacts, the following mitigation measures are proposed.

(2) Mitigation Measures

- Consultation with the local authorities, complying with relevant air quality laws and obtaining necessary permissions at least for critically polluted areas are necessary before the start of any construction activities.
- Appropriate maintenance of all construction vehicles and machineries should be done for minimizing the emissions.
- Payload area of the trucks or dumpers should be covered by tarpaulin when transporting soil and crush in order to prevent fall out of fines and emissions as dust. The material carrying trucks or dumpers will carry on the haulage corridors provided for the transport.
- Spraying water on the stones shall be done during unloading from the trucks or dumpers at the primary crusher feeder chute and the transfer points from one conveyor belt to another.
- Regular cleaning and wetting (e.g. water sprinkling) of the unpaved roads and exposed soil at construction sites including haulage corridors of borrow areas and quarry sites should be provided in dry weather.
- Trees should be planted as a green belt within and along the boundary of the construction yards and haulage corridors. Vegetation may also improve air quality by filtering atmospheric pollutants through their leaves.
- Concrete batching plant and other machineries which tend to generate dust should be kept away at safe distances from the residential areas and should not be in the prevailing upwind direction of these areas.
- All major construction machineries including batching plants at construction sites should be inbuilt with appropriate dust reduction measures.

10.1.3 Water Pollution

(1) Impacts

Water pollution is likely occurred mainly by the construction activities. Impacts on the water quality would be brought not only by the construction activities itself, but also the discharge of wastewater and materials into surface water bodies from the workers being temporarily housed for the construction. The deterioration of surface and ground water quality is expected if adequate arrangements are not made to ensure proper control and management of drainage of water and wastewater from the construction yards and camp sites including water form stagnant pools. Stagnant pools of water may promote the breeding of mosquitoes and create generally unsanitary conditions.

Surface water would become polluted if sediment is washed from construction sites, roads and other exposed soil by rainfall. River water would be also polluted by sediment if sand or aggregate are obtained from the riverbeds. Soil compaction can also occur as a result of construction activities. Soil compaction causes a reduction in the volume of water permeating into the ground therefore increasing run-off. The run-off would normally contain suspended silt as the compacted ground would be susceptible to erosion in the absence of vegetation cover.

On the other hand, water pollution is likely occurred by used petroleum, oil and lubricant (POL) products that may have entered the drainage system from maintenance activities etc.

(2) Mitigation Measures

- All relevant water quality laws should be complied with at construction/project sites during the entire project period.
- No wastewater is discharged from any construction/project activities without proper treatment.
- Site drainage should be retained in purpose-built lagoons to allow enough time for most sediment to settle out before discharge to natural or urban drains.
- Lagoons or other silt retention measures should be provided at the base of embankments built near water bodies.
- Effective storm water drainage system should be provided to eliminate / reduce the chance of discharge of untreated storm water directly into the river.
- Stockpiled soil and other loose material should be covered with secure tarpaulins and drainage should be passed from stockpile areas into settlement lagoons.
- In order to prevent materials leaking from static plants, such as pumps and generators, contaminating the ground and being washed into the drainage system, static plants should be placed on drip trays.
- All parking, repair and fuel storage areas should be located more than 100 m from any water body.
- Measures should be adopted to avoid contact between water and machinery when construction work is conducted in rivers, streams and canals.
- Oil catch pit/ trap may be installed along drainage channels from construction sites to prevent POL products flowing into any water body.
- As a temporary/emergency mitigation measure, a floating oil boom should be placed on the water surface near construction sites to prevent discharge of any POL products that may have entered the drainage system. This would serve as a contingency measure for the surface water body.

- Used POL products should be collected and stored in sealed damage-proof containers and disposed of at legally approved common disposal sites according to local laws., or may be sold to CPCB/ SPCB approved authorized recycler/ re-processor.

10.1.4 Waste

(1) Impacts

Significant quantities of solid waste would be generated by the project, especially during the construction phase, including gravel; concrete; miscellaneous structures such as culverts, poles and cables, steel, and organic materials such as cleared vegetation, timber; and soil. In addition, there will be oils, fuel, grease and chemicals from construction equipments and vehicle servicing. Any hazardous materials that are used will also need to be stored and handled correctly to prevent spills and pollution.

(2) Mitigation Measures

- Comply with relevant laws pertaining to the management and disposal of solid and hazardous wastes.
- Before start of construction activities, all suitable disposal measures should be identified for solid waste and any other form of waste likely to be generated from the construction activities.
- A designated solid waste disposal site should be secured away from human settlements. In addition, a disposal site should be away from water streams and any archaeological and historical monuments. Generally barren lands are preferable for this purpose.
- No dumping should be carried out on private property without written consent of the owner.
- No dumping should be allowed on wetlands, forest areas, and other ecologically sensitive areas.
- Prepare and implement a hazardous waste management plan for the disposal of waste oil, batteries and other hazardous materials.
- All areas designated for the storage of fuels, oils, chemicals or other hazardous liquids should have a dense base and be surrounded by a bund to contain any spillage. These areas should be covered by a roof structure to minimize the potential for infiltration and contamination of rainwater.
- Areas designed for the storage of hazardous materials are to be clearly designated and storage of such materials outside these areas strictly prohibited.
- Chip and mulch vegetation cleared and reuse it as an organic base for re-vegetation; ensuring that materials, which may cause land/water contamination or create odour problems, are not disposed of on the site.
- Ensure that there is the adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes.

10.2 NATURAL ENVIRONMENT

10.2.1 Flora, Fauna and Biodiversity

(1) Fauna in Protected Area (BAWS - JSBS Corridor)

1) Planning Phase

During the planning phase, there will not be any particular impacts to the fauna. However, the following mitigation measures are required as a precautionary method:

- The passage of wildlife should be safely secured with adequate provisions such as installing culverts and underpasses. It was observed through the biodiversity assessment that the larger box culverts and underpasses located below the road/railway track appeared to be used by wildlife. From this observation, installing box and pipe culverts with dimension of 0.5m x 0.5m for reptiles and smaller fauna and 3.0m x 3.0m for lager fauna could work effectively.
- Earthworks should be designed/planned carefully since the poor earthworks may lead to the filling of culverts which will be a cause of water quality degradation in the Balaram River during the monsoon season.
- Construction activities require the borrow areas though arrangement of the borrow areas is a responsibility of a contractor. Since the borrow areas will require site clearance, negative impacts to the surrounding environment will not be inevitable. Thus, a Borrow Area Management Plan including site selection (i.e. not locating in/around the protected area) and rehabilitation of the site should be developed by a contractor.

2) Construction Phase

The proposed DFC alignment passes through the BAWS and close to the JSBS. It is within the RoW of the existing track, and therefore tree removal and site clearance will be limited. On a basis of the project nature and current fauna condition in the protected area confirmed through the primary and secondary data, the following negative impacts will be anticipated though they will not be irreversible impacts to change the surrounding environment seriously.

a. Impacts

- Trees, herbs and shrubs in the RoW will be felled linearly along the alignment which could adversely affect vegetation cover and local landscape, and may lead to habitat fragmentation and loss (e.g. the removal of *Ficus sp*. an important part of the sloth bear's diet), and negative impact to local landscape.
- Infrastructure projects in remote protected areas are notorious for facilitating the illegal hunting, poaching or other removal of wildlife.
- Increased earth and rock extractions during the construction phase may affect or remove root structures and disrupt ecosystems.
- There is likely to be considerable waste both associated with the construction work itself as well as from construction workers. Discarded construction waste and litter may be harmful to wildlife, cause water pollution as well as being aesthetically displeasing.

b. Mitigation Measures

- The efficient and timely delivery of construction activities will be an extremely important mitigation measure. Additionally, impacts on fauna can also be reduced by minimizing of the works during the monsoon season, when heavy rains will not only make working conditions dangerous, difficult or impractical but would also significantly increase soil erosion, landslides, and associated water pollution and sedimentation.
- It is also proposed that construction works at nighttime should be minimised. Many of the key mammal species in the area are either nocturnal or crepuscular species, therefore it is intended that this timeframe will reduce disturbance to wildlife.
- Risks of accidental loss of wildlife in the process of site clearance and/or construction activities can be reduced with procedures for the careful removal or chasing away of wildlife within the RoW to be cleared. Construction workers should work closely with DFO staff for the safe and effective removal of wildlife prior to the use of heavy machinery.
- Construction workers should be made aware of the relevant legislation on the illegal hunting and poaching of wildlife species prior to work beginning. In addition, regular monitoring of illegal hunting and poaching of wildlife species by responsible agencies such as DFO is necessary.
- Construction yard should not be set up in the protected areas.

3) Operation Phase

Although initial demand for the transportation of goods by the DFC is considered as lower, the demand forecast to 2030 suggested an eight-fold increase in throughput. Such demand is likely to cause considerable disturbance to resident fauna along the alignment identified below:

a. Impact

- The noise and vibration from trains passing is likely to disturb the areas along the proposed alignment used by nesting birds and other resident wildlife.
- Restricting wildlife movement across the tracks, outside the BAWS and further weakening of linkages to the JSBS may increase wildlife losses resulting from accidents or collisions with freight trains.

b. Mitigation Measures

- Trees planted though compensatory afforestation/reforestation should be monitored and managed for successful growth of trees.
- It is proposed that honking restrictions should apply for along the alignment section just before and inside the BAWS.
- Strengthening the main existing natural ecological corridor between the BAWS and the JSBS would be better to create attractive habitats and food sources for wildlife, which will contribute for reducing the movement of wildlife across the tracks. There are at least two more smaller drainage channels further north extending into the Banas River valley which also appear to be natural conduits for wildlife movement between the two wildlife sanctuaries. Further studies should be undertaken to identify its feasibility as effective wildlife corridors, and similar measures could be developed to enhance or strengthen them.
- Regular maintenance of culverts and underpasses shall be necessary.

(2) Flora in Protected Area (BAWS – JSBS Corridor)

1) Construction Phase

Tree removal and site clearance will be necessary at limited area within the RoW of the existing railway track. Although irreversible impact to flora may not be anticipated, there may be some risks identified below;

a. Impact

- Habitat currently used by resident bird species and/or sources of food or shelter for other fauna may be lost and disturbed due to tree removal and improper disposal and/or removal of rubbish/waste from the construction sites and worker's camp.
- Increased earth and rock extractions during the construction phase may affect or remove root structures and key stone species which is likely to disrupt ecosystems.
- There may be accidental or incidental loss of additional trees and habitat due to construction works.
- There may be a risk that construction workers use trees for temporary shelters, furniture and fuelwood.

b. Mitigation Measures

- The RoW should be clearly marked to avoid unnecessary tree removal.
- According to the provision of the Forest Conservation Act (1980), an infrastructure project that clears forest land in a protected area would be required to provide compensatory reforestation for double the area directly affected. Although this legislation will not apply to this section because the area of site clear is already owned by the MOR, the same level compensation stipulated in the regulation should be done since the construction and operation phases would negatively affect the habitat and wildlife.
- Tree removal should be follow the procedures of the careful removal or chasing away of wildlife within the RoW.
- Rehabilitation of tree species at the tree removal and site clear area is necessary though compensatory afforestation/reforestation and strengthening greenbelt.
- Compensation reforestation should focus on the planting of appropriate native species and/or mixed forest in degraded area lying close to the affected area.
- Particular mature keystone tree species to be removed within the proposed RoW between Chitrasani and Jethi should be transplanted to areas identified for habitat creation/restoration since newly planting will be at least a couple of decades before such trees are able to act as foundation species.
- Necessary transport of equipment and materials should be done using existing roads and access points to avoid further habitat destruction/loss.
- Necessary education and awareness on legal restriction on timber and fuel wood from protected areas to labors and construction supervisor should be provided.
- Disposal and removal of rubbish and waste from the site should be treated with adequate measures.

2) Operation Phase

a. Impact

- Improper post-planning care/maintenance as well as illegal felling of plantation

along the alignment would offset the positive effects by the project.

b. Mitigation measures

- Plantation along the alignment shall be maintained properly as well as protected illegal felling.

(3) Fauna in Other Areas

In addition to the specific impacts on fauna and habitats within the BAWS section of the alignment, the construction of the DFC will also necessitate the removal of trees and habitat along the length of the entire Wamaj-Iqbalgarh section. Due to that, the following impacts could be anticipated:

1) Construction Phase

a. Impact

- Both terrestrial and avifauna may be affected in the construction phase by noise and vibration due to construction equipment and machinery as well as movement of construction bound vehicles.
- Fauna may be impacted by destruction of habitats such as bird nests, breeding sites along the proposed alignment.
- Construction workers having greater accessibility to the forest which may lead to poaching activity in the forest areas along the alignment.
- Increased sediment loads into water bodies during bridge construction work may impact aquatic fauna due to temporary loss of habitats and degraded water quality.

b. Mitigation Measures

- Construction works during the monsoon season when groundcover is significantly higher since this is the tie for amphibians and reptiles of a breeding/egg-hatching should be minimised.
- Construction works at nighttime should be minimised.
- Equipment and machinery should be fitted with mufflers and silencers to reduce disturbance to wildlife.

2) Operation Phase

a. Impact

- Wildlife killed in collisions with trains is already observed at the existing tracks. It may be increased due to increasing traffic volume after operation of the DFC.

b. Mitigation Measures

- Underpasses and culverts may be better to be installed along the length of the alignment, particularly in key rural areas where there appears to be quite abundant wildlife.
- Small boxes and pipe culvers crossing all tracks including the existing track may be provided at regular intervals in key rural areas where there appears to be quite abundant wildlife.
- Culverts may be placed around natural drainage channels where possible or at specified intervals where the track is straight and flat.

- Although smaller species of mammals amphibians and reptiles have more risk of collision with trains than larger animals, larger culverts or underpasses may be constructed for drainage along undulating sections.

(4) Flora in Other Areas

In addition to the specific impacts on flora and habitats within the BAWS section of the alignment, the construction of the DFC project will also necessitate the removal of trees and habitat along the length of the entire Wamaj-Iqbalgarh section. Due to that, the following impacts could be anticipated:

1) Construction Phase

a. Impact

- The trees and vegetation provide several important functions including the provision of habitat for numerous wildlife species, provision of groundcover reducing soil erosion, aesthetic improvement and the clear demarcation of the RoW. Such functions may be reduced.
- Increased earth and rock extractions during the construction may affect or remove root structures and key stone species which is likely to disrupt ecosystems.

b. Mitigation Measures

- The RoW should be effectively/clearly demarcated by the hedgerow to avoid removing extra trees.
- The hedgerow and the greenbelt along the alignment should be established by planting appropriate native tree species (i.e. Acacia catechu and/or Nilotica, Azadirachta indica, Ficus religiosa, Holoptelea integrifolia), shrubs and grasses/herbs for the central reservation along the alignment. The greenbelts should be consciously managed.
- Appropriate compensatory plantation should be initiated as per the applicable state level tree felling and preservation acts to compensate for the vegetation loss due to felling trees. The rate of replacement shall be decided by the State Forest Department and informed to DFCCIL through tree felling permission for non-forest areas.
- Compensatory reforestation should focus on the planting of appropriate native species and/or mixed forests in degraded areas lying close to the affected area.
- Consistent with the mitigation measures proposed for mitigating soil erosion, a Borrow Area Management Plan should be developed and borrow pits should be rehabilitated as grasslands, orchards, woodlands or farmlands and planted with trees or groundcover vegetation as appropriate.

2) Operation Phase

a. Impact

- Improper post-planning care/maintenance as well as illegal felling of plantation along the alignment would offset the positive effects by the Project.

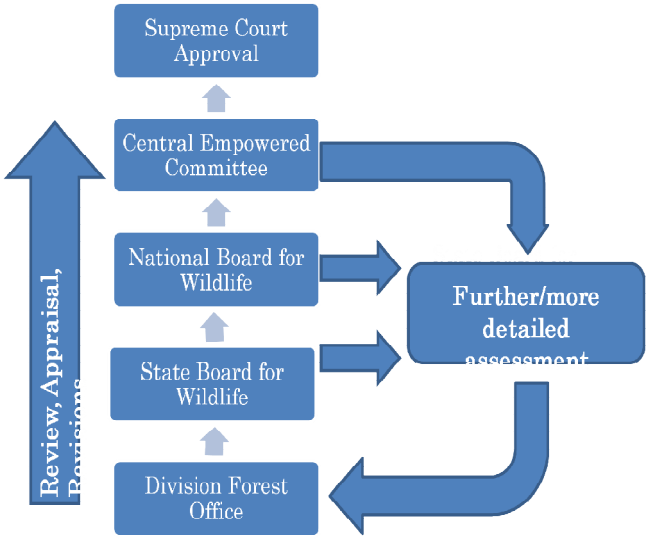
b. Mitigation measures

- Continual management and monitoring of the created greenbelts will be required.
- Plantation along the proposed alignment shall be maintained properly as well as protected illegal felling.

(5) Wildlife Protection Act Clearance

Within any discussion of environmental mitigation measures for the BAWS it is important to note that in addition to and irrespective of the measures proposed here, the DFC project has to comply with conditions and mitigation measures stipulated during clearance procedures associated with the Wildlife Protection Act (WPA, 1972). Under the WPA, any infrastructure project passing through a wildlife sanctuary or other protected area established for the conservation of wildlife must receive prior clearance from the National Supreme Court. Such clearance will be accompanied with certain conditions and requirements. The project is then required by law to comply with the stipulated conditions and mitigation measures.

WPA clearance procedures begin with an assessment carried out by the local DFO concerned and the submission of a brief report and proposed mitigation measures. The State Forest Department/Board for Wildlife may revise or add to these proposed mitigation measures before submission to the National Board for Wildlife (NBWL). Recommendations and mitigation measures may then be further revised at the national level or there may be call for further or more detailed studies before submission to the Central Empowered Committee (CEC). There may yet again be further studies and alterations prior to approval and submission to the Supreme Court who will in turn review and eventually approve legislation binding the DFC project to specific measures. A simple diagram is provided below illustrating this process which is decreed in the WPA.



Source : Prepared by NKC based on Wildlife Protection Act 1972

Figure 10.2.1 Approval Process for Development Projects Affecting Wildlife and Protected Areas based on Wildlife Protection Act 1972

During this ESIA report preparation, the meeting of the Standing Committee of NBWL was held on 13 June 2012. One of the agenda of the meeting was to discuss the proposal for diversion of 1.4459ha of forest land from BAWS for the construction of DFC railway lines. After discussions, the Committee decided to recommend the proposal subject to the following conditions suggested by the Chief Wildlife Warden, Gujarat.

i. The construction of yard and the camp should be at least 3km away from the sanctuary.

ii. Proper underpass shall be provided for movement of wildlife at every one km on consultation with Chief Wildlife Warden (CWLW).
iii. Culvert/pipe shall be provided at every one km between the underpasses. Further 10 inch diameter pipe shall be provided at every 200m distance to facilitate free movement of reptiles.
iv. Metal beam crash barrier shall be provided on both sides of the railway line.
v. The programme for controlling the speed of the trains shall be decided in consultation with local Forest Division.
vi. Afforestation along the railway line shall be done.
vii. Impact assessment studies shall be organized periodically on consultation with the State Forest Department.
viii. The civil structures shall be designed is such a manner that water flow to the Thol Lake is not obstructed. The same shall be ensured by providing culverts.
ix. Adequate number of appropriate signage shall be placed throughout the track in the protected area.
x. An amount of Rs.5 lakh will be deposited annually with the State Forest Department for improving the measures for wildlife conservation.
xi. The user agency shall strictly ensure that no damage is caused to flora and fauna in the area during execution of the project.
xii. The CWLW or any officer authorized or working under him shall monitor the compliance of conditions and on any non-compliance, shall report to MOEF, who may place the case before the Standing Committee for cancelation of the permission.
xiii. Any other conditions that may be imposed by CWLW/Government from time to time will be strictly complied with.

10.2.2 Soil Erosion

The soils of the northern Gujarat Plain are of a poor sandy/fine loamy nature making them extremely vulnerable to erosion and desertification. The construction of the railway line will require substantial earthworks to provide a suitable base for the track which may result in the erosion of soils. Borrow pits will also be required creating similar problems in areas adjacent to the alignment. No significant long term impacts on soils and soil erosion associated with the operation phase are anticipated as long as embankment consolidation and slope stabilization measures are monitored and maintained. The most significant mitigation measures are discussed in greater detail as follows:

(1) Mitigation Measures for Loss of Soils and Vegetation Cover

i) Clear demarcation of the RoW will minimise unnecessary disturbance, damage or loss of soils by ensuring that only soils within the RoW are excavated.

ii) Existing access roads to the proposed alignment or the RoW itself should be used wherever possible to ensure that disturbance, damage or loss of soils resulting from the creation of new access routes for the transportation of construction equipment and materials is kept to an absolute minimum. This should be relatively straightforward for most of the Wamaj - Iqbalgarh section since most of the alignment runs parallel to the existing railway track which is crossed at regular intervals by numerous roads. Where this is not possible, the route involving least disturbance to vegetation and soils should be chosen.

iii) The number and locations of borrow pits should be carefully considered in order to minimise disturbance, damage and loss of soils. Careful planning is required in order that use of borrow areas and soil excavation is efficient and therefore kept to a minimum. Borrow pits should not be located in a) protected areas or recorded forests,

b) on slopes or valley sides, or c) riverbeds. Areas with highly (or relatively highly) fertile soils for agriculture should also be avoided. Wherever possible borrow pits should be located in areas of unused, barren wasteland.

iv) A greenbelt should be developed concurrently with the construction work (or immediately after completion) for the area by planting of replacement trees and shrubs along the proposed alignment. Herbs/grasses may also be sown if appropriate/necessary in order to restore groundcover. Native species should be preferred as exotic species may become invasive and fast growing exotics such as eucalypts also have a degrading effect on soils and negatively impact natural regeneration and ecological succession.

v) Borrow areas should also be rehabilitated once they have served their purpose by replacing the topsoil and planting/sowing of appropriate species of grasses/herbs, trees and shrubs. As above, native species should be preferred. The borrow areas should be regenerated as grasslands, orchards, woodlands or farmlands after closure.

(2) Mitigation Measures for Soil Erosion

Increased soil erosion takes place on soils which have been disturbed, damaged or exposed. Therefore in addition to the measures proposed above for minimising disturbance, damage and removal of soils, the following mitigation measures are proposed:

i) Major soil excavations and earthworks should be minimised during the monsoon season.

ii) During construction exposed soils should be lightly watered in order to reduce wind erosion (and air/dust pollution). The soils along most of the alignment are of a fine loamy or sandy nature and therefore if exposed will become vulnerable to wind erosion.

iii) It is essential that during the construction phase, earthworks are done properly, embankments are well consolidated and slope protection/stabilization measures are put into place. On slopes with such poor sandy soils, immediate soil compaction work is essential. Such measures should include;

- Intercepting ditches at the top and at the bottom of the slopes. Gutters and spillways should also be used to control the flow of water down a slope;
- Riprap or rock material should be embedded in the slope face, sometimes combined with vegetation planting;
- Retaining structures such as gabions, cribs (grids of wood or concrete beams filled with earth or rock), or other types of grid works, usually battered back against the slope;
- Retaining and breast walls are more substantial structures able to resist bending and with a footing designed to withstand pressure at the base of the slope and maybe necessary at locations where high or steeply sloping embankments;
- Reinforce earth embankment walls built up as the earth fill is placed, with anchors compacted into the fill material; and
- As far as practicable, top soil removed from the construction sites should be used for construction of embankment to enhance growth of vegetation on the embankment surface and its consolidation.

iv) Greenbelt planting along the alignment is recommended not only as a measure to replace the groundcover and trees removed during RoW clearance but this also serves to reduce run-off and soil erosion. Plantation work (of grasses/herbs, shrubs and saplings) should take place during the monsoon season.

v) As above for mitigating soil and vegetative cover loss, borrow pits should be rehabilitated.

10.2.3 Disaster

The DFC project in general has potential impacts on the occurrence of two types of disasters in the Wamaj - Iqbalgarh section namely floods and landslides. It is worth remembering that disasters occur at the convergence of hazards and vulnerability. Therefore this section deals with how the project may impact the occurrence and severity of 'hazards' by increasing the affected area's 'vulnerability' to them.

Hazard risk reduction measures for floods and landslides are grouped together in the environmental mitigation measures because their causes are similar. Overall great care must be taken in hilly areas and where the alignment crosses valleys such that impacts on slope stability and drainage are minimized. Mitigation measures specified above avoiding, minimizing and compensating for vegetation cover removal and soils and soil erosion should be strictly adhered to (slope stabilization measures).

Adequate cross drainage channels (longitudinal and median drains) should be provided along the DFC route at suitable locations for the smooth passage of the surface run-off to prevent flooding.

10.3 SOCIAL ENVIRONMENT

10.3.1 Potential Social Impacts and Mitigation Measures

Major infrastructure projects such as the DFC frequently present numerous and significant social impacts on populations residing in the project area or in the immediate vicinity of the proposed alignment. Social considerations are also a critical element in the ESIA. In this case, a detailed assessment of social impacts of the proposed DFC has been conducted through a Baseline Survey and Census, which in turn informs the development of a RRP intended to provide for and mitigate impacts on the social environment.

All villages along the proposed alignment were considered under the study and information was collected from those peoples directly displaced by the Project using a structured questionnaire (i.e. those with public and private residential, other land including agricultural land holdings lying within the proposed alignment or squatters/encroachers). Meanwhile information from other members of affected communities who would be impacted in other ways was also collected through public consultation processes.

The issue of land acquisition is of primary importance to the PAPs and those communities lying along the proposed alignment and being will be in accordance with the Gazette notifications published by the MOR. The Baseline Survey and Census has thrown light on the issues faced by local peoples. Some of the issues are discussed below i.e. several community structures such as irrigation channels, wells, bore wells, educational institutions and factories and industrial establishments are expected to be affected by the proposed alignment. There are also a good number of employed and self employed people residing along the alignment that will lose their main employment or source of livelihood. A compensation package should be provided for PAPs in accordance with the NRRP. These issues were discussed in the PCMs on the draft ESIA and the RRP reports in November 2011 and July 2012. After finalization of the ESIA and RRP reports, further

public consultation, even informal meetings with a village, shall be recorded properly until land acquisition and resettlement and rehabilitation have been successfully completed.

Minimum land acquisition and disturbance to existing features should be the prime objective of the design. Socially sensitive stretches should be avoided and alternatives should be selected with detours around settlements.

Rehabilitation of the PAPs and removal of affected structures should be planned in consultation with the PAPs and local authorities to ensure minimum disturbance to the PAPs. This is required to minimize impacts within the limitation of technical requirements with an emphasis placed on cost effectiveness. Most mitigation measures have already been adopted by DFCCIL, such as utilizing existing railway land.

Table 10.3.1 Potential Social Impacts and Proposed Mitigation Measures

Status	Impact	Mitigation Measure
Local economy	Local economy such as employment and livelihood will be affected due to land acquisition and involuntary resettlement.	Negative impacts on the local economy could be mitigated through creation of new employment or livelihood opportunities related to the Project e.g. jobs for priority PAPs as construction workers.
Land use and utilization of local resources	Land use and utilization may be affected.	Restoration of agriculture land and orchards. Irrigation sources should be replaced.
Social institutions (including regional severance)	Sensitive receptors and residential areas are affected	Where the DFC alignment crosses existing roads and major footpaths, appropriate structures such as RUB, ROB and pedestrian subways will be provided to enable the crossings to continue.
Socially vulnerable groups such as poor, indigenous and ethnic people	Socially vulnerable groups such as poor, indigenous and ethnic people may be affected.	Equitable opportunities for ethnic and vulnerable groups to participate in consultation processes and receive compensation or benefits. This may require printing of materials in different languages or use of interpreters.
Inequitable or unfair distribution of benefits and damages	PAPs feel that city dwellers will benefit.	The opportunity for mediators to affect or control distribution should be avoided by endorsing transparent processes with strict monitoring and accountability.
Local conflict of interests	PAPs feel that their interests should be adequately taken care of by the local government.	Efforts made to incorporate local/PAP interests into design, construction and operation phases. This requires careful facilitation and again effective participation may require translation/interpretation for fair representation. Also make clear compensatory benefits and what PAPs are entitled to and how to get it.
Water usage and water right	Accessibility of water sources for domestic use and irrigation would be restricted.	Alternate facilities for domestic use and irrigations should be installed.
Historical and cultural heritage (including religious matters)	Religious structures affected.	It should be handled with a sensitive approach and carefully resolved between project managers and village leaders/local authorities. If construction work is carried out within 100 m of any designated heritage or archaeological sites, permission should be obtained from the relevant authorities. The status of such structures should be checked with the archaeological department.
Sanitation	An issue with the advent of construction workers.	Proper sanitation facilities should be installed.
Hazardous (risk) infectious diseases such as HIV/AIDS	Could arise with influx of construction workers.	Awareness campaigns programme and distribution of condoms should be planned.

Status	Impact	Mitigation Measure
Occupational Health and Safety (OHS)	During construction phase, large vehicles and equipment may affect safety.	Safety rules to be established at construction and project sites should be followed.
Accident and Public Safety	During construction, operation of heavy vehicles and equipment may have a risk of accidents. Increased risk of accidents is expected by higher speed train operation.	Special cares should be taken during both construction and operation to avoid accidents. Proper warning signals of alarm system should be in place to warn people for coming trains. Local people must be informed/educated about public safety to discourage people from gaining access to the DFC track.

Source: NKC

10.3.2 Labour Aspects

Labor issues are an important consideration to be emphasized in any major development project as follows:

(1) Labour Force

The labour problem arises where external labour forces are brought for the works with various potential repercussions and likely impacts caused by the new work force at the site. Local people could benefit if employed in the contractor's workforce and this may help to compensate for disturbance by the works and reduce the size of construction camps. The employment of local people as skilled or unskilled workers will be prioritised based on their availability in the vicinity of construction sites. As far as possible, those people who will be affected by land acquisition and from disadvantaged households will be employed so as to provide a temporary source of income.

(2) Construction Camp and Site

The site of construction camps has the potential to cause conflict with the local population if done without consideration for local traditions and customs. The influx of a large number of outside workers into small villages may lead to conflict. The employment of local labour on the Project will go some way to decreasing the risks but there will still be a need for a sizeable proportion of the workforce to be recruited from outside the area. Construction camps must therefore be sited well away from local communities so as to minimize interactions between the workforce and the local populations.

The construction sites are likely to have limited public health impacts due to their isolated location. However, contractors will ensure that no untreated wastewater is discharged to local water bodies and that no site-specific landfills will be established at the construction camps. There will be a potential for diseases to be transmitted, exacerbated by inadequate health and safety practices. Each contractor should therefore be required to recruit a safety, environment and health manager to address such concerns in the work sites and liaise/work with the labourers. Some of the mitigation measures are listed below:

- Provision of adequate healthcare facilities (first aid) within construction sites;
- Training of all construction workers in basic sanitation and healthcare issues, general health and safety matters, an on the specific hazards of their work;
- Personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection;
- Provision of clean drinking water facilities for all workers;
- Adequate protection to the general public, including safety barriers and marking of hazardous areas;

- Safe access across the construction site;
- Adequate drainage throughout the camp to ensure that disease vectors such as stagnant water bodies and puddles do not form; and
- Septic tank and garbage bins will be set up in construction sites, which will be regularly cleared by the contractors to prevent outbreak of diseases.
- Where feasible the contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities.

(3) Occupational Health and Safety (OHS)

Associated risks from accidents and incidents could affect health and safety of the workers and others on constriction/project sites. Since the location of most of the construction sites would be away from medical centers, improper first aid facilities on the sites could affect health and safety of workers and others. The following major mitigation measures should be in place.

- Relevant labour laws should be strictly complied with pertaining to the health and safety of workers, employees and others.
- All workers and staff should be provided with Personal Protective Equipment (PPE) appropriate to their job on-site.
- All construction sites should be surrounded with secure tamper-proof fence, with security lighting and regular security patrols.
- All materials and components should be stored and stacked safely in dedicated secure areas.
- Use of any paint containing lead or its products or material containing asbestos should be prohibited.
- Smoking should be prohibited near areas of fire or explosion risk.
- Sufficient supply of potable water should be ensured for all workers and employees on-site.
- Ensure that first aid kits are available in all work areas, supplied with adequate material to treat common workplace injuries.
- Dedicated transport should be provided at all work sites to take injured persons to hospitals if needed. Record of all nearest hospitals and health centers should be kept at each construction site.
- A regular medical facility at each construction camp should be provided with suitable qualified staff and equipment to treat minor ailments and injuries.
- An effective alarm system should be established to warn track workers of approach of trains on IR lines.
- Protect all electric sub-stations, high tension towers and other areas from electrocution risk by providing security fencing and lights, warning signs and security patrols.

CHAPTER 11 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN, AND ENVIRONMENTAL AND SOCIAL MONITORING PLAN

11.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

11.1.1 Basic Approach of Environmental and Social Management Plan

The environmental and social management plan (ESMP) is designed based on the impact assessment which comprehensively covers all aspects of pollution control, natural environment and social environment so that adverse impacts if any are taken care of and the project does not create any hazard or affect the quality of life for present and future generations. The ESMP often provides not only technical approach but also institutional and organizational arrangements and the financial outlay for all environmental related aspects, because detailing of the budgetary provisions for different activities is useful for the project authorities. The technical components of the ESMP are described briefly in the following points:

- Pollution Control
- Natural Environment Management
- Social Environment Management
- Other relating aspects management

(1) Pollution Control

1) Noise and Vibration Control

The noise levels created by construction equipment vary greatly depending on the type of the equipment used. The dominant source of noise from most construction equipment is from the engines, usually those which are diesel operated without sufficient muffling. In some cases like the pile driving and rock breaking, noise generated through the process dominates. Stationary equipment operates in one location for short periods of time with either a fixed power generation (pumps, generators and compressors) or variable noise-making operations like the pile driving and rock breaking. Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers and loaders) or to and from the site (trucks and dumpers).

There are several measures which are indicated to curtail the noise levels emanating from the construction sites in ESMP:

- Noise barriers such as temporary walls or piles of excavated materials should be established around the yard near residential area and sensitive receptor during the activities such as blasting and pile driving which generate the high level of noise;
- Reroute truck traffic away from the residential areas, if possible select streets with fewer homes if no alternative route is available;
- Site equipment to be placed away from the residential location and sensitive areas;
- Construct walled enclosures around especially noisy activities or clusters of noise-making equipment;
- All plant equipments and vehicles being fitted with appropriate noise suppression equipment to reduce noise levels as far as possible;

- All equipment should be operating in good condition. Use specially quieted equipment such as enclosed air compressor and mufflers on all engines;
- All site workers are trained in noise reduction such as proper use of machinery and hearing protection;
- All site workers must wear appropriate hearing protection if in close proximity to machinery for extended periods;
- Avoid night time construction activities as much as possible in noise sensitive areas;
- Avoid pile driving work where possible in noise sensitive areas by quieter alternatives where geological conditions permit their use;
- Control noise and vibrations at the sources which includes track measures like rail grinding, welding to smooth discontinuity, lubrication, use of soft rail pads and relocation of signals or turnouts. The other mitigation measures include wheel lubrication, use of disc brakes, dampening of wheel and use of resilient wheels; and
- Plantations of trees and shrubs (as green belts) for instance would contribute little to actual noise reduction, but they do have a psychological effect in reducing the perceived nuisance of the construction noise, and they are often used to soften the visual appearance of mounds and walls.

Vibration is also associated with the heavy equipment usage at the construction sites. The purpose of mitigating vibration is to minimize the adverse impacts that project ground borne vibration will have on residents living nearby. Perceptible ground borne vibration is generally limited to the areas within few hundred feet of the railway system. However, there are mitigation measures suggested for curtailing vibration levels in addition to the ones for noise levels which also contribute to reduce the vibration level as mentioned above.

- The vibrations can be reduced considerably by ensuring and keeping correct track geometry by advanced measurement;
- Effective maintenance are essential for controlling ground borne vibration.
- Avoid operation of vibratory rollers and packers, and earth moving equipment near vibration sensitive areas as much as possible;
- Avoid simultaneous operation of earth moving and ground impacting operations; and
- Avoid night time construction activities as much as possible in vibration sensitive areas because people are more aware of vibration in their homes during the night time hours.

2) Waste Management

a. Construction waste management

Any construction project of this magnitude will create an enormous amount of solid waste which should be properly disposed of at the controlled locations. The waste is generated by construction activities as well as from the construction yards and camps. Prior permission from the relevant responsible authorities will be required before disposing of any solid waste.

Properly disposing of solid waste generated from construction yards and camps is a must to protect the environment. The main waste generated from the kitchen normally comprise of organic waste (discarded foods, vegetable peels, meat and bones), inert materials like (polyethylene bags, and mineral water bottles) and wastewater flowing out of the construction yards and camps. The wastewater from toilets will flow into septic tanks.

In order to avoid associated health and aesthetic problems caused by improper management, the following measures should be taken into consideration for construction waste management.

- Avoid uncontrolled solid waste dumping which could be breeding ground for vermin, and as such could pose a vector for disease. Uncontrolled solid waste dumping invariably attract casual dumping by others and also this could encourage improper disposal of hazardous wastes; and
- Segregation of waste depending on the nature of the materials should be carried out. Special attention should be given to diverting hazardous materials/wastes for proper management in accordance with applicable regulatory requirements as shown below.

b. Handling of hazardous waste/materials

Whenever it is feasible, engineering controls must be used to reduce employee exposure to hazardous materials. The two most common engineering controls are the use of local exhaust and general ventilation. These measures limit an employee's exposure to airborne contaminants. When engineering controls are not available, or they fail to adequately reduce hazards, other personal protective equipment is required. Examples of personal protective equipment include: safety glasses, hearing protection, gloves, respirators, etc. Personal protection devices must be provided and worn in accordance with the manufacturer's recommendations indicated on the label of the product or as stated in the Material Safety Data Sheet for the product.

Hazardous chemical spills should be handled effectively with a action plan which should be developed as part of Safety, Health and Environment (SHE) plan. Spill procedures should include the following general procedures:

- If the spilled material is flammable, turn off ignition and heat sources.
- Attend to any person who may have been contaminated or affected.
- Notify individuals in the area about the spill.
- Evacuate non-essential personnel.
- Avoid breathing vapours of spilled materials. Establish an exhaust or ventilation, if it is safe to do so. Air handling units are not to be used because they may re-circulate the hazardous vapours.
- If a spill is relatively large or involves a highly toxic material, a carcinogen or flammable material, call for assistance in cleaning up the spill and disposing of the hazardous waste resulting from the cleanup.

Hazardous wastes undergo the following different treatments in order to stabilize and dispose of them.

- Recycling
- Neutralization
- Hazardous waste landfilling

(2) Natural Environment Management

It is standard practice within an ESIA to incorporate a greenbelt development plan, however in this case where certain environmental impacts on wildlife and their habitats are perceived, an integrated greenbelt, habitat restoration and wildlife management plan is proposed as follows:

1) Greenbelt Creation

Greenbelt creation, reestablishment or strengthening is proposed for the entire section as a major component of the ESMP. Greenbelt along the RoW serves a number of environmental enhancement and mitigation purposes including;

- The improvement of landscape aesthetics by hiding the railway tracks behind a vegetated screen, hedgerow or tree line/beautification of the corridor
- The significant reduction of noise pollution and vibration
- The mitigation of air pollution both in terms of the local or micro level by absorbing pollutants and by contributing to global efforts to combat climate change through the absorption of carbon dioxide
- The protection of soils and reduction of soil erosion
- The provision of valuable wildlife habitat for numerous species which have become accustomed or adapted to living in agricultural and urban human-dominated or anthropogenic landscapes
- The creation or strengthening of a hedgerow or tree line along the alignment also serves the practical purpose of demarcating the RoW and therefore prevents or reduces encroachment

For much of the Wamaj - Iqbalgarh section (especially in Mehsana, Patan and Banaskantha Districts), the alignment will run parallel to an existing railway track. There has been previous greenbelt of the existing track's RoW such that a mature hedgerow now exists along the alignment. For certain sections, removal of this existing hedgerow may not be necessary and preserving it should be a priority wherever possible. In such sections, efforts should focus on the strengthening of the existing tree line and the replacement of groundcover and shrubs within the RoW.

In other sections, it seems likely that the existing hedgerow or tree line will have to make way for the alignment. However, since the alignment falls on one side of the existing track (on the east side for most of the alignment in the section), removal of trees and habitat on the opposite side will not be necessary. Where this mature hedgerow and vegetation in the alignment must be removed efforts will focus on re-establishing this hedgerow or tree line as well as replacing groundcover and shrubs within the RoW.

There are also some sections (especially in Kalol Taluka, Gandhinagar District) where the proposed DFC alignment runs by itself and not in parallel to any existing track. In this area the alignment passes mainly through agricultural fields and as such tree removal is not expected to be significant. In these sections a greenbelt including a planted hedgerow or tree line will be developed on both sides of the proposed alignment.

The only forested area which is directly impacted by the proposed alignment is the short 2.4 km section cutting through the BAWS. In this section, the proposed alignment runs parallel to and within the RoW of an existing railway track. Forest on

this western periphery of the protected area is significantly degraded and environmental impacts on important or threatened flora or habitats are not significant. Furthermore as mentioned above it may also be possible to avoid the removal of trees and habitat along the edge of the RoW. In addition to re-establishing the greenbelt along the alignment/RoW in this section, efforts should also focus on restoration of natural habitats and the strengthening of natural ecological corridors for the benefit of wildlife populations and their movement across the alignment, beyond the protected area boundary and in the wider landscape.

A number of measures are proposed for greenbelt creation, reestablishment and restoration as below:

i) Firstly where there is a pre-existing hedgerow or tree line it should be preserved wherever possible

ii) Special efforts should be made to avoid the removal of mature keystone trees along the alignment, especially if they are native species providing valuable nesting sites and fodder to birds and mammals.

iii) Along the BAWS section during the biodiversity assessment particular keystone trees were noted as magnets for biodiversity on a microhabitat level. If such species cannot be avoided, transplanting should be considered where feasible as a part of habitat restoration efforts or to strengthen natural ecological corridors. Growth and regeneration rates are extremely low in this arid region and therefore it may take up to two decades for some of these trees to be adequately replaced in terms of their ecosystem function by planting of saplings.

iv) The plantation of trees will be completed in the construction stage so that substantial growth is achieved when the project is completed.

v) Overall the replacement rate should be double the number of trees to be removed along the alignment. This should generate a surplus of trees to be planted in the areas where there are trees in the RoW. This surplus should be used for a) the creation of a greenbelt with hedgerow/tree line in the Kalol section (and other short sections) where there is no existing greenbelt, and b) for natural habitat restoration and strengthening ecological linkages in the BAWS-JSBS landscape.

vi) Greenbelt creation and re-establishment includes the plantation of trees as well as shrubs and grasses/herbs. A mix of native species should be preferred. Appropriate species should be relatively quick-growing (in order to rapidly be able to absorb pollutants, act as an effective screen and perform all the functions of a greenbelt) and hardy (for survival in a harsh, arid climate). A list of suggested species is provided below but competent authorities should be consulted prior to investment. Special notes are provided on the selection of species for the BAWS section below.

vii) Tree planting and groundcover restoration work should be undertaken early-on in the monsoon season (July).

viii) Saplings should be procured from local nurseries in close proximity to the plantation areas (but they should also be carefully checked for diseases and quality).

ix) Different planting techniques are required for different species of trees/shrubs. Competent authorities (DFO or Social Forestry Department) should be contracted to perform the plantation work. Various factors need to be considered including the depth of the planting pits, spacing of the saplings (from a silvicultural perspective as well as with consideration for the ability of the trees

to hide the alignment), quantities of compost/mulch required etc. Shrubs should be planted between the trees to enhance vegetative cover and grasses/herbs sown and in the middle of the RoW.

x) Grasses are used to provide surface cover on slopes but it also needs a well-prepared surface in which to be planted. For a well spread grass cover, the surface should not be disturbed in the initial stages of sowing. The grass species recommended are Cynodon dactylon, Cythocline purpurea, Solanum nigrum, Xanthium strumerium. Desmostachya bipinnata, and Aristida hysterix are recommended for side embankment of eroded and dry patches. All these species are locally available in the surrounding area. The contractor will ensure that the condition of the site is good enough for successful establishment of grasses. They will also supervise all field operations like preparation of surface, sowing of grasses and quality of grass seeds used.

xi) Relatively intensive work is required over the first three months in tending and weeding to ensure the establishment of the saplings and groundcover vegetation.

xii) Ongoing monitoring and maintenance of the planted greenbelt areas is required and should be performed by the competent authorities (i.e. DFO/ Social Forestry Department). Lopping will not be an immediate concern but may be required after 10-15 years depending on the tree species. Grasses/herbs and groundcover will retreat considerably during the dry, hot summers before returning during the monsoon season in this arid region which should make management relatively straightforward i.e. once established the area can be left to regenerate naturally without significant landscaping, surgery or constant chopping back.

Table 11.1.1 List of Suggested Flora Species for Greenbelts

SN	Scientific Name	Common Name	Local Name	Characteristics
Tree Species				
1.	*Bauhinea variegata*	White Kachnar	Kachnar	Medium size ornamental tree, conspicuous white flowers
2.	*Cassia fistula*		Amaltas	Medium size tree, conspicuous yellow flowers
3.	*Delonix regia*	Flamboyant	Gulmohar	Medium size ornamental tree, conspicuous. scarlet flowers
4.	*Lagerstroemia thorelli*	Lagerstroemia		Ornamental tree bearing pink flowers.
5.	*Lagerstroemia indica*	Lagerstroemia		Ornamental tree bearing white flowers
6.	*Madhuca indica*		Mahua	Shady tree with large canopy
7.	*Azadirachta indica*		Neem	Shady tree with large canopy
8.	*Syzygium cumini*		Jamun	Shady tree with large canopy
9.	*Polyalthia longifolia*	Indian Fir Tree	Devdaru	Conical shaped tree
10.	*Terminalia arjuna*	Arjun Tree	Arjun	Shady tree with large canopy
11.	*Terminalia alata*	Indian laurel	Ain	Shady tree with large canopy
12.	*Albizzia lebbek*	Lebeck	Siris	Shady tree with large canopy
13.	*Acacia catechu*	Catechu	Khair	Shady tree with large canopy
Shrubs				
14.	*Calotropis gigantea*	Crown Flower	Akand	Flowering shrub growing to 4m
15.	*Nyctanthes arbor-tristis*	Night Flowering Jasmine	Harsigar	Shrub/small tree with white flower
16.	*Nerium indicum/N. oleander*	Oleander	Kaner	Ornamental shrub with white/pink flowers
Grasses/Herbs				
17.	*Cynodon dactylon*	Durva grass		Fast growing and tough species
18.	*Cythocline purpurea*	Gangotra	Bandhaniya	Erect annual herb with medicinal properties
19.	*Solanum nigrum*	Black Nightshade		Common herb with edible berry
20.	*Xanthium strumerium*	Cocklebur		Naturalised from North America, annual plant

SN	Scientific Name	Common Name	Local Name	Characteristics
21.	*Desmostachya bipinnata*	Halfa grass	Daabh	Common grass species
22.	*Aristida hystrix*			Perennial grass species

Source: NKC

2) Wildlife Habitat Restoration and Biodiversity Protection

The alignment will pass through a small section of the BAWS on the western boundary and further weaken linkages with the JSBS further to the west. The vegetation to be removed during the construction phase is not in itself regarded as a serious negative environmental impact since the habitat is generally significantly degraded, dominated by exotic species and unexceptional overall. However evidence from the biodiversity assessment (including analysis of secondary information) indicates that there is movement of numerous endangered, keystone and flagship fauna species along and across the alignment with potential migration between the two protected areas. The DFC during the construction and operation phases will therefore have a cumulative impact (in addition to the existing railway track and NH14) on the ecological continuity within the landscape. For this reason specific mitigation measures have been proposed to avoid and minimize habitat loss and reduce impacts of the DFC in terms of wildlife disturbance and loss. Measures have also been suggested to strengthen the existing natural ecological corridor between the two protected areas.

Throughout the remainder of the section, the DFC will not pass through any other recorded forest. The proposed alignment only passes through agricultural and settlement (non-forest) land use areas. However, as mentioned above for much of the Wamaj - Iqbalgarh section the proposed alignment is within the RoW of an existing railway track with a pre-existing greenbelt consisting of a mature hedgerow. This hedgerow in places supports significant levels of fauna as observed and recorded along certain sections of the alignment during the tree census. Therefore certain measures are also included for the non-forest sections with regard to avoiding, minimising and reducing impacts on fauna and flora.

The following measures have been identified for wildlife habitat restoration and protection of biodiversity:

i) Provision of training to construction labourers and teams on working in environmentally sensitive areas to increase awareness, knowledge and understanding of issues and techniques to minimise ecological impacts and damage/disturbance to fauna and flora. Aspects of the course may involve relevant environmental legislation, introduction to the site, identification of key species and important habitats, basic behavioural ecology of key species, practical methods for minimising impacts on key species and habitats (e.g. during RoW clearance, embankment construction, use of hazardous materials) etc.

ii) Contractual clauses developed to ensure strict adherence of construction teams to relevant forest and wildlife laws particularly for teams working in the BAWS section.

iii) Construction camps, construction yards, quarries and waste disposal sites to be situated well away from the BAWS (and any other forest areas).

iv) Construction work should be minimised during the monsoon season.

v) Construction work at night should be minimised to mitigate disturbance to nocturnal and crepuscular wildlife species.

vi) Adequate provisions are made for construction workers, particularly those working in the BAWS, to prevent the use of local natural resources such as fuelwood and timber for temporary constructions. All timber required for construction activities should be procured from a verified sustainable source outside the protected area.

vii) Close attention is to be paid towards pollution control measures in the BAWS section. In particular there are to be no borrow areas located inside the BAWS (or any other forest area). Water pollution control measures are especially important with regard to the protection of waterholes and other surface water in the BAWS-JSBS landscape - thus discharge of construction wastewater and liquids is to be strictly controlled, avoiding surface waters, ensuring proper treatment etc.

viii) Avoidance of unnecessary removal of trees and habitat along the alignment and in particular keystone tree species wherever possible (as above in greenbelt section).

ix) If and where mature native keystone or protected species must be removed the possibility of transplanting them should be considered and the DFO consulted.

x) Prior to the clearance of the RoW (removal of habitat and trees) measures should be implemented to remove or scare away wildlife along the alignment to prevent accidental losses.

xi) Compensatory afforestation/reforestation for the BAWS section should focus on the restoration of natural habitats using native foundation species such as Ficus Sp (e.g. religiosa), Cassia fistula, C. siamea and others in order to provide appropriate foraging and nesting habitat for birds and key mammal species such as the Sloth Bear. Through habitat restoration it may be possible to reduce the need for wildlife movement across the tracks. Habitat restoration in this area should be planned in close consultation with the DFO and should also strengthen existing natural ecological corridors (especially along the course of the Balaram River) and/or guide wildlife to safe crossing points (using clues in the landscape such as natural drainage channels) along the alignment in the BAWS-JSBS landscape.

Planting should take place at the start of the monsoon season and will require close attention for the first 3-6 months (ground preparation, weeding, removal of exotic and invasive species etc) in order that natural ecological succession is well established. Ongoing maintenance and monitoring of the habitat restoration areas will be required thereafter by the relevant competent authority i.e. DFO.

xii) Man-made water holes could be developed as features to further support the strengthening of natural ecological corridors such as along the Balaram River course in the BAWS-JSBS area. The location and specifications of these water holes should be decided in close consultation with the State Wildlife Board, local DFO and relevant experts. It may be possible to incorporate such waterholes in the Borrow Area Management Plan.

xiii) Small box and pipe culverts with dimensions of 0.5m x 0.5m should be provided at regular intervals along the alignment where there are high concentrations of wildlife for the safe passage of amphibians, reptiles and smaller mammals across the tracks. Larger culverts (3m x 3m) and underpasses should be provided where the alignment crosses drainage channels (streams/small rivers etc) to facilitate the movement of larger mammals such as blue bull and more endangered species such as in and near to the BAWS. All wildlife crossing points should traverse the entire RoW including the existing railway track and should be aligned with

crossing points on major roads such as the NH14 in the case of the BAWS. The precise locations of these culverts should be decided in close consultation with the State Wildlife Board and local DFO.

xiv) Construction areas are to be well-managed according to standard best practices in terms of maintaining equipments and machineries and keeping the site clean. Waste is not to be disposed of in the BAWS area or the Balaram River and must be taken away for safe disposal at an appropriate location.

xv) Local DFO or Social Forestry Department staff should work closely with the constructor to advise, supervise and monitor works to ensure that relevant mitigation measures are properly implemented.

xvi) Honking should be prohibited in the Chitrasani-Jethi section to reduce disturbance to wildlife during both construction and operation phases as far as the safety is secured.

3) Soil Erosion Control

Construction activities on site have potential to cause soil erosion and the deposition of sediment into adjoining lands and waters. Construction activities include land clearing and earth works which can be designed to reduce the risk of damaging the soil and to fit the project into its environment with minimal adverse impacts. Simple techniques such as replanting will be an effective solution in many situations, whereas more sophisticated techniques, such as retaining walls are used only in the most difficult cases.

Replanting cleared areas and slopes is the most effective action to be taken in reducing erosion and stability problems. It should be undertaken as early as possible in the construction process, before erosion becomes too advanced. To be most effective, it should be done immediately after a disturbance takes place. Vegetation should be selected to serve a specific engineering function.

Engineering functions of vegetation includes its abilities to:

- Catch and retain material moving over the surface.
- Protect the surface against erosion and abrasion by intercepting raindrops.
- Reinforce the soil profile by increasing its shear resistance.
- Drain the soil profile by drawing water out through the roots and releasing it to the air by transpiration.
- Facilitate infiltration of water through the soil profile, thereby reducing the proportion of water flowing over the soil surface.
- Grasses can effectively limit surface erosion.
- Shape the slope surface for maximum seedling survivability.
- Choose the right varieties, according to the soil type, climate, ease of maintenance, and desired engineering function. Local varieties are always preferable.
- Right season should be preferred for planting the saplings.

(3) Social Environment Management

1) Land Acquisition and Resettlement Management

The acquisition of land and private property shall be carried out in accordance with the RRP. Compensation and assistance package will be planned in RRP, separately from the ESIA.

It has to be ensured that all resettlement and rehabilitation activities including the

payment of the compensation may be reasonably completed before construction activities starts on any section of the DFC. There are some utility services along the proposed DFC alignment such as electric poles, telephone lines, cable line, pipelines, religious facilities, existing railway quarters and structures, the affected lines will be shifted in consultation with the concerned local government departments, Indian Railways and communities before the commencement of the construction activity. There are several roads crossing along the proposed alignment. The structures will be shifted in consultation with the concerned local government departments, Indian Railways, communities.

2) Occupational Health and Safety (OHS) Management

During the construction phase, construction yards and camps will be located along the alignment. Inflows of large numbers of workers are likely to cause a significant increase in the local population in the project area. A proper construction yard and camp management has to be in place to control degradation of the surrounding environment due to setting of the construction yards and camps. The main health and safety risks during construction would arise from:

- Inadequate sanitation facilities in construction yards and camps may lead to /outbreak diseases like typhoid, cholera and malaria, and
- Introduction of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS and other diseases by immigrant workers.

The contractor must provide a health education programme for the workers and villagers such as ones for road safety, malaria, hygiene, prevention of STI and STD including HIV/AIDS.

In addition, the contractor must provide and maintain adequate working and living conditions and ancillary facilities that must be included in the contract documents provided to the contractors. the following are major actions to be undertaken at construction yards or camps for adequate working and living conditions.

- Sufficient supply of potable water must be provided at yards and camps. If the drinking water is obtained from an intermittent public water supply, then storage tanks must be provided. All water supply storage must be at least 15 m away from the toilets or drains.
- Adequate washing and bathing facility must be provided in clean and drained condition. Separate bathing and changing areas must be provided for women.
- Adequate sanitary facilities must be provided within the areas of each yard and camp. Water flush toilets are desired which should be adequately ventilated and washing facilities should be provided near toilet facilities. The facilities should comply with the requirements specified by the competent authority.
- Collection of domestic waste and its suitable disposal must be carried out on a regular basis.
- Adequate supply of fuel in the form of kerosene or LPG must be provided to construction labours to avoid the felling of trees or collection of firewood for cooking and other household activities. No open fires shall be allowed in the camps.
- Construction equipment, and petroleum, oil and lubricant (POL) products should be stored 500 m away from the local settlements and workers living areas and it should be away from the water resource.
- Adequate trainings on good work practices including handling of hazardous materials, housekeeping and emergency response etc.

- There should be provision of adequate health care arrangements including first aid facilities and personnel (qualified first aid personnel or a nurse) for workers who suffer an accident or sudden illness. The manner in which first aid facilities and personnel are to be provided should be prescribed by national laws or regulations, and drawn up after consulting the competent health authority and representative organizations concerned.
- Suitable rescue and resuscitation equipment, as required, including stretchers should be kept readily available at the construction site.
- First-aid kits or boxes, as appropriate, should be provided at the workplaces and be protected against contamination by dust and moisture.
- Workers should be required to undergo pre-employment medical screening and treatment (if required) and periodic health checks thereafter.

Furthermore, a suitable housekeeping program should be established and continuously implemented on each construction site which should include:

- General housekeeping shall be carried out and ensured at all times at work sites, construction camps, stores and offices.
- All staff and supervisors and engineers working at the site should be educated on the necessity of good housekeeping.
- The contractor should maintain the site reasonably clean through sub contractor provision related to housekeeping.
- Special housekeeping staff would be in charge of each work section.
- Loose materials which are not required for use should not be placed or allowed to accumulate in the site so as not to obstruct access to and egress from workplaces and passageways.
- Workplaces and passageways that are slippery, owing to oil or other causes should be cleaned up or strewn with sand, saw dust, ash or the like.
- Each section shall maintain the site reasonably clean and keep from obstruction, and properly store any construction equipment, tools and materials. Any wreckage and/or rubbish shall be temporarily stored in wreckage and rubbish bins. These rubbish bins and wreckage shall be cleaned at frequent intervals.
- Full height fence and barriers should be installed at the site in order to preserve the surrounding area from excavated soil, rubbish etc.
- Arrangement to control dust pollution including silica dust through provision of wind screens, water sprinklers, and dust extraction systems will be provided at all site, likely crushers, concrete batching plants, quarry area and sand sites
- Immediate disposal of the weeds, trash and debris resulting from site clearing.
- Oil and grease dripping from machinery should be collected in a drip pan of suitable size. The areas should be cleared after the repair and maintenance of the construction equipment.
- Efficient drainage and leveling of the low lying areas should be done at all construction sites to prevent the creation of stagnant pools or puddles of water.
- Empty oil drums, cans and other receptacles which may retain water shall be disposed of regularly.

As for fire prevention and fire fighting, the following actions should be done by the contractors;

- All the appropriate measures should be taken to avoid the risk of fire control quickly and efficiently any outbreak of fire and bring about a quick and safe evacuation of persons.

- Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers.
- Smoking should be prohibited and no smoking notices be prominently displayed in all places containing readily combustible or flammable materials.
- In confined spaces and other places in which flammable gases, vapors and dust can cause danger:
    - Only suitably protected electrical installations and equipment, including portable lamps, should be used.
    - Oil rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place.
    - Adequate ventilation should be provided.
- Combustible materials such as packing materials sawdust, greasy/oily waste and scrap wood or plastic should not be allowed to accumulate in work places but should be kept in closed metal containers in a safe place.
- Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations, and conductors, stores of flammable and combustible material, hot welding and cutting operations
- Suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible
- Fire-extinguishing equipment should be properly maintained and inspected at suitable intervals by a competent person.
- Where necessary to guard against danger, workers should be suitably trained in the appropriate actions to be taken in the event of fire, including the use of means of escape.
- Where appropriate, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.
- Means of escape should be kept clear at all times.

The contractors are required to prepare, submit and obtain approval for a safety, health and environment (SHE) plan which contains the above mentioned measures, but not limited to them, prior to the commencement of the construction works.

(4) Management of Other Relating Aspects

1) Construction Camp Management for its Development, Operation and Demobilization

Construction camps may damage trees, habitats and landscapes when they are constructed, and affect water quality when in use. Poor accommodation management could lead to affect the workers physically, physiologically and psychologically, and also cause social problems around the camp sites. Therefore, the following mitigation measures are proposed.

- Camps should be located carefully to minimize loss of trees/habitats;
- Camps should be located away from inhabited areas and rivers or streams;
- Camps should be designed as per the local laws and guidelines;
- Proper accommodation should be provided to all employees who are working a significant distance from their home;
- Water storage tanks should be located above ground and boreholes should be away from toilets/drains;
- Clean and properly staffed and equipped canteen should be provided at camps;

- Wastewater from the camps should be suitably treated and disposed away from the sites as per the applicable standards and guidelines;
- Regular spray of a mixture made from diesel and insecticides should be done at all water stagnation areas to avoid mosquito breeding and spread of any vector borne diseases; and
- Garbage bins should be provided at suitable locations and should be ensured that each site is tidied and refuse taken to a licensed site regularly.

As land will be occupied temporarily for construction camps, stockpiles etc., it would be affected and polluted by the works. The long term impacts of construction works would be magnified unnecessarily if contractor demobilize without rehabilitation of the land where they have occupied temporarily and clearing away debris and other waste. Therefore, the following mitigation measures are proposed for demobilization of the contractor.

- All garbage, debris and hazardous materials should be removed from the construction sites and deposed of at licensed disposal sites.
- Consult with the owner of the site and leave any buildings, well or any structure if wanted by them.
- All trenches should be filled and all equipment, plant and materials should be removed from the site.
- Compensate for rehabilitating the landscape and vegetation disturbed during construction activities.

2) Borrow Area (and Quarry Site) Management

It will be the responsibility of the contractor to identify and negotiate borrow areas. However it is proposed that an appropriate Borrow Area Management Plan should be formulated to control the degradation of the surrounding landscape due to the excavation work. The national standard adopted by the MoEF and which applies to the borrowing of earth is the IRC: 10- 1961[1] and these guidelines should be followed at all times.

The contractor is required to take quarry materials only from licensed quarries. In the case of existing quarries the contractor through the Project Management Consultant representative will have to ensure that all actions in these quarries are in accordance with the environmentally sound and acceptable manner.

In case the contractor establishes additional quarries and dedicated crusher plants, the contractor has to ensure that all actions are in accordance with the environmental requirements.

In case of borrow areas, the contractor need to specify a detailed arrangement including the agreement with the owner of the land. The contractor must comply with provisions of taxes, levies, royalties etc. of the State.

The Borrow Area Management Plan will at a minimum specify the following:

- Names, locations and ownership of the borrow or quarry areas;
- Existing land use of the areas (including the access roads to be developed) to be quarried;
- Approximate quantities of the materials available;
- The number of trees and the species of the trees to be removed;
- Total area involved;

[1] Recommended Practice for Borrow Pits for Road Embankment Constructed by Manual Operation, IRC: 10-1961, Indian Road Congress (IRC) Publication, 1961

- Arrangements with the owners;
- Whether purchased or leased;
- A statement from the owners saying the actual arrangement (not in terms of exact monitory compensation) with him is agreeable for him;
- The exact restoration plan indicating the number of trees that will be planted;
- The action plan for leveling and landscaping in order to bring the area in conformity to the neighboring land uses;
- The access roads rehabilitation: and
- Compliance certificate of tax, levy, royalty, etc. provisions.

The following principles should guide the selection of locations, management and rehabilitation of the borrow areas:

- No borrow areas will be located inside protected areas or recorded forest areas.
- Borrow areas should be located (at least 1 km) away from villages and settlements.
- Barren or wasteland areas should be prioritized for use as borrow areas. Borrowing of earth shall not be carried out on productive land. In the event that such an occasion arises, the contractor has to obtain permission from the supervising engineer.
- No borrow area will be opened without the prior permission from the relevant local administrative bodies such as Village Panchayats, State Industries and Mines Department (SIMD) and State Pollution Control Board (SPCB).
- Borrowing of earth should not be done continuously. Slopes of edges shall be maintained not steeper than 1:4.
- During works execution, the contractor shall ensure spreading of stripping material to facilitate water percolation
- During excavation the removal of trees is to be avoided where possible. Where trees must be removed there shall be adequate compensatory planting
- Top soil (15 cm) from all areas may be preserved in stockpiles and utilized for redevelopment of borrow/quarry areas.
- Rehabilitation of borrow areas should be mandatory and must be included in the agreement made with the contractor.
- Landscaping of borrow areas and quarry sites should be carried out such that trees, shrubs and grasses/herbs are planted so as to rehabilitate the areas as grassland, orchard, or woodland areas.
- The rehabilitation of borrow areas should be specified in the contract with the contractor and include consultation with appropriate authorities (e.g. SIMD, SPCB, or other appropriate planning agencies).

11.1.2 Phase Wise Activities of Environmental and Social Management

(1) Environmental and Social Management Plan (ESMP)

The project will be executed in a phase-wise manner, Pre-construction (Planning/Design stages), Construction and Operation phases. The planning/design phase will be concentrated on the alignment and ground-truthing of the entire project area. Acquisition of land is essential for the next construction phase. The location for the borrow areas and quarry sites will be identified for the construction work.

The environmental issues during construction phase generally involve equity, safety and public health issues. The contractor is required to comply with the laws with respect to

pollution prevention and control, environment protection, forest conservation, resettlement and rehabilitation, health and safety and any other applicable law. The ESMP provides guidance and stipulations on how the project activities are to be controlled, implemented and monitored in order to minimize environmental and social impacts. Tables 11.1.1, 11.1.2 and 11.1.3 summarize the main management activities for significant impacts in Planning/Design, Construction and Operation phases. They provide mitigation/ management measures for significant impacts and an estimated for their implementation. They also identify the parties to incur the costs and implement the measures.

The proposed DFC alignment will pass through protected are (BAWS) therefore impacts on the natural environment and fragile ecosystems are also one of the key issues to be managed properly. For the management of natural environment aspects, mitigation measures during the construction phase will be the responsibility of the contractor. However DFCCIL will make provisions in the contractual arrangements with the contractor to ensure the implementation of mitigation measures. The SEMU may also check and oversee the work of the contractor to make sure that such measures are taken up in practice. The contractor should form close working relationships with the competent authorities for habitat restoration and wildlife management in the project affected areas including the Gujarat State Biodiversity Board and the respective Divisional Forest Offices (DFOs) and Social Forestry Departments in Gandhinagar, Mehsana, Patan and Palanpur. Such stakeholders should actively participate in the design and implementation of all works and mitigation measures where trees and wildlife habitat are impacted. This would include advising on trees to be removed, habitat restoration and greenbelt development, compensatory afforestation/reforestation, rehabilitation of borrow areas, locations of culverts and underpasses and ecological corridor strengthening. Relevant forest and wildlife authorities should also actively participate in relevant activities where appropriate. With respect to borrow areas a wider range of stakeholders may be involved including SPCB, Village panchayats and other local authorities as well as landowners themselves.

During the operation phase, DFCCIL will take responsibility for the implementation of mitigation measures. DFCCIL will therefore need to develop close working relationships with the local stakeholders identified above during the construction phase and maintain these relationships through the operation phase.

Table 11.1.2 Environmental and Social Management and Responsibilities during the Planning/Design Phase

No.	Items	Management Activities	Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision and Responsible		
1	Land acquisition and resettlement	- The acquisition of land and private properties shall be carried out in accordance with the RRP for the Project approved by MOR. - Any additional environmental and social impacts resulting from land acquisition will be addressed and integrated into the ESMP and other relevant documents.	Parties should be determined in a separate RRP study.	DFCCIL assisted by Project Management Consultant (PMC)	-	To be discussed in a separate RRP report.
2	Tree cutting and green belt development	- Avoidance of non-essential tree-cutting shall be made by setting/marking of the RoW clearly at site. - Green belt development shall be planned and designed at the sensitive locations such as the residential areas and ecologically important areas.	Contractor	ditto	State Forests and Environment Department (SFED)	No incremental cost
3	Construction yard and camp	- Setting of the construction camps shall not be planned within 500 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. - The proper wastewater treatment and waste management for the construction yards and camps shall be planned and designed. - Location for stockyards of construction materials shall be identified at least 300m away from watercourses.	ditto	ditto	State Pollution Control Board (SPCB), SFED	ditto
4	Construction vehicle, equipment and machinery	- All vehicles, equipment and machineries to be procured for the construction shall comply with the relevant Bureau of India Standard (BIS) norms. - The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 shall be strictly adhered to. - The silent/quiet equipment and machinery available in the market shall be selected. - The routes for construction vehicles shall be planned to avoid settlement areas as far as possible by using the existing village roads wherever available.	ditto	ditto	SPCB, SPCB	ditto

No.	Items	Management Activities	Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision and Responsible		
5	Crusher and concrete batching plant	- Construction plants which generate relatively large noise and vibration such as crusher and concrete bathing plants shall be sited sufficiently away from settlements areas. Such plants shall be located at least 100m away from the nearest dwelling preferably in the downwind direction. - Specifications for crushers, and concrete batching plants shall comply with the requirements of the relevant BIS norms. - Consent for the establishment and operation of crushers, and concrete batching plants from statutory authorities shall be obtained before establishment and operation respectively.	ditto	ditto	SPCB	No incremental cost, while statutory consent fees may be applicable
6	Borrow area and quarry site	- Borrow areas and quarry sites shall be finalized after the assessment of the availability of sufficient materials, quality and other logistic arrangements. - Borrow areas shall be located (at least 1 km) away from villages and settlements. - The necessary clearances shall be obtained from the statutory agencies such as SPCB and SIMD. - The haul roads shall be routed to avoid settlement areas as far as possible and shall use existing village roads wherever available.	ditto	ditto	State Industries and Mines Depart. (SIMD), SPCB	No incremental cost
7	Labour	- Preferably employ unskilled labour drawn from local communities, especially the PAPs, shall be planned to maximize benefits to the local communities.	ditto	ditto	State Labor and Employment Department (SLED)	ditto
8	Disaster	- The seismic factors shall be appropriately incorporated in the civil and structural designs of major structures. - Adequate cross drainage channels (longitudinal and median drains) shall be planned along DFC alignment at suitable locations for the smooth passage of surface run-off to prevent flooding.	ditto	ditto	As required	ditto

*No separate ESMP cost but in-built as part of Good Construction Practice.
Source: NKC

Table 11.1.3 Environmental and Social Management and Responsibilities during the Construction Phase

No.	Items	Management Activities	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
1	Tree cutting and green belt development	- Trees identified under the project shall be cut only after receiving clearance from the SFD. - If required, vegetation shall be removed from the construction areas before commencement of construction after obtaining necessary permissions. - The RoW shall be clearly marked by the hedgerow or others to avoid removing extra trees and vegetation. - All works shall be trained so as not to damage or disrupt flora. - Green belt shall be created by the plantation of a mix of native species of trees as well as shrub and grass/herbs	Contractor	DFCCIL assisted by PMC	SFED	Estimated at detailed design stage based on detail land plan (green belt development)
2	Noise and vibration	- Construction activities producing high noise levels shall be done at different time intervals to curtail the noise levels. - Avoid night time activities because sensitivity to noise increases during the night time hours in residential areas. - The equipment used shall have mufflers to reduce noise levels. All equipment shall be properly lubricated. - Periodical inspection and effective maintenance of vehicle and equipment shall be done. - The construction yards shall be surrounded by temporal barriers near the sensitive receptors.	ditto	ditto	SPCB	No incremental cost as normal construction activities (Good Construction Practice)
3	Air pollution	- The air pollution can be observed from the excavation, dismantling activities and emissions from the vehicles and equipment used for construction. - Sprinkling of water at the dust prone areas will reduce dust emissions. - Equipment and trucks shall be properly maintained at regular intervals. - Dumpers and trucks carrying the construction materials shall be spill-proof.	ditto	ditto	SPCB	Rs 100,000 per site for sprinkling. No incremental cost for other activities as normal construction activities.
4	Siltation	- The silt fencing shall be provided prior to commencement of earthwork and continue until the stabilization of the embankment slopes on the particular sub-section of the freight corridor is completed. - Construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby water bodies.	ditto	ditto	SPCB	No incremental cost as normal construction activities

No.	Items	Management Activities	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
5	Petroleum, oil and lubricants (POL)	- The necessary permissions shall be obtained for handling and use of the POL. - The used oil and lubricants shall be sold to authorized parties. - The storage places for POL shall have restricted entry. - Accidental spillage of POL shall be immediately cleared. - The trucks and dumpers shall not be washed at the nearby water bodies, instead of that they will be cleaned in the construction yard and the wastewater shall be collected in a settling tank before it can be e-used for some other purposes like gardening etc.	ditto	ditto	SPCB, Local municipality	ditto
6	Construction waste	- Construction waste shall be separated into inorganic waste (concrete etc.) and organic waste (bio-degradable) and hazardous material for proper treatment and disposal. - Construction waste shall be disposed of at the approved and controlled locations. - No disposal of the construction waste shall be permitted in the protected areas and watercourses.	ditto	ditto	ditto	ditto
7	Construction yard and camp	- The waste shall be treated and disposed of appropriately. - The wastewater from construction yard and camp shall be treated before being discharged into surface water bodies to avoid siltation. - Construction yard and camp shall be provided with adequate drainage to avoid accumulation of stagnant water. - Social disruption shall be avoided by good management practices. - Plan and carry out post construction site clean-up and rehabilitation.	ditto	ditto	SPCB, SFED	ditto
8	Slope protection	- Slope protection and minimization of soil erosion can be made by constructing breast walls, retaining walls, pilot bioengineering methods, dykes, sedimentation chambers, basins, fibre mats, mulches, grasses, slope, drains and other devices. After completion of embankment building, the embankment shall be turfed for slope stabilization. - Cascading drainage system shall be provided for controlling of the soil erosion from the embankments.	ditto	ditto	SFED	Estimated at detailed design stage based on detail land plan

No.	Items	Management Activities	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
9	Stock pile	- Stockpile shall be managed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, silt fencing will protect the edges of the pile. - Stockpiles shall not be surcharged or otherwise loaded and multiple handling shall be kept to a minimum to ensure that no compaction will occur. - The stockpiles shall be covered with sheets or vegetation. - Proper drainage systems shall be provided to prevent stagnation of water.	ditto	ditto	SPCB, SFED	No incremental cost as normal construction activities
10	Borrow area and quarry site	- The earth materials shall be borrowed from licensed borrow areas until the formal agreement is signed between landowner and the contractor. - The sand shall be procured from licensed sand mines. - The excavation of borrow shall be specified as per the guidelines. - Access to the borrow areas and quarry sites shall be strictly controlled. - All workers at the borrow areas and quarry sites shall be provided with personal protective equipment. - All the haul roads are watered regularly to reduce dust pollution.	ditto	ditto	SIMD, SPCB, SFED	ditto
11	Public health and safety risks	- Barriers (e.g. temporary fence) shall be installed at construction sites to deter pedestrian access to the freight corridor except at designated crossing points. - The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and the areas where heavy equipment is in operation. - Speed restrictions shall be imposed on project vehicles and equipment when traversing sensitive areas. - No material shall be so stacked or placed as to cause danger or inconvenience to any person or the public. - Malaria control and HIV/AIDS prevention education shall be implemented for local people.	ditto	ditto	State Health and Family Welfare Department (SHFWD), Local municipality	Rs.250,000/ time for the education program. No incremental cost for other activities as normal construction activities

No.	Items	Management Activities	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
12	Occupational Health and Safety (OHS)	- Monitoring and control of the working environment and planning of safety and health precautions shall be performed as prescribed by national laws and regulations. - Safety provisions shall be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work locations. - There should be proper demarcation of work areas with sign boards in local language showing the work areas. - All site workers shall be provided with personal protective equipment such as safety shoes, helmets, welders, eye shields, gloves and earplugs (for those working higher noise level area) - Workers shall not be allowed to work without the appropriate personal protective equipment. - Workers shall be provided with an adequate potable water supply. - Provision of distinguishing clothing or reflective devices or otherwise conspicuously visible material when there is regular exposure of workers to danger from moving vehicles. - HIV/AIDS awareness and prevention programme for the workers shall be implemented. - The following facilities shall be provided at the workers' camps: ➢ Washing facilities or showers ➢ Toilets/sanitation facilities with proper flushing provisions in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained to allow effective operation. ➢ Accommodation for taking meals and for shelters during interruption of work due to adverse weather conditions. ➢ First aid facilities under with qualified first aid personnel or a nurse at a readily accessible place for treatment of minor injuries and as a rest place for seriously sick or injured workers. - Adequate measures shall be taken for the control of malaria, typhoid, dengue, cholera etc. - Construction vehicle, equipment and machine shall be kept in good working order and shall be regularly inspected and properly maintained. All construction vehicles used in the construction yard shall have reverse horns. - Construction vehicle, equipment and machine shall be operated by workers who have received appropriate training in accordance with national laws and regulations.	ditto	ditto	SLED, SIMD, SHFWD	Rs.250,000/ time for the training program. No incremental cost for other activities as normal construction activities

No.	Items	Management Activities	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
		- The drivers and operators of construction vehicle, equipment and machinery shall be medically fit, trained and qualified and of at least the prescribed minimum age as required by the government rules and regulations. - Suitable scaffolds from the ground shall be provided for the work force, who are working at elevated heights, if a ladder is used proper foot holds and hand holds shall be provided on the ladder. - Persons operating electrical equipment shall be fully instructed as to any possible dangers associated with the equipment concerned. All electrical equipment shall be inspected before use to ensure that it is suitable for its purpose. - Only suitably protected electrical installations and equipment, including portable lamps, shall be used. - Suitable warnings shall be displayed at all places where contact with or proximity to electrical equipment can cause danger. - Water transport tanks, storage tanks and dispensing containers shall be designed, used, cleaned and disinfected at suitable intervals. - Water that is unfit to drink shall be conspicuously indicated by notices prohibiting workers from drinking it. - Secure storage areas shall be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers. - Smoking shall be strictly prohibited and no smoking notices be prominently displayed in all places containing combustible or flammable materials. - Oil rags, waste and clothes or other substances liable to spontaneous ignition shall be removed without delay to a safe place. - Fire-extinguishing equipment shall be provided at construction camps, asphalt plants, storage areas for combustible materials and other areas where fire hazards are found.				

Table 11.1.4 Environmental and Social Management and Responsibilities during the Operation Phase

No.	Items	Mitigation/Management Measures	Responsible Organization		Other Concerned Entitles	Estimated Costs of measures
			Planning and Implementation	Supervision		
1	Supervision of operational performance	- Monitoring of the operational performance of the various mitigation measures shall be carried out as a part of the operation. - The indicators selected for the operational performance monitoring shall include the survival rate of trees; utility of relocated facilities and other relocated structures; status of rehabilitation of borrow areas, condition of waste accumulation especially at the stations and depos etc.	SEMU	DFCCIL	-	Normal cost of operation
2	Noise control	- Noise barriers shall be designed and established at necessary locations such as settlement areas and near SRs which are adjacent to the alignment based on the results of monitoring of railway noise.	SEMU	DFCCIL	SPCB	Estimated based on the monitoring
3	Green belt management	- Maintenance of plantation in the developed green belt.	SEMU	DFCCIL	SFED	Normal cost of operation except for supplemental plantation etc.
4	Construction yard and camp management	- Post construction clean up to ensure no dangerous debris are left behind the years and camps	SEMU	DFCCIL	SPCB, SFED	Rs.150,000 per site (depending the site condition)
5	Borrow areas and quarry sites rehabilitation (post-closure management)	- All borrow areas are to be reclaimed properly with necessary drainage to a level that is acceptable level to the land owner. - Reclaimed borrow areas and quarries sites shall be landscaped and re-vegetated such as by growing native species.	Contractor/ SEMU	DFCCIL	SPCB, SIMD, SFED	Rs.300,000 per site for landscaping and re-vegetation (depending on the site condition). Reclamation cost is to be included in normal construction cost.
6	Disaster management	- Maintenance of cross drainage channels (longitudinal and median drains) shall be carried out.	SEMU	DFCCIL	-	Normal cost of operation

Source: NKC

(2) Organizations Responsible at Different Phases

Organizations relating to the environmental and social management of the DFC project are listed up as follows:

1) Planning and Construction Phases

- State Pollution Control Board (SPCB): At the time of construction for giving the necessary permissions for the construction yards and the equipments brought for the construction activity. SPCB will also play a major role at the time of hazardous material management.
- The State Forests and Environment Department (SFED): For cutting any forest trees or encroaching into the forest land requires the permission from SFED.
- The State Industries and Mines Department (SIMD): SIMD is responsible for giving all necessary permissions for the borrow areas and quarry sites.
- The State Agriculture and Co-operation Department (SACD): If the contractor uses surface water or river water, then necessary permission from SACD.
- The State Labor and Employment Department (SLED): The labour laws are to be strictly to be followed during the construction and at the time of operation.
- The State Health and Family Welfare Department (SHFWD) are considered during any exigencies.
- The disposal of waste requires proper permission from the local municipal authorities.

2) Operation Phase

The most important government agencies during the operation stage is the MoR, Local municipality, SFED and SPCB.

11.2 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

11.2.1 Introduction

An Environmental and Social Monitoring Plan (ESMoP) provides a basis for monitoring potentially adverse environmental impacts of the project during its execution. The information derived from environmental monitoring activities can be used to mitigate and reduce environmental impacts and enhance project benefits through adaptive management. The implementation of the EMoP is adopted in all project works. An ESMoP is important as it provides useful information and helps to:

- Assist in detecting the development of any unexpected environmental or social situation and thus provides opportunities for adopting appropriate control, management or mitigation measures.
- Defines the responsibilities of the project proponents, site engineers, contractors and environmental monitors and provides means of effectively communicating environmental issues among them.
- Defines the monitoring mechanism and identifies monitoring indicators, methods and parameters.
- Provides information which allows for the evaluation of the performance and effectiveness of mitigation measures proposed in the ESMP and enables managers to make improvements in management plan.
- Identifies training requirement at various levels.

11.2.2 Environmental and Social Monitoring Plan

An environmental and social monitoring plan normally involves two main types of activities as shown below:

Supervision Work

Observation of the construction/operation works to ensure mitigation actions will be conducted during routine site inspections. This work will be conducted as general operation working/maintenance progress including daily work. (See Table 11.2.1). Thus, No incremental costs are expected for this work.

Environmental and Social Impact/Mitigation Monitoring

The monitoring to be conducted to determine the actual and social impacts. (See Table 11.2.2)

Table 11.2.1 Environmental and Social Monitoring Plan –(ESMoP) Supervision Work

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
1	Social impact	Planning /Design phase	To ensure that the adverse impacts of land acquisition and resettlement are addressed and compensated	- Inventory of losses - Implementation of RRP - Public consultation	- Check notification and DFC payment record	Monthly	Project Management Consultant (PMC)	DFCCIL
		Construction	To ensure that the adverse impacts of construction activities are minimized and mitigated	- DFCCIL will employ an NGO to address resettlement and rehabilitation issues associated with the project.	- Check if the community has brought the problems to the notice	Monthly	PMC	DFCCIL
2	Social infrastructure	Planning /Design phase	To ensure that the recommendations given with the conditional approval by DFCCIL followed by PMC	- ROB and RUB have been designed. - Existing irrigation, protection measures have been identified.	- Check final design drawing and original plan	Before commencement of the construction activities	Contractor	DFCCIL assisted by PMC
3	Crops and vegetation	Planning /Design phase	To minimize the direct impacts on crop production and other vegetation	- Clearing of surface cover for construction and borrow areas, cutting trees and other important vegetation during construction should be minimized. - Follow procedures with regard to spoil dumping - Replacement of topsoil and restoration of vegetative cover	- Interviews with local residents will also help in this matter.	ditto	Contractor	DFCCIL assisted by PMC

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
4	Air Pollution	Construction	To minimize air pollution from the construction	- Watering on earthen surfaces especially in the settlement areas - All construction vehicles should be maintained in good condition to minimize emissions.	- Check watering as per the frequency given in the ESMP. - Proper implementation can be achieved by site inspection along with interviews with local residents.	Monthly/As necessary	Contractor	DFCCIL assisted by PMC
5	Noise and vibration	Planning /Design phase	To minimize the noise and vibration level resulting from freight corridor	- Establishing standards and regulations for noise levels for various equipment used at the site - Strict enforcement of regulations.	- Determination of critical sites and methods of mitigation during the construction period.	As necessary	Contractor	DFCCIL assisted by PMC
		Construction	To control noise and vibration levels from exceeding tolerable levels	- All road construction vehicles must have working mufflers and be maintained in good condition - Noise barriers should be established around the yard near residential area and sensitive receptor during the activities such as blasting and pile driving.	- Check that the Contractor is performing mitigation measures. - This can be achieved by interviewing the locals and site inspection.	Monthly/ As necessary	Contractor	DFCCIL assisted by PMC
		Operation	To minimize the noise and vibration levels resulting from rolling stock	- Maintenance of the rail, sound barrier as wall as well as equipment rolling stock	- Visit site and check the condition	Periodical	SEMU	DFCCIL

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
6	Water quality	Planning /Design phase	To control the impacts on the quality of surface and groundwater	- Maintain existing concentrations of chemicals sediments and water at specific locations. - Design appropriate mitigation measures	- Check final planning and approve if proposal suitable	Before commencement of the construction activities	Contractor	DFCCIL assisted by PMC
		Construction	At the bridge construction areas	- Avoiding chemical discharge and spills in soil and water at specific locations like bridge construction areas.	- Visit site and check drain provision/ functioning	Monthly	Contractor	DFCCIL assisted by PMC
7	Oil spills and hazardous materials	Construction	To avoid and minimize oils spills and spills of other hazardous wastes	- Establish standards for safe handling, storage and transport to avoid spills - Establish emergency response and containment/ clean up procedures	- Check the mitigation measures. - A fortnightly inspection is necessary until the completion of the project.	Monthly	Contractor	DFCCIL assisted by PMC
9	Construction Waste management	Construction	To minimize the impact from the disposal of construction waste	- Preparation and implementation of waste management plan based on estimated amounts of construction waste	Interviews with local residents will also give a proper assessment of the issue.	Monthly	Contractor	DFCCIL assisted by PMC
10	Land slide and soil erosion	Planning /Design phase	To minimize landslides resulting from excessive erosion of slopes and water ways with corresponding silting of the eroded soil.	- Maintaining proper vegetation cover and erosion protection - Constant surveillance as part of routine maintenance	Visit the site and check land plans and alignment	As necessary	Contractor	DFCCIL assisted by PMC

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
		Construction	Constructed embankments could be a source of silt if not protected from erosion by rain fall	- Work plan: excavate and embankment mainly in dry season	A site inspection along with the review of the design plans is necessary.	During construction and specially during rainy seasons	Contractor	DFCCIL assisted by PMC
11	Earthwork operation	Construction	To ensure that the earthworks are safe and do not have adverse environmental impacts	- Use appropriate designs and size of drainage structures in accordance with designs approved by the client, - Structural stabilization of drainage system - Hauling material to be carefully transported to designated dumping areas	- Ensure the contractor performs detailed design and instability checks - Check if erosion or instabilities were observed. - The conditions at the site can be observed by a site inspection along with review of the design plan.	ditto	Contractor	DFCCIL assisted by PMC
12	Traffic safety	Planning /Design phase	To avoid and minimize traffic accidents during construction	- Make traffic marking such as sign boards - Observe speed limits - Safe loading and covering of materials being transported - Planning of transport routes	Visit the site and check around traffic situation and construction plan	Before commencement of the construction activities	Contractor	DFCCIL assisted by PMC

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
		Construction	To avoid and minimize traffic accidents during construction	- Traffic sign boards for proper movement of construction vehicles, - limit speed of vehicles - Safe loading and covering of materials being transported - Planning of transport routes	Checking the traffic problems at the construction site.	Monthly	Contractor	DFCCIL assisted by PMC
13	Disturbance to flora	Construction	To minimize direct impacts on vegetation Prevent damage to vegetation outside RoW	- Prohibit vegetation cutting outside RoW - Record and check no cutting out side RoW	Visit the site and inspect RoW boundary and adjacent areas	Monthly	Contractor	DFCCIL assisted by PMC
14	Disturbance to fauna	Construction	To minimize direct impacts on fauna.	- No construction camps or quarries in wildlife habitat areas - No hunting, poaching and unnecessary habitat destruction - Training for staff working in wildlife areas (or at least briefings)	Visit the site and check the construction area	Monthly	Contractor	DFCCIL assisted by PMC
15	Plantation	Construction	Growth of planted trees	- The number and condition of planted trees	Visit the site and record the growth of plantation	Quarterly	Contractor	DFCCIL assisted by PMC
16	Construction labour force management	Planning /Design phase	To minimize impact on workers	- Establish minimum standards for construction camp layout and housing provision, provide sanitary facilities and insect control particularly as related to malaria and other vector borne diseases	Check construction camp layout and facility	Before commencement of the construction activities	Contractor	DFCCIL assisted by PMC

No.	Environment Component	Project Phase	Issue	Management Activities	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
		Construction	To minimize impact on workers during construction	- Conduct special briefing on site training on environmental requirements and safety for the workers. - Strictly instruct workers not to interfere in local affairs	- Check the Contractors are following the mitigation measures - Check with the communities and construction staff if any conflict has occurred, if yes find out reason. - This can be achieved by regular site inspections.	Weekly	Contractor	DFCCIL assisted by PMC
17	Construction camp management	Construction	To ensure that the operation of work camps does not adversely affect the surrounding environment and residential areas	- Identify sufficient locations for disposal sites and design disposal sites in the contract - The location shall be approved by the PMC	Visit the site and check the construction camp management activities	Monthly	Contractor	DFCCIL assisted by PMC

Source. NKC

Table 11.2.2 Environmental and Social Monitoring Plan – Impact and Mitigation Monitoring

No.	Environ-ment Component	Project Phase	Environmental and Social Monitoring Program				Institutional Responsibility		Estimated Cost
			Parameters	Methodology	Location	Duration /Frequency	Implementation	Supervision	
1	Noise and Vibration	Construction	Noise level in dB (A) and Vibration in dB	Noise and vibration levels from construction activities are measured with noise level and vibration level meters according to the noise (regulation and control) rule and/or international standards.	Next to identified sensitive receptors along the alignment basically near predicted points, major construction site in any settlement areas as well as the machinery operation areas.	Hourly records for 12 hours for minimum 3 days, 4 times a year (preferably in each season)	Contractor	DFCCIL assisted by PMC and SPCB inspecting	Rs. 50,000 per site per season
		Operation	ditto	Noise and vibration levels from rolling stocks are measured with noise level and vibration level meters according to international standards.	Next to identified sensitive receptors along the alignment basically near predicted points	First operation year: monthly From second year: Twice a year	SEMU	DFCCIL and SPCB inspecting	Rs. 50,000 per site per season
2	Air pollution	Construction	PM_{10}, $PM_{2.5}$, CO, SO_2, NO_X,	Analysis as specified in the National Ambient Air Quality Standard	At construction sites in sensitive areas along the alignment. Final decision shall be made in consultation with SPCB.	The frequency of monitoring will depend on the sensitivity of locations as well as extent of construction activities.	Contractor through MoEF approved laboratories	DFCCIL assisted by PMC and SPCB inspecting	Rs. 100,000 per site per season
3	Water quality	Construction	See Note	Sampling and analysis as per Standard Methods for Examination of Water and Wastewater	Surface water: at tree points of (upstream, center and downstream) at important rivers	Monthly	Contractor through MoEF approved laboratories	DFCCIL assisted by PMC and SPCB inspecting	Rs. 5,000 per river per time
					Ground water: identified wells near the construction yards and camps	Quarterly during construction/excavation periods			Rs. 5,000 per location per time

No.	Environ-ment Component	Project Phase	Environmental and Social Monitoring Program				Institutional Responsibility		Estimated Cost
			Parameters	Methodology	Location	Duration /Frequency	Implementation	Supervision	
					Drinking water and waste water: each construction camp	Weekly			Rs. 10,000 per sample per time
4	Soil erosion	Construction	Surface status of ground modification	Checking the status of soil erosion by the project progress report and site inspection.	Along the alignment	Rainy seasons	Contractor	DFCCIL assisted by PMC	No separate cost
5	Flora and Fauna	Construction	Flora species, Fauna species (mammal, reptile, bird) and biodiversity	Checking the status of flora and fauna by filed survey and available secondary data including interviews to experts and local people	Along the alignment (especially in the BAWS)	2 times a year (rainy and dray seasons)	Contractor	DFCCIL assisted by PMC and SFED inspecting	No separate cost
		Operation	ditto	ditto	ditto	ditto	SEMU	SFED	No separate cost
6	Borrow area and quarry site	Construction	Environmental impacts by borrow areas and quarry sites	Checking the status (environmental impacts) by the project reports and site inspection in line with the Borrow Area Management Plan.	In and around borrow areas and quarry sites	Depending on the site conditions and construction activities (preferably in each season)	Contractor	DFCCIL assisted by PMC and SPCB and SFED inspecting	No separate cost

Note: Water flow, Water Temperature, pH, EC, DO, BOD, COD, TDS, TSS, Oil and Grease, Heavy metals, Total Coliform and Feacal Coliform, etc.
Source. NKC

11.3 INSTITUTIONAL FRAMEWORK OF IMPLEMENTATION OF ESMP AND ESMOP

11.3.1 Institutional Framework

Organizational structure for implementation of ESMP and ESMoP is shown in Figure 11.3.1. The responsibility for implementation and supervision of the ESMP and ESMoP is vested with the Social and Environmental Management Unit (SEMU) of DFCCIL, respective CPM offices, Supervision Consultant, and Contractors.

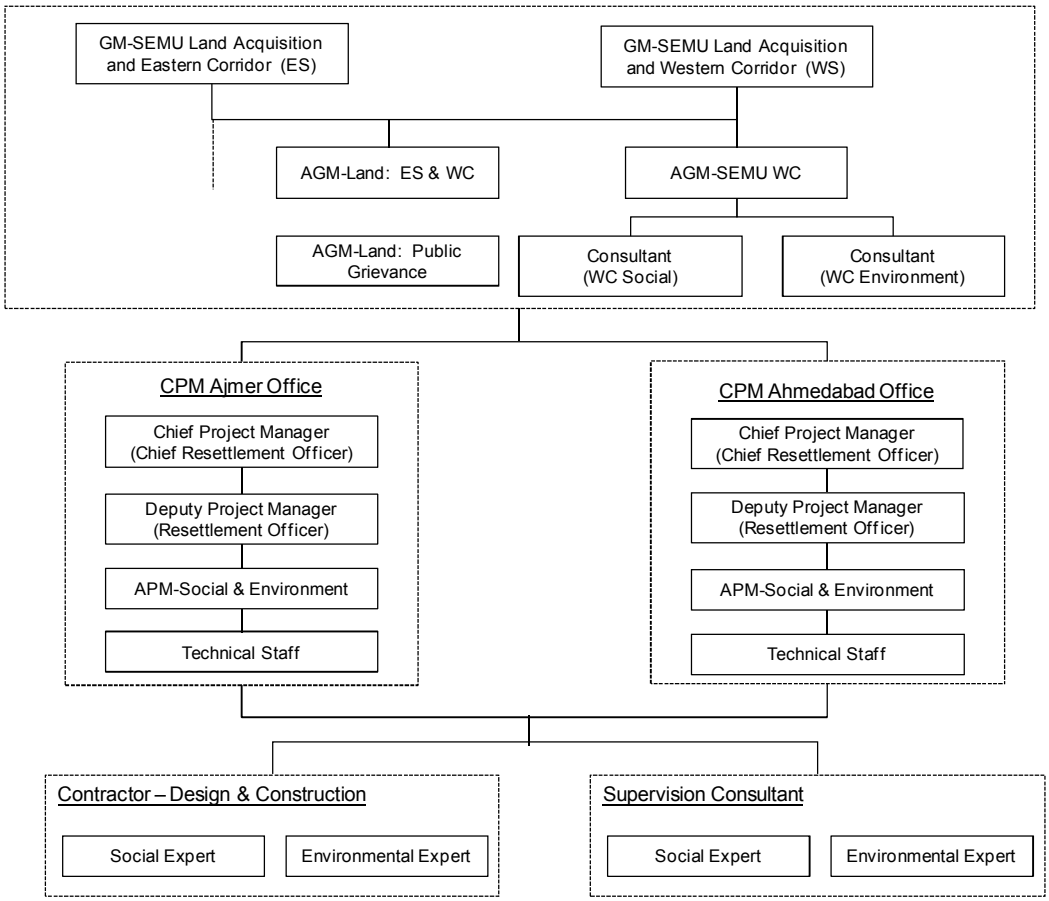


Figure 11.3.1 Organizational Structure for Implementation of ESMP and ESMoP

To ensure that the ESMP and ESMoP produce acceptable outputs, it is important that the following parties fulfill their key responsibilities allocated as follows.

(1) Social and Environmental Management Unit (SEMU):

The Social and Environmental Management Unit (SEMU) is the section of DFCCIL that is responsible for managing environmental and social matters relating to the project, and ensuring compliance with the environmental and social safeguard policies of the Government and lender(s), and relevant national laws.

According to an Office Order issued by DFCCIL in January 2011, SEMU is responsible for:

- All matters relating to environment, land acquisition, rehabilitation and resettlement with respect to the DFC project;
- Internal DFCCIL policy and guidelines on environmental and social issues;

- Internal and external coordination on environmental and social matters (including coordination with zonal railways, the National Planning Commission, the Prime Minister's Office and other projects);
- Responding to Parliamentary questions, public representations, court cases and Right To Information queries on environmental and social issues;
- Any other environmental and social matters or enquiries.

During the project implementation, SEMU will be responsible for the following:

- Procuring the environmental permits/clearances that the project proponent is required to obtain;
- Ensuring necessary budgetary provision for implementing the ESMP and ESMoP and RRP;
- Coordinating and monitoring progress of CPM offices in implementing the EMP and EMoP, the land acquisition process, and the provisions of the RRP;
- Routinely reporting to the Director (Project Planning) and the Director (Infrastructure) on the above in relation to the eastern and western corridors respectively;
- Planning and commissioning training for project staff and others involved in managing environmental and social aspects of the project; and
- Providing guidance to field offices in matters related to environment, social issues and RRP implementation.

Under the required organizational structure as shown in Figure 11.3.1, there are currently two SEMU General Managers: one responsible for the Eastern Corridor and land acquisition along both corridors; and one responsible for the Western Corridor. They are supported by one Assistant General Manager (AGM Land) and one Deputy General Manager (DGM Public Grievance). Assistant Project Manager (AGM) for SEMU WC is currently vacant. In addition, consultants for SEMU cover both Eastern and Western Corridors. Therefore, the project management consultants (PMCs) in charge of each corridor will be employed.

(2) Chief Project Manager (CPM) Offices

The CPM offices are responsible for dealing with the environmental and social issues of the project at the field level, and the main specific tasks in this regard are:

- Implementing the land acquisition and resettlement process and disbursing compensation to PAPs in conjunction with the Competent Authority as set out in the RRP;
- Managing local implementation of the ESMP and ESMoP for work conducted in the CPM area, including supervision of the Contractor to ensure mitigation is provided, and site observations of environmental practice and environmental and social impacts;
- Coordinating supervision and monitoring activity with the Engineer's Senior Environmental Officer/Manager and staff of construction Contractors to avoid duplication and ensure full ESMP and ESMoP implementation;
- Reporting on progress of the ESMP and ESMoP and LA/RRP to SEMU and responding to queries, data requests, etc;
- Managing the Grievance Redress Mechanism (GRM) and participating in site reviews and meetings to consider and resolve complaints.

Presently all CPMs and deputies are in place, together with one or more APMs. Some APMs have been designated to deal with environmental and social aspects (mainly involving land acquisition at present).

(3) Project Management Consultant (PMC)

The environmental and social experts of the Project Management Consultants (PMCs) are responsible for preparing the detail/up-dated Environmental and Social Management and Monitoring Plan (ESMMP) in the early stage of the Engineering Consultancy Service based on the ESMP and ESMoP in the ESIA Report, and carrying out monitoring on Contractor's compliance with the mitigation measures; and provide regular monitoring reports to DFCCIL in the stage of the construction supervision.

(4) Contractor

The key responsibilities of the Contractor are based on the ESMP and ESMoP and ensure the implementation of the environmental mitigation measures for the construction activities. Site-specific ESMP and ESMoP have to be prepared based on the ESMP and ESMoP in the ESIA Report. They should be reviewed and approved by DFCCIL together with SHE plan. The contractor is responsible for obtaining the necessary permits from the statutory organizations such as for quarry sites, borrow areas, construction yards and camps.

11.3.2 Grievance Redress Mechanism under ESMP

The main complaints associated with railway projects are normally related to the process of compulsory acquisition of land and property, and include the amounts of compensation offered, the way the process is conducted, and other issues. For this project these and other related matters will be dealt with through a Grievance Redress Mechanism (GRM) for Land Acquisition and Resettlement, which was established via the RRP. This involves consideration by Grievance Redress Committees at local/field and headquarters/ central level if necessary, with further recourse to the Competent Authority and an official government Arbitrator/Ombudsman if necessary.

Grievances/complaints on environmental matters are expected to be relatively few and more straightforward, so a simplified procedure is more appropriate in this case. Local concerns mainly arise as a result of inappropriate implementation of the ESMP and ESMoP, the main aim of which is the reduction of negative impacts to acceptable levels. These issues are best addressed through open dialogue and a responsive approach, with frank acknowledgement of errors where appropriate, followed by rapid remedial action. This will be the principal philosophy of the environmental GRM.

The CPM office will be the point of contact for any such grievances, and local communities will be informed of this at consultation meetings. Any complaints will firstly be assessed to determine whether they are genuine and reasonable, and where this is the case the CPM will meet to discuss the issue with the CPM and other relevant officers, and senior managers from the Contractor and Engineer when relevant. Affected sites will also be visited and inspected. The CPM will respond in writing to the complainant within 30 days of receipt, and will give the decision, with an explanation of the rationale, and proposed remedial action where appropriate.

If an acceptable solution cannot be agreed locally the matter will be referred to GM-SEMU, who will consult within DFCCIL as necessary and inform the complainant in writing, again within 30 days of receipt. He will take into account the views of the CPM

and the complainant, and any precedent set by responses to similar complaints in other CPM areas in either Eastern or Western Corridors. He may also seek expert advice from others as may be necessary. DFCCIL will consider the response from the CPM or GM-SEMU as final, though the complainant can seek further redress through the courts if he wishes.

Any complaints relating to deficient design or matters of policy will be referred immediately to GM-SEMU, who will consult with relevant DFCCIL officers and senior representatives of Contractors and the Supervision Consultant as appropriate, before responding to the complainant as above.

In all cases, remedial action will be implemented by the appropriate agency (Contractor, Supervision Consultant or DFCCIL - head office or CPM), and the agency and responsible officer will be identified in the written response. A timescale for completion will also be given. The affected party will be entitled to make a further complaint if he feels the action has not addressed the problem or has not been conducted adequately.

DFCCIL will keep a record of all complaints received and action taken to resolve, and will monitor the degree of satisfaction of complainants regarding the outcome.

11.3.3 Reporting Arrangement

Effective project management and supervision requires clear monitoring and reporting structures in order to ensure that the project is being implemented in accordance with the specifications of the ESMP. Monitoring and progress reporting enables managers to make timely decisions that address project bottle-necks and social and environmental issues or problems arising.

The monitoring and evaluation of management and mitigation measures envisaged are critical activities in implementation of the project. Monitoring involves periodic checking to ascertain whether activities are going according to plan. It provides necessary feedback for the project management to keep the program on schedule and delivering against the requisite standards and targets. The reporting system is intended to demonstrate accountability and as a means of ensuring that mitigation measures are implemented as per the ESMP. The main actors in the monitoring and reporting process are:

DFCCIL: The client holds overall responsibility for the implementation of the environmental mitigation measures and execution of the project and the sole responsibility would lie with the Project Management Consultant (PMC) recruited by the client in implementing the ESMP and other project activities. The PMC will interact with the client on a regular basis and inform the client about progress and issues arising.

Project Management Consultant (PMC): The PMC should be involved in implementation of the mitigation measures and in developing the required training material for the client. The various tasks to be performed during the project cycle are:

- Monitoring of the progress of the project on the implementation of the environmental provisions as per planned schedule.
- Supervising and implementing the mitigation measures.
- Assist the engineers at the site by providing appropriate mitigation measures.
- Documenting the experience in implementation of the environmental process.

The overall responsibility will be on the Environmental Section of the PMC. The environmental expert(s) in the Environmental Section will have the following responsibilities:

- Review the ESIA and RRP documents for the project.
- Liaise with the central and state Environmental Departments and with the Pollution Control Boards.
- Continuous interaction with local communities in implementing the ESMP.
- Preparation of the environmental compliance reports for the ministry and for the funding agency (JICA) at regular intervals.

Contractor: The PMC should have a role in advising the contractor on key environmental and social issues and mitigation measures and how they should be implemented. The contractor should adopt environmentally sound practices. The contractors should have sufficient environmental awareness necessary for the successful completion of the work entrusted. The activities envisaged are:

- Develop and detail an implementation plan for the environmental management, mitigation and monitoring specified in the ESMP and ESMoP
- Continuations interaction with the environmental specialist of PMC.
- For all activities there should be a formal approval from the Supervision Consultant.
- Liaise with the Government Agencies like the SPCB and other Government Departments.
- Carrying out environmental monitoring.

11.4 COST FOR IMPLEMENTATION OF ESMP AND ESMOP

Table 11.4.1 shows approximate indicative incremental cost for implementation of major items of the ESMP and ESMoP except for the costs for other items which are to be estimated at detail design stage. The detailed costs for all necessary activities will be estimated in preparation of the detail Environmental and Social Management and Monitoring Plan in the detail design stage.

Table 11.4.1 Indicative Incremental Cost for Implementation of Major Items of ESMP and ESMoP

Major Items	Quantity	Unit	Unit Cost (USD)	Total Cost (USD)
1. Mitigation				
Water (sprinkle) the roads in the settlement areas when dust seem to be arise	1	site/time	2,000	2,000
Programme for making workers and local people aware on safety and health including prevention of STI and STD including HIV/AIDS	1	time	5,000	5,000
Maintain borrow area by landscaping and re-vegetating after the operation	1	site	6,000	6,000
Maintain quarry site by landscaping and re-vegetating after operation	1	site	6,000	,000
Post construction clean-up to ensure no dangerous debris are left behind the camp site	1	site	3,000	3,000
2. Monitoring	See Table 11.2.2			

Note: Figures in the tale are provisional and vary depending on the site conditions and construction activities.
Source: NKC

CHAPTER 12 CONCLUSIONS AND RECOMMENDATIONS

12.1 MAJOR FINDINGS FROM THE ESIA STUDY

The Wamaj-Iqbalgarh section will pass through four districts of Gujarat, up-scaling faster freight movement connecting important trade zones and facilitating larger economic growth and development of people. The corridor has been planned in a sincere effort to minimize land acquisition of private agricultural lands, in compliance with the Policy Objectives of the Government of India. The project would reduce traffic congestion on road for transportation of goods and enhance employment opportunities.

The ESIA study reveals that various environmental and social aspects need to be considered for the project planning and implementation. As for pollution control, noise and vibration during both construction and operation phases are major concerns. The proper mitigation measures shall be arranged to mitigate the impacts by the project.

The alignment of the Wamaj - Iqbalgarh section passes through the arid/semi-arid biogeographic zone of central and northern Gujarat. There is no recorded forest along the alignment and impacts on the natural environment in the section as a whole are not greatly significant. A short section of the alignment however run through the western tip of the BAWS. Special attention shall be paid on this section including ecosystem connectivity between the BAWS and the JSBS.

The PAPs were mainly concerned with the compensation and the job opportunity related to the project because some of the PAPs may lose their agricultural land, residential areas and job. Although these aspects have been discussed in the ESIA study, the ESIA study will be supplemented with the RRP report on social aspects related to the land acquisition for the project.

Major findings of the ESIA study are summarized in Table 12.1.1.

Table 12.1.1 Major Findings from the ESIA Study

Item	Issue	Findings	Responsible organization	Remarks
Pollution Control				
Generation of noise and vibration	Major impact near settlement areas and SRs	• Construction activities produce some extent of noise and vibration. • The contractor should give an awareness campaign for the locals about the likely impacts. • Suitable mitigation measures to be implemented at the time of operation together with monitoring.	• Contractor under PMC • DFCCIL	• Mitigation measures to be implemented at the time heavy machines usage especially compaction and blasting activities. • Necessary precaution measures to be implemented at the site. • Mitigation measures to be considered based on the monitoring after the start of operation.

Item	Issue	Findings	Responsible organization	Remarks
Increase of air pollution	Minor impact during construction phase	• Since the construction works would emit some amounts of air pollutants, it requires a regular monitoring and sprinkling at the dust prone areas.	• Contractor under PMC • DFCCIL	• Mitigation measures to be implemented as and when it is required.
Increase of water pollution	Minor impact during construction phase	• The construction yards and the labour camps are the worst offender, unless some proactive measures are taken • The best way of handling is to provide soakage pits and settling tanks. The waste water to be regularly monitored.	• Contractor under PMC • DFCCIL	A regular water quality monitoring shall be conducted.
Waste generation	Minor impact during construction phase	• The construction works would produce some amount solid waste • Proper handling of solid waste should be arranged	• Contractor under PMC • DFCCIL	-
Natural Environment				
Disturbance of flora, fauna, and biodiversity	Alignment passes through section of BAWS – potential habitat loss, wildlife disturbance etc. Potential weakening of ecological linkages between BAWS and JSBS	• Habitat in affected area is significantly degraded and unexceptional but wildlife species move through the area • Temporary impacts on fauna and flora during construction phase (habitat loss and wildlife disturbance) • Small cumulative additional impact in the long term from DFC in the BAWS in terms of wildlife movement • Potential for increased wildlife accidents	• State Forests and Environment Department • State Wildlife Board • Divisional Forest Office (Palanpur)	• Construction phase impacts are mainly temporary, not hugely significant and can be greatly minimised by environmentally sensitive construction practices and mitigation measures • Project can have a positive impact by regenerating natural habitats and strengthening ecological corridors • Wildlife accidents can be mitigated by creating safe crossing places (culverts and underpasses)

Item	Issue	Findings	Responsible organization	Remarks
Removal of trees along the alignment	Some trees will be removed for construction	• Relatively low number of trees to be removed • The alignment does not pass through any recorded forest areas (mainly agricultural land) • The alignment is within RoW of existing tracks for most of the section • Existing RoW has a planted tree • Some areas of existing planted hedgerow provide important habitat for wildlife adapted to living in agricultural areas	• State Forests and Environment Department • Social Forestry Department • Divisional Forest Offices	• The tree cutting should be minimised especially avoiding the removal of the existing hedgerow where possible. • Since the alignment falls in the existing RoW, removal of trees only on one side of the existing tracks • Compensatory replanting of native tree species.
Increase of soil erosion	DFC construction may cause slope destabilisation and increased soil erosion	• Soils are of a poor fine loamy – sandy nature and potentially vulnerable to erosion • Majority of the alignment is on relatively flat plain area (therefore limited impact on slopes) • Overall impact on soils likely to be insignificant and problem is not exceptional for this section	• Contractor under PMC	• Standard soil protection and slope stabilisation practices to be adopted • Greater care and attention to be paid in hilly parts of Banaskantha and on steep valley sides • Borrow Area Management Plan should be prepared
Increase of vulnerability to disasters	DFC construction activities may trigger flash flooding and landslides	• No major cutting or tunnelling envisaged in the section therefore impact in tems of earthquakes is negligible • Alignment is not in highly elevated area with steep topography therefore unlikely to trigger major landslides or flooding • May be some small localised flooding from embankments	• DFCCIL • Contractor PMC	• Overall not a significant issue for the section and DFC construction highly unlikely to contribute to increased vulnerability to disasters in the section • Standard soil protection and slope stabilisation practices observed to prevent small scale or localised landslides and flooding
Contribution to climate change and global warming	The DFC project may have a positive effect in terms of global warming	• DFC project overall will have a net positive effect in terms of global warming by reducing levels of road transport over the long term	• DFCCIL	• Compensatory tree planting could also further serve to offset emissions and other negative impacts from DFC construction and freight rail transport

Item	Issue	Findings	Responsible organization	Remarks
Social Environment				
Impact by land acquisition	Compensation, and livelihood recovery for PAPs	• Different categories of PAPs have their own issue of concern.	• DFCCIL • District administration	• To be discussed in RRP • Give proper value for the lost property. • Continuous consultations and communication are required. • Establishment of grievance mechanism
	Loss of agricultural land and properties	• By land acquisition, some portion of agricultural land will be bifurcated and may not be of any use for the PAP. • Small land holding PAPs with no other source of income need support on livelihood recovery.	• ditto	• Compensation to be provided for damaged land as well, if in case it is not being acquired. • To be discussed in RRP
Impacts on socially vulnerable group	Discussion in RRP.	• Elderly people, unmarried girls, and widow may have serious issue.	• ditto	Awareness and compensation should be given to the vulnerable persons.
Impacts on historical and cultural heritage (religious places)	Religious structures are coming in RoW, and those coming near alignment would have impact due to vibration and noise.	• The religious places should be avoided or relocated after considering the public opinion.	• DFCCIL • Contractor under PMC	It is being a sensitive issue and it requires a careful handling. Local communities should be taken into consideration while handling this religious matter.
Increase of risk of hazardous	Increase of risk for infectious diseases	• A lot of workers will come to the project site.	• ditto	Awareness program should be conducted to the labour
Increase of risk of accident	Increase of risk for accident during construction	• Heavy machine operation and traffic movement during construction	• ditto	Safety measures will be taken.

Source: NKC

12.2 CONCLUSION AND RECOMMENDATION

12.2.1 Pollution Control

The ESIA study revealed that since noise and vibration problems would be predicted in construction as well as in operation stages, preventive measures should be taken so that impacts can be reduced. As some residential areas and sensitive receptors are falling near

the corridor and would have impacts by noise and vibration, preventive measures should be taken in such areas such as setting soundproof walls. The necessary engineering design should be worked out and implemented during the project

The ESIA study also showed that air quality would not be disturbed along the corridor in operation of the DFC project as the freight train will be electrified. The air quality may be disturbed even though it is a temporary impact during the construction period due to the excavation and movement of dumpers. Implementation of regular monitoring by the respective State Pollution Control Boards would help in plug in the air pollutants to some extent which is caused by the industrialization.

The water quality may not receive any significant adverse impacts due to the proposed project. In construction phase, preventive actions are required to avoid even short term impacts. There will be a considerable increase in the silt, oil and grease content in the river water. The impacts caused during the construction stage are short lived and by implementing suitable mitigation measures would reduce the impacts to a great extent.

The solid waste should be disposed at the designated locations so that leachate and runoff can be prevented and it should not pass through the natural drainage system. The quarry and borrow areas should be reclaimed after use and the excavated areas should be back filled regularly. Hazardous waste generated should be suitably disposed off as per the regulations.

12.2.2 Natural Environment

A short section of the alignment does run through the western tip of the Balaram Ambaji Wildlife Sanctuary and also crosses the Balaram River and potentially threatens to further weaken ecosystem connectivity between the BAWS and the Jessore Sloth Bear Sanctuary. However in this section the alignment follows the existing railway track and therefore there is only a small additional or cumulative negative environmental impact (as compared to a new railway alignment through a forested area). Environmental impacts are also minimized by the fact that the alignment falls within the existing railway RoW, meaning there will be no acquisition of protected area (forest) land and limited habitat disturbance or removal.

Vegetation in this section is generally significantly degraded and unexceptional. However there is sufficient evidence to demonstrate that there is movement of flagship threatened fauna species in the area and across the alignment. The main longer term impact is that weakening of the ecological continuity between the two protected areas could be exacerbated by further reducing wildlife movement, especially along the Balaram River course which is recognized as the main wildlife corridor. The project has the potential however to have a positive impact in this area by compensating for further edge effects to the wildlife sanctuary through natural habitat restoration and ecological corridor strengthening mitigation measures. Safe movement of wildlife in the area is also to be facilitated by the strategic positioning of culverts and underpasses along the alignment and the development of natural pathways to guide wildlife to these safe crossing locations.

Construction works in the wildlife sanctuary are likely to take place over a relatively prolonged period of time due to the significant engineering challenge of constructing a bridge over the Balaram River. There will be some temporary and generally short term impacts in terms of habitat loss and wildlife disturbance along the alignment and in the immediate vicinity during the construction phase. However with close cooperation

between contractors and the local DFO, adherence to environmentally-sensitive construction practices and by following the proposed mitigation measures it is believed that such impacts may be avoided, minimized or compensated for to a considerable extent, and without meaningful long term consequences.

There will inevitably be some removal of trees along the length of the entire section. However the number of trees to be removed is relatively low because more than 90% of the alignment passes through agricultural land. Much of the alignment also follows existing railway RoW which has been planted with a greenbelt (resembling a tree line or mature hedgerow) on both sides of the tracks. Since the alignment will be on one side of the existing tracks, there is no need for removal of the greenbelt in the RoW on the other side of the existing track. The impact of tree removal will also be mitigated for through compensatory planting of native or indigenous tree species (and groundcover) either along the alignment to create or re-establish the greenbelt (vegetative barrier) or as part of efforts to restore natural habitats and ecological linkages in the BAWS - JSBS landscape.

It was noted during the tree census work that in certain sections of the alignment where it follows existing tracks with a mature greenbelt in remote agricultural areas, the RoW provides good habitat for a wide range of fauna species. Thus efforts should be made to reduce impacts on fauna even in these non-forest areas. This would include the provision of culverts and underpasses at regular intervals in sections where a high concentration of wildlife was observed.

With regard to soils, the proposed alignment mainly passes through relatively flat agricultural plains and therefore for most of the alignment impacts on soils are not perceived to be significant. Soils are however of a fine loamy/sandy nature and of a deteriorating quality in the northern part of the section in Banaskantha District. Due attention and care should be paid on measures to minimize vegetation cover and soil loss, reduce soil erosion through the implementation of standard good practices relating to conservation of top soils, slope stabilization, site drainage and by restoring vegetative cover as quickly as possible. Particular caution is also urged for those areas where the alignment crosses rivers and steep-sided valleys. A Borrow Area Management Plan has also been proposed to include specific mitigation measures during the construction phase from quarrying and borrowing of soils including mandatory rehabilitation of borrow pits.

In terms of disaster risks, although Gujarat is vulnerable to earthquakes, the construction of the DFC project will not be a significant contributor to any major disaster resulting from an earthquake. The majority of the proposed alignment is along relatively flat ground of the Central Gujarat plain and along the existing railway RoW and therefore major cuttings are not envisaged in the section. Greater care and attention should be paid in the northern Banaskantha area where the land begins to rise slightly into undulating hills, however even here no major cuttings and no tunnels are foreseen and impacts from the DFC on seismic activity will almost certainly be negligible.

Any large scale infrastructure construction project has some potential for impacts on flash flooding and landslides, and due to the aridity of the region and the fact that run-off can occur very quickly this is an identified hazard in Gujarat. However assuming that slope stabilization and other soil erosion mitigation measures are implemented there is no reason to assume that the DFC project will have a significant impact on flash flooding or landslides, particularly as most of the section is along a flat valley plain area.

The DFC project overall is expected to have a net positive impact on climate change and global warming by substantially reducing CO^2 and other harmful emissions associated

with road transport of goods. Afforestation and reforestation also implemented by the project as a compensatory mitigation measure will also serve to ensure the project has a net positive impact in terms of reducing global warming.

12.2.3 Social Environment

Since the proposed alignment between the Wamaj - Iqbalgarh section is the parallel section in Gujarat state which is one of the industrial and commercial states and well developed in addition to agricultural land, the adequate compensation shall be secured. The gap between DFCCIL's proposed land compensation and the actual market value shall be examined by the DFCCIL after completing the market value survey which each CPM offices of the Western Corridor is currently conducting. Moreover the corridor has provision of ROBs and RUBs so that the local conveyance is less interrupted. Villagers are also concerned on access to water during construction and operation. The farmers are losing some of their basic facilities like the bore wells which comes directly under the RoW, these needs to be managed so that drinking water and irrigation problem does not arise.

Additionally, affected villagers expect that the construction of the project would generate temporary employment to the local population. Since the specific instruction from MoR regarding the job provision to the families affected by a railway project is requested, it needs to be followed up so that affected villagers request can be fulfilled. The implementation of the suggestions given by the local peoples during the public consultation meetings and the recommendation given in the ESIA report should be followed up while executing the project with a regular monitoring of the of the progress by the supervision consultant and DFCCIL.

APPENDICES

Appendix 2: List of Project –Affected Villages

Appendix 5: List of Sensitive Receptors

Appendix 6a: Noise Survey

Appendix 6b: Vibration Survey

Appendix 6c: Water Quality Survey

Appendix 7a: List of Reviewed Documents

Appendix 7b: Records of Experts Interview

Appendix 7c: List of Species Recorded During the Field Survey at Balaram-Ambaji Wildlife Sanctuary (BAWS)

Appendix 7d: List of Tree Species Recorded in Tree Census

Appendix 9a: Material Used for PCMs for Environment Scoping

Appendix 9b: Results of PCM for Environmental Scoping

Appendix 9c: Materials Used for PCMs for Draft ESIA and RRP

Appendix 9d: Results of PCMs for Draft ESIA and RRP

Appendix 10a: Summary of Draft ESIA (English and Gujarati)

Appendix 10b: Materials Used for Information Dissemination of Draft ESIA

Appendix 10c: Distribution List of Draft ESIA Report

Appendix-2
List of Project-Affected Villages

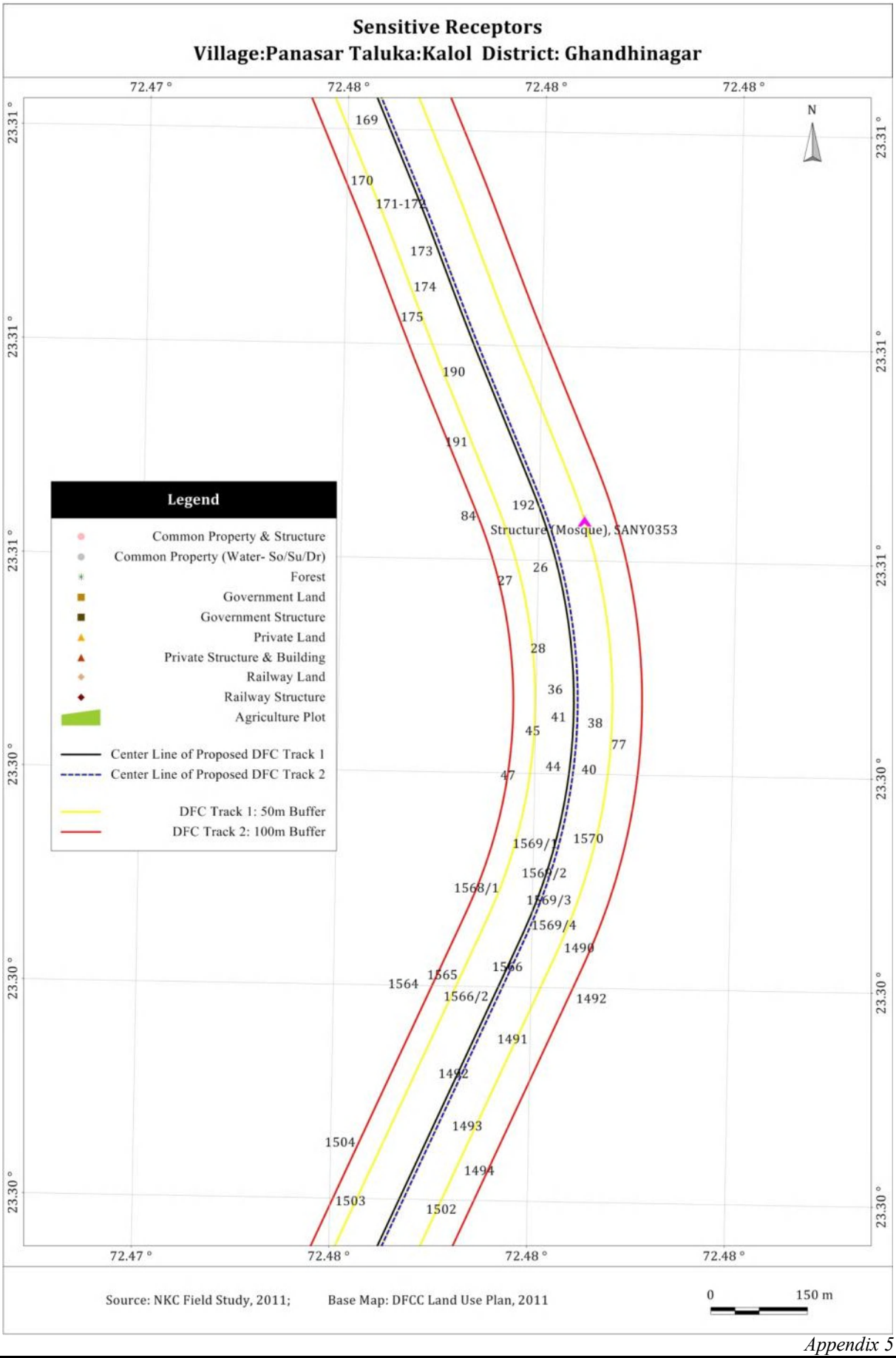
S. No.	CPM	Taluk / Tahsil	Name of Village	Date of 20A Notification	Date of 20E* Notification
1.	**Gandhinagar District**				
1	Ahmedabad	Kalol	Vansjara (K)	31.07.08	05.02.10
2			Ramnagar	12.07.11	04.04.12
3			Piyaj	12.07.11	04.04.12
4			Borisana	12.07.11	04.04.12
5			Kalol	12.07.11	04.04.12
6			Pratapura	12.07.11	04.04.12
7			Chhatral	12.07.11	04.04.12
8			Ola	12.07.11	04.04.12
9			Isand	12.07.11	04.04.12
10			Vadavswami	12.07.11	04.04.12
11			Pansar	12.07.11	04.04.12
Sub Total			**11**		
2.	**Mehsana District**				
1	Ahmedabad	Kadi	Julasan	19.10.11	-
2			Ghumasan	25.07.11	-
3			Dangarava	19.10.11	-
4			Anadpura	25.07.11	24.07.12
5			Tankiya	25.07.11	24.07.12
6			Kaiyal	19.10.11	20.07.12
7			Wamaj	25.07.11	24.07.12
8		Mehsana	Mevad	25.07.11	24.07.12
9			Navi Sedhavi	19.10.11	20.07.12
10			Jornang	25.07.11	24.07.12
11			Ambliyasan	25.07.11	24.07.12
12			Chaluva	19.10.11	24.07.12
13			Dholasan	25.07.11	24.07.12
14			Geeratpur	25.07.11	24.07.12
15			Ditasan	25.07.11	24.07.12
16			Jagudan	19.10.11	-
17			Hebova	25.07.11	24.07.12
18			Punasan	25.07.11	24.07.12
19			Shobhasan	19.10.11	-
20			Kukas	25.07.11	24.07.12
21			Hedua Hanumant	25.07.11	24.07.12
22			Mehsana	19.10.11	-
23			Ramosana	25.07.11	24.07.12
24			Taleti	19.10.11	20.07.12
25			Nani Daue	19.10.11	-
26			Palodara	Govt.land	-
27			Moti Dau	25.07.11	24.07.12
28		Visnagar	Bhandu	19.0711	20.07.12
29			Jethal Vasna	25.07.11	24.07.12
30		Unjha	Ithor	19.10.11	20.07.12
31			Unjha	19.10.11	-
32			Maktupur	19.10.11	24.07.12
33			Kamali	19.10.11	24.07.12
Sub Total			**33**		

S. No.	CPM	Taluk / Tahsil	Name of Village	Date of 20A Notification	Date of 20E* Notification
3. Patan District					
1	Ahmedabad	Sidpur	Khali	12.07.11	22.02.12
2			Lalpur	12.07.11	22.02.12
3			Sidpur	12.07.11	22.02.12
4			Sujjanpur	12.07.11	22.02.12
Sub Total			**4**		
4. Banaskantha District					
1	Ahmedabad	Vadgam	Dharewada	12.07.11	30.03.12
2			Manpura	12.07.11	30.03.12
3			Pasvadal	12.07.11	30.03.12
4			Kotai	12.07.11	30.03.12
5			Chhapi	12.07.11	30.03.12
6			Majadar	12.07.11	30.03.12
7			Malosana	12.07.11	30.03.12
8		Palanpur	Jaselani	12.07.11	30.03.12
9			Sedarsana	19.10.11	-
10			Jagana	19.10.11	-
11			Palanpur	19.10.11	-
12	Ahmedabad/Ajmer		Sadarpur	12.07.11, 11.0811	- 30.03.12
13	Ajmer		Karjoda	11.08.11	22.02.12
14			Surajpura	11.08.11	22.02.12
15			Hebatpur	11.08.11	22.02.12
16			Chitrasani	11.08.11	22.02.12
17			Jaspuriya	11.08.11	22.02.12
18			Rajpuriya #	Not Required	Not Required
19			Jethi	11.08.11	22.02.12
20			Iqbalgarh	11.08.11	22.02.12
Sub Total			**20**		
Total No. of Villages in DFC Phase-1 (Western Corridor) : Wamaj - Iqbalgarh			**68**		

Note : 1. * As of 31 August 2012.
2. # Rajpuriya was initially included as one of the villages affected by land acquisition. However, it was later identified and clarified by CPM Ajmer that Rajpuriya is not affected by land acquisition in the Joint Measurement Survey (JMS).

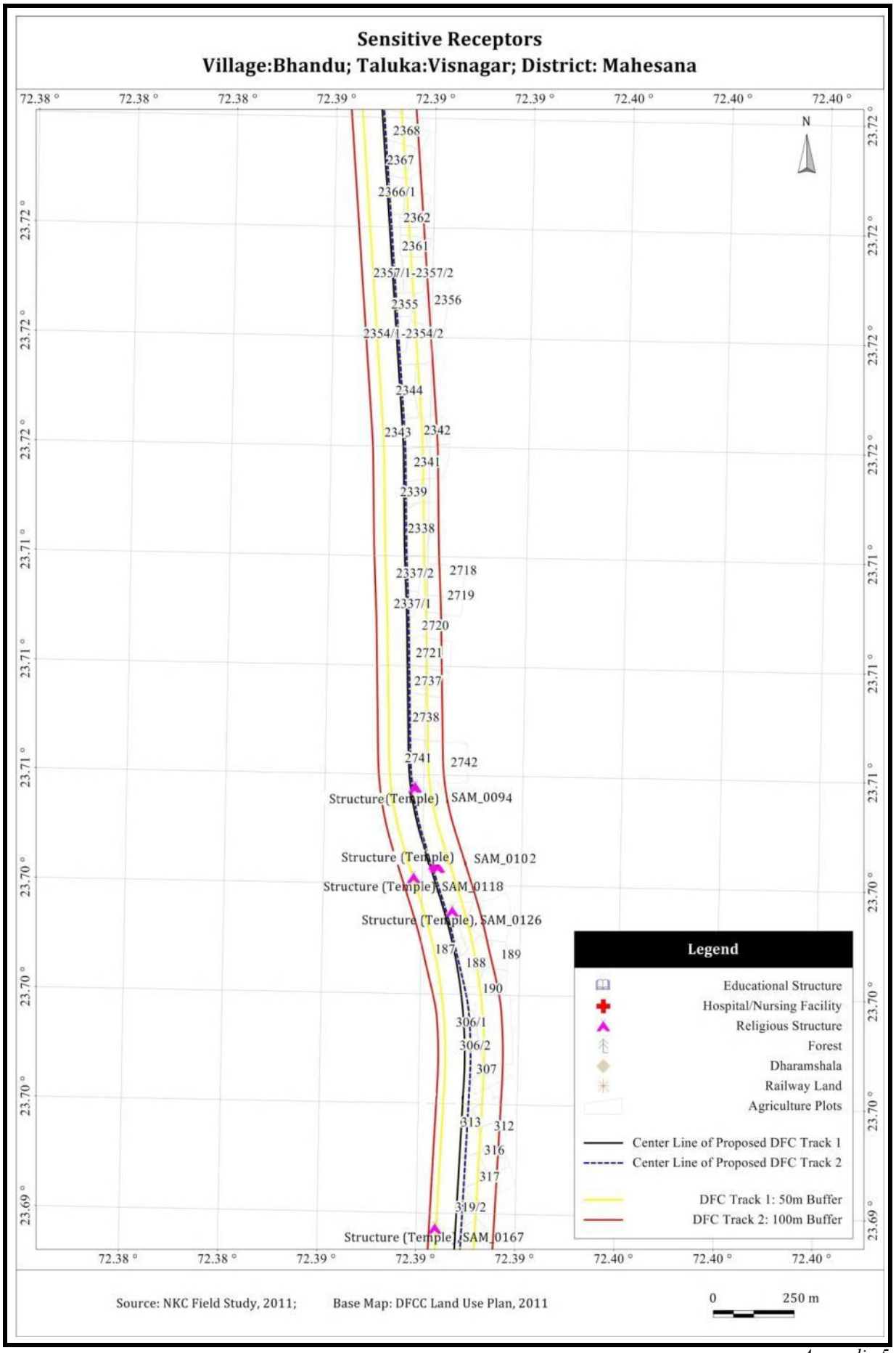
Source : 20A & 20E Notification

Appendix-5 List of Sensitive Receptors



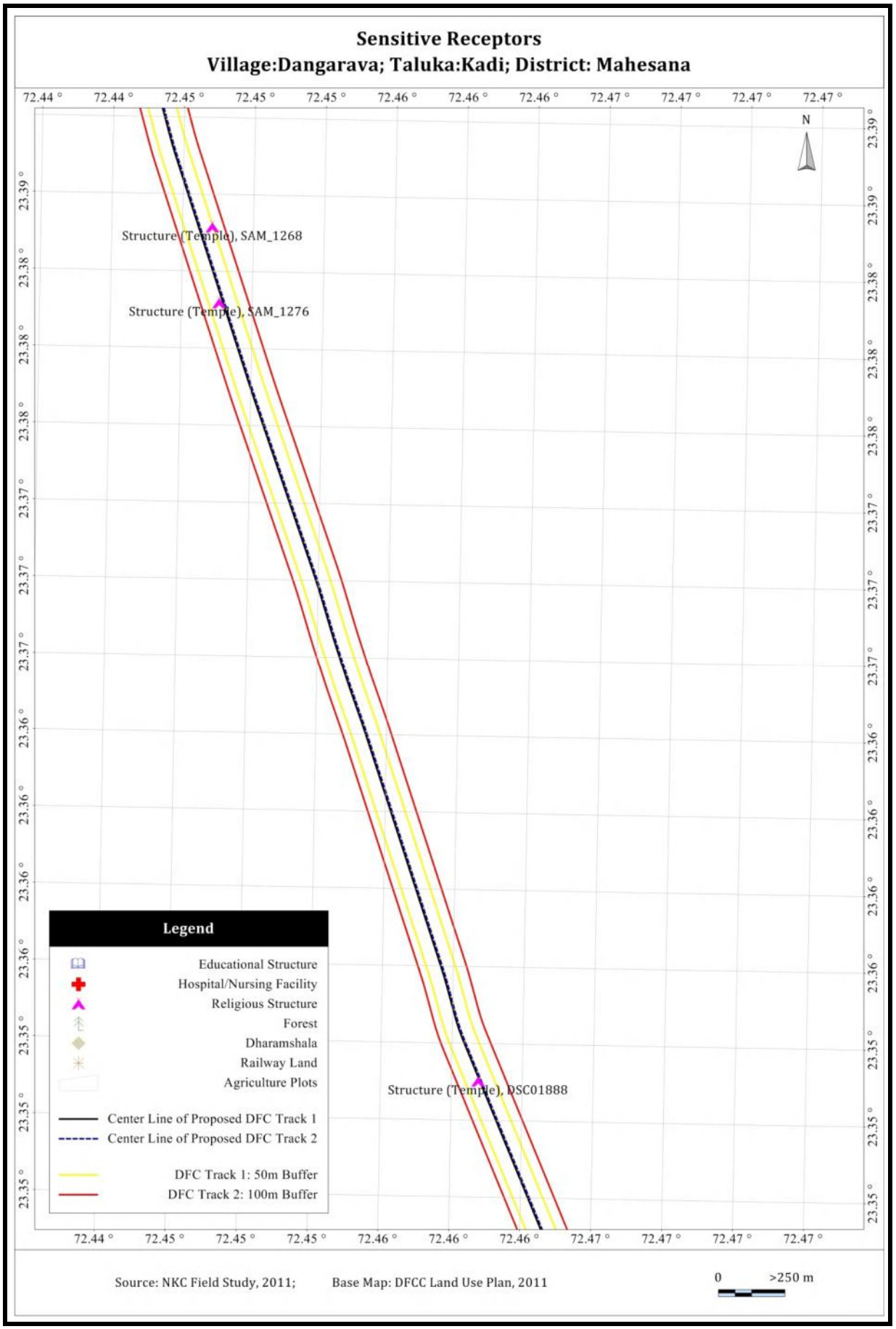
Appendix 5

Village: Pansar; Taluka: Kalol(G); District: Gandhinagar									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SANY0353	38	12.18	14.01	23.30756	72.48069	Mosque	<50 Mtr	100-150 Sqm	Campus area by land user

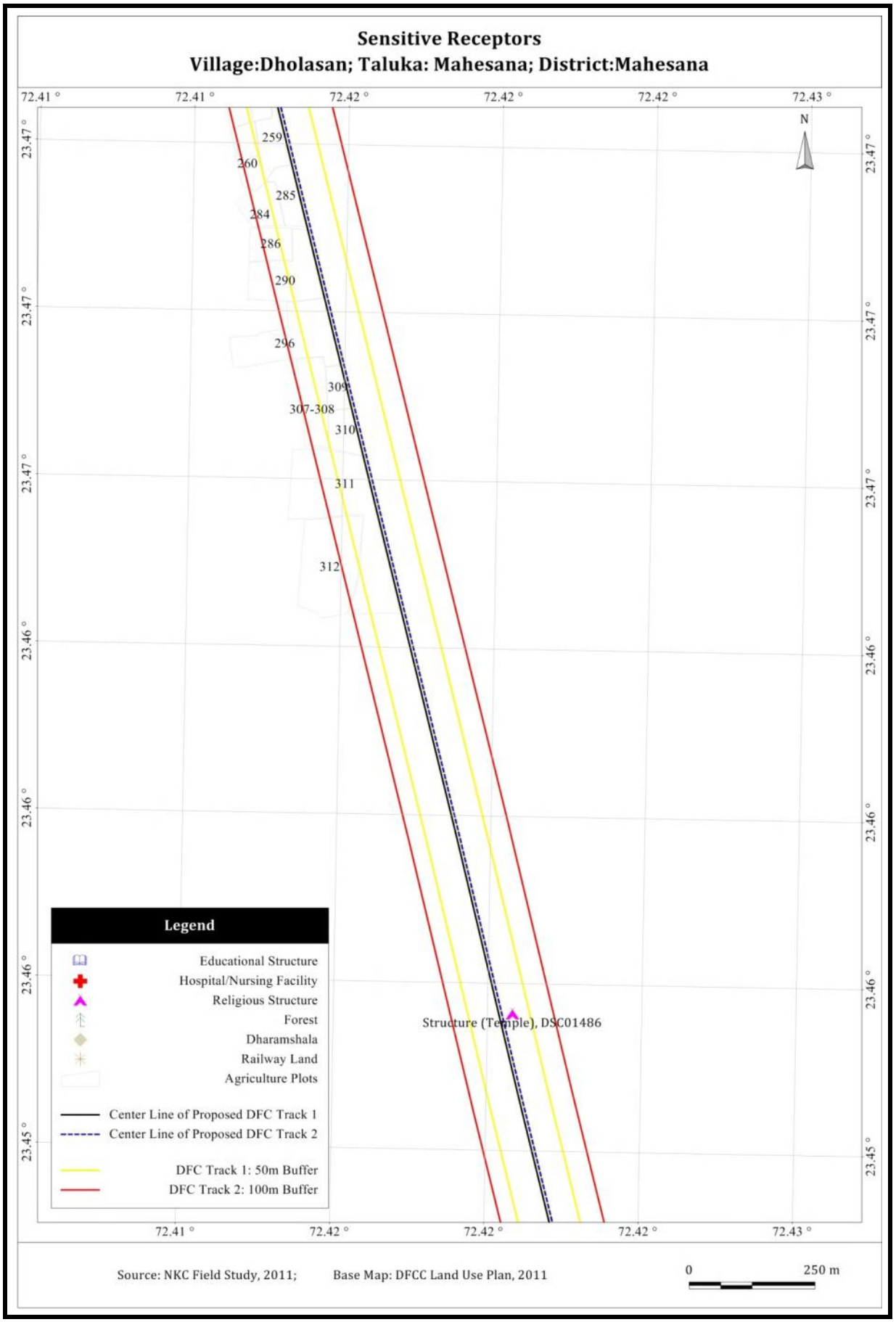

Sensitive Receptors
Village:Bhandu; Taluka:Visnagar; District: Mahesana
N
2368
2367
2366/1
2362
2361
2357/1-2357/2
2355
2356
2354/1-2354/2
2344
2343
2342
2341
2339
2338
2337/2
2718
2719
2337/1
2720
2721
2737
2738
2741
2742
Structure (Temple) SAM_0094
Structure (Temple) SAM_0102
Structure (Temple) SAM_0118
Structure (Temple), SAM_0126
187
188
189
190
306/1
306/2
307
313
312
316
317
319/2
Structure (Temple) SAM_0167
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Appendix 5

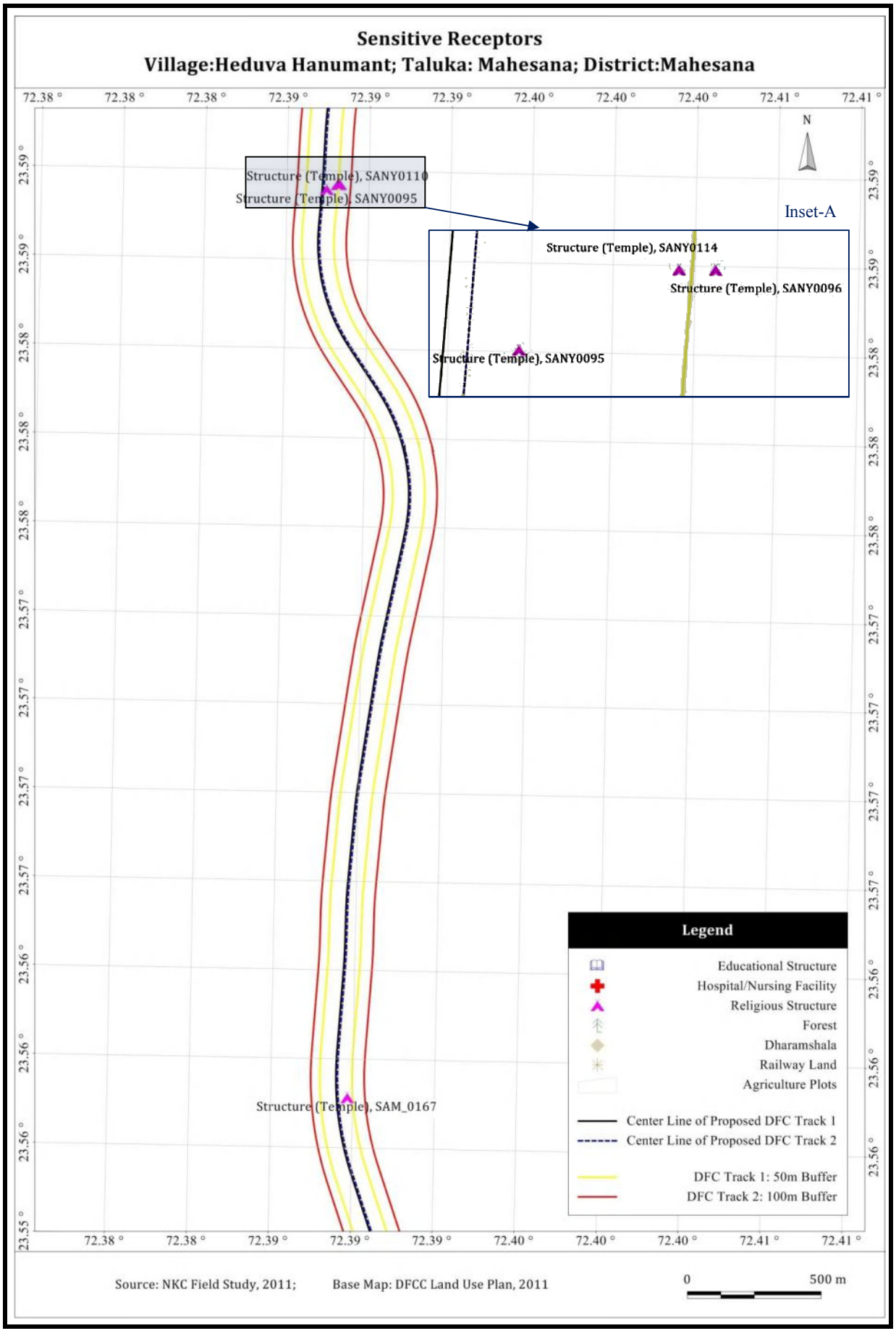
Village: Bhandu; Taluka: Visnagar; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_0094	192	58.46	61.94	23.70566	72.38974	Temple	<50 Mtr	<10 Sqm	Open Land
SAM_0102	198	58.46	61.94	23.70354	72.39037	Shiv Temple	<50 Mtr	50-100 Sqm	
SAM_0118	212	58.46	61.94	23.70317	72.38974	Verahi Temple	<50 Mtr	50-100 Sqm	
SAM_0126	217	58.46	61.94	23.70227	72.39092	Temple	<50 Mtr	<10 Sqm	Open Land
SAM_0167	248	58.46	61.94	23.69357	72.39057	Temple	50-100 Mtr	<10 Sqm	Open Land


Sensitive Receptors
Village:Dangarava; Taluka:Kadi; District: Mahesana
72.44 °
72.45 °
72.46 °
72.47 °
23.39 °
23.38 °
23.37 °
23.36 °
23.35 °
N
Structure (Temple), SAM_1268
Structure (Temple), SAM_1276
Structure (Temple), DSC01888
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
>250 m

Village: Dangarva; Taluka: Kadi; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01888	67	19.54	22.78	23.35051	72.46014	Temple	<50M Mtr	<10 Sqm	Open Land
SAM_1268	411	19.54	22.78	23.38076	72.44861	Temple	<50M Mtr	<10 Sqm	Open Land
SAM_1276	417	19.54	22.78	23.38371	72.44826	Temple	<50M Mtr	<50 Sqm	Open Land


Sensitive Receptors
Village:Dholasan; Taluka: Mahesana; District:Mahesana
72.41 °
72.42 °
72.43 °
23.47 °
23.46 °
23.45 °
N
259
260
285
284
286
290
296
309
307-308
310
311
312
Structure (Temple), DSC01486
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Dholasan; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance From Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01486	164	31.86	34.57	23.45645	72.42049	Temple	<50M Mtr	50-100 Sqm	Open Land


Sensitive Receptors
Village:Heduva Hanumant; Taluka: Mahesana; District:Mahesana
N
Structure (Temple), SANY0110
Structure (Temple), SANY0095
Inset-A
Structure (Temple), SANY0114
Structure (Temple), SANY0096
Structure (Temple), SANY0095
Structure (Temple), SAM_0167
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
500 m

Appendix 5

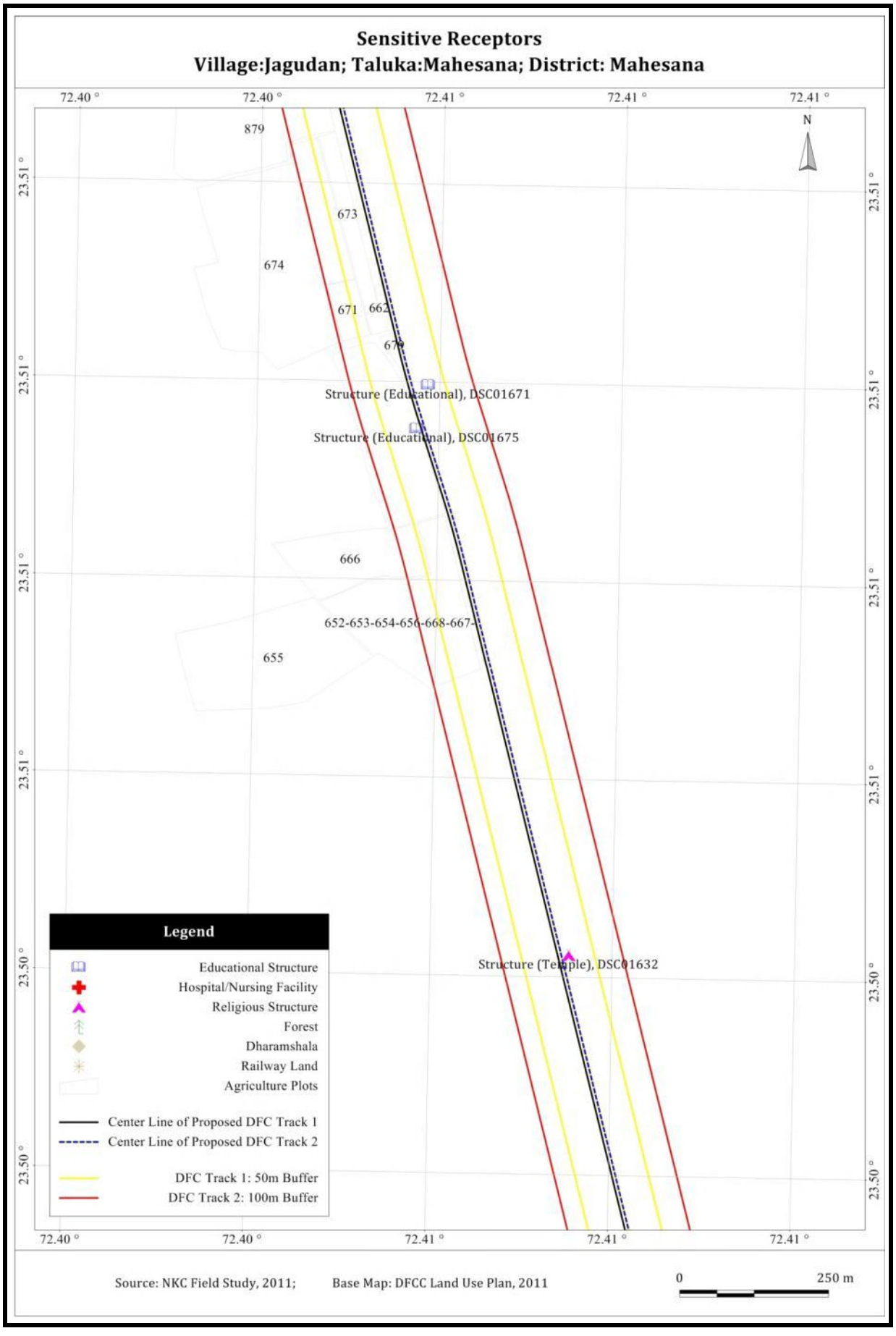
Village: Heduva Hanumat; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_0167	22	44.27	46.00	23.55768	72.38981	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0095	195	44.27	46.00	23.58834	72.38846	Compound Wall of Temple	<50 Mtr	-	Open Land
SANY0096	196	44.27	46.00	23.58852	72.38894	Compound Wall of Temple	50-100 Mtr	-	Open Land
SANY0110	197	44.27	46.00	23.58852	72.38885	Temple	<50 Mtr	50-100 Sqm	Open Land


SAM_0167


SANY0095


SANY0096


SANY0110


Sensitive Receptors
Village:Jagudan; Taluka:Mahesana; District: Mahesana
72.40 °
72.41 °
23.51 °
23.50 °
N
879
673
674
671
662
679
666
655
652-653-654-656-668-667-
Structure (Educational), DSC01671
Structure (Educational), DSC01675
Structure (Temple), DSC01632
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

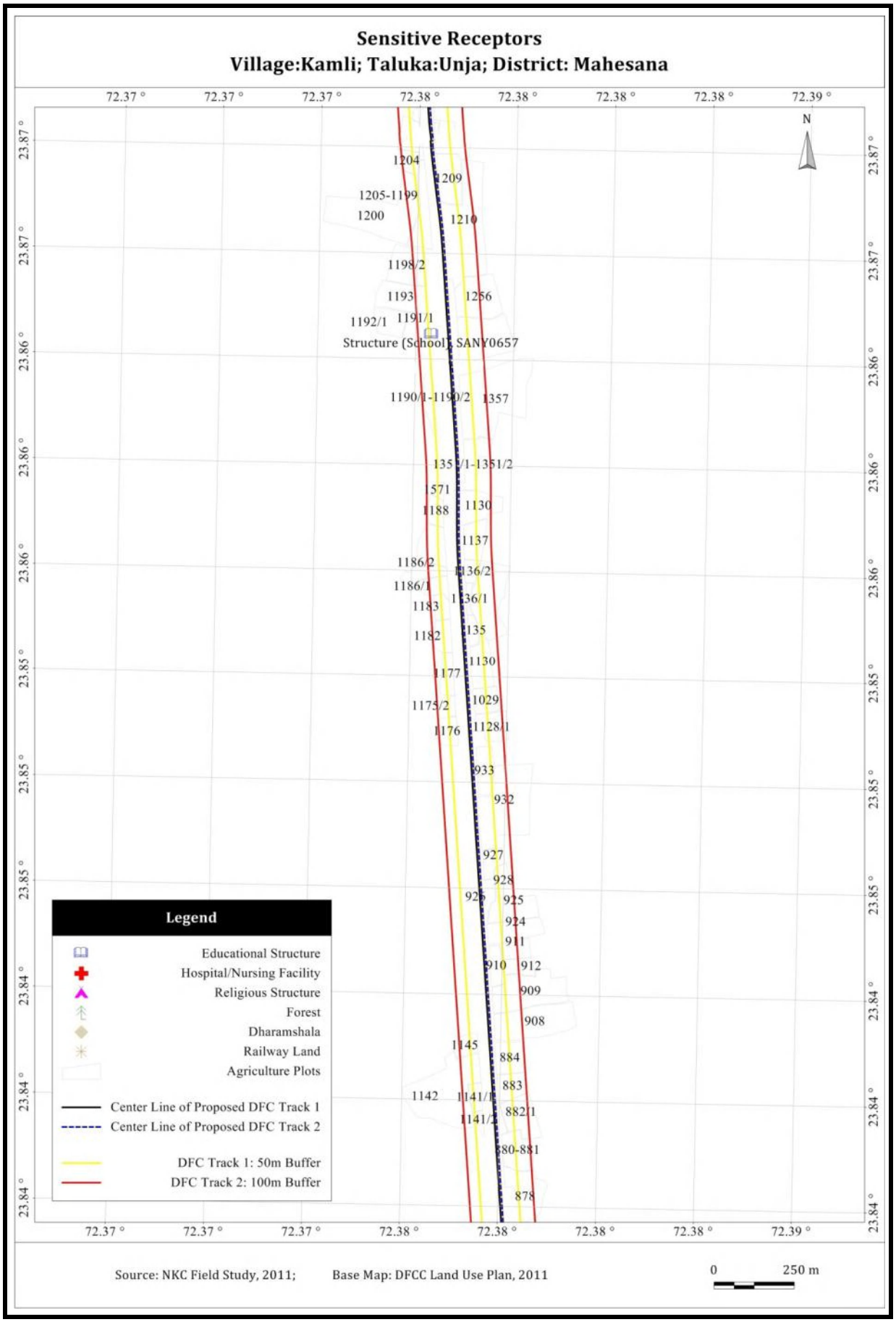
Appendix 5

Village: Jagudan; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01632	297	36.80	39.71	23.50232	72.40729	Temple	<50 Mtr	<50 Sqm	Open Land
DSC01671	330	36.80	39.71	23.51094	72.40480	Jagudan Polytechnic	<50 Mtr	150-300 Sqm	Campus area by land user
DSC01675	334	36.80	39.71	23.51028	72.40463	Jagudan Polytechnic	<50 Mtr	150-300 Sqm	Campus area by land user

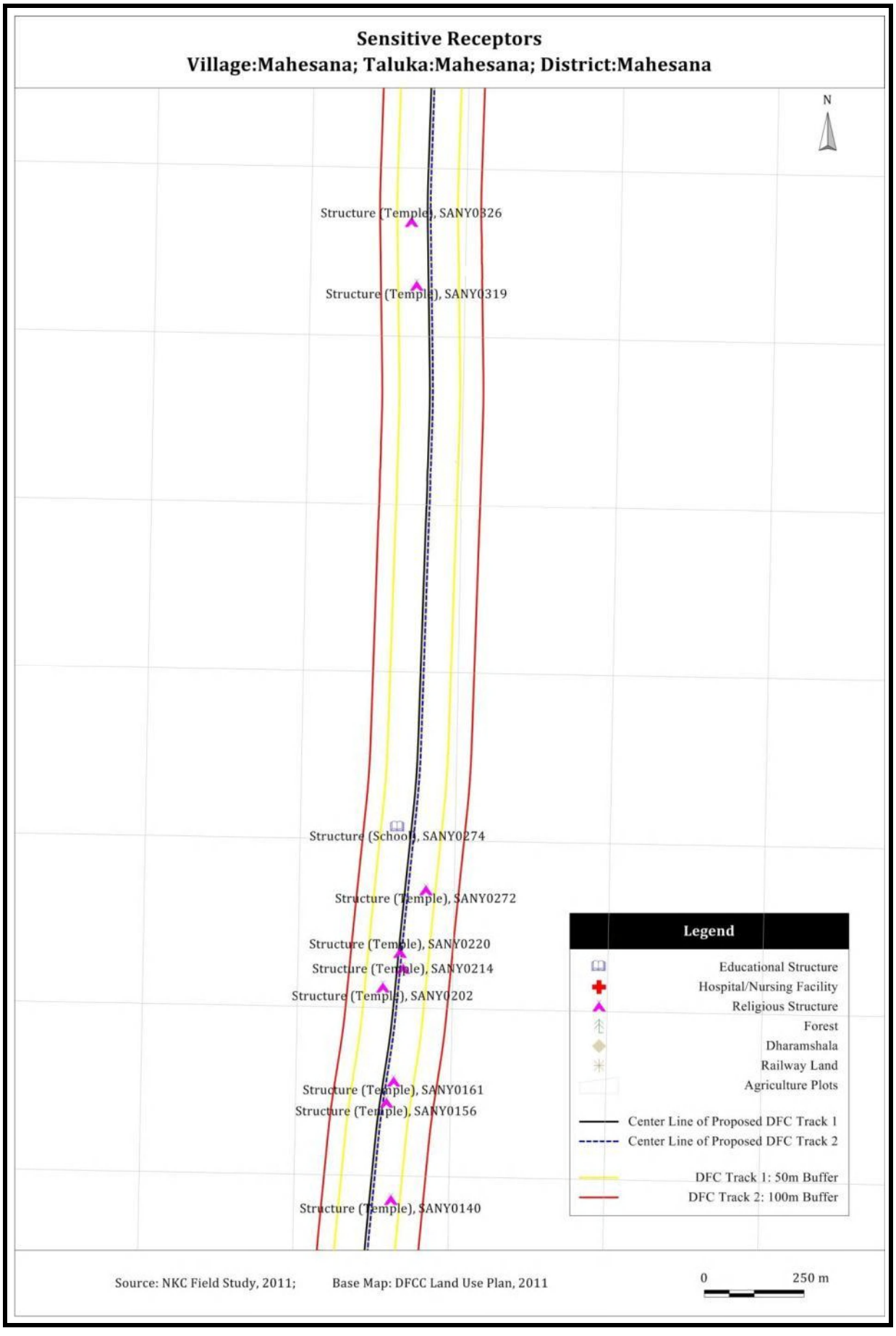

DSC01632


DSC01671


DC01675

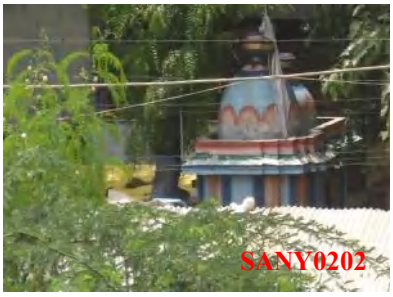

Sensitive Receptors
Village:Kamli; Taluka:Unja; District: Mahesana
72.37 °
72.38 °
72.39 °
23.87 °
23.86 °
23.85 °
23.84 °
N
1204
1209
1205-1199
1200
1210
1198/2
1193
1256
1192/1
1191/1
Structure (School): SANY0657
1190/1-1190/2
1357
1351/1-1351/2
1571
1188
1130
1137
1186/2
1136/2
1186/1
1136/1
1183
1182
1135
1130
1177
1175/2
1029
1176
1128/1
933
932
927
928
926
925
924
911
910
912
909
908
1145
884
1142
1141/1
883
1141/2
882/1
880-881
878
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

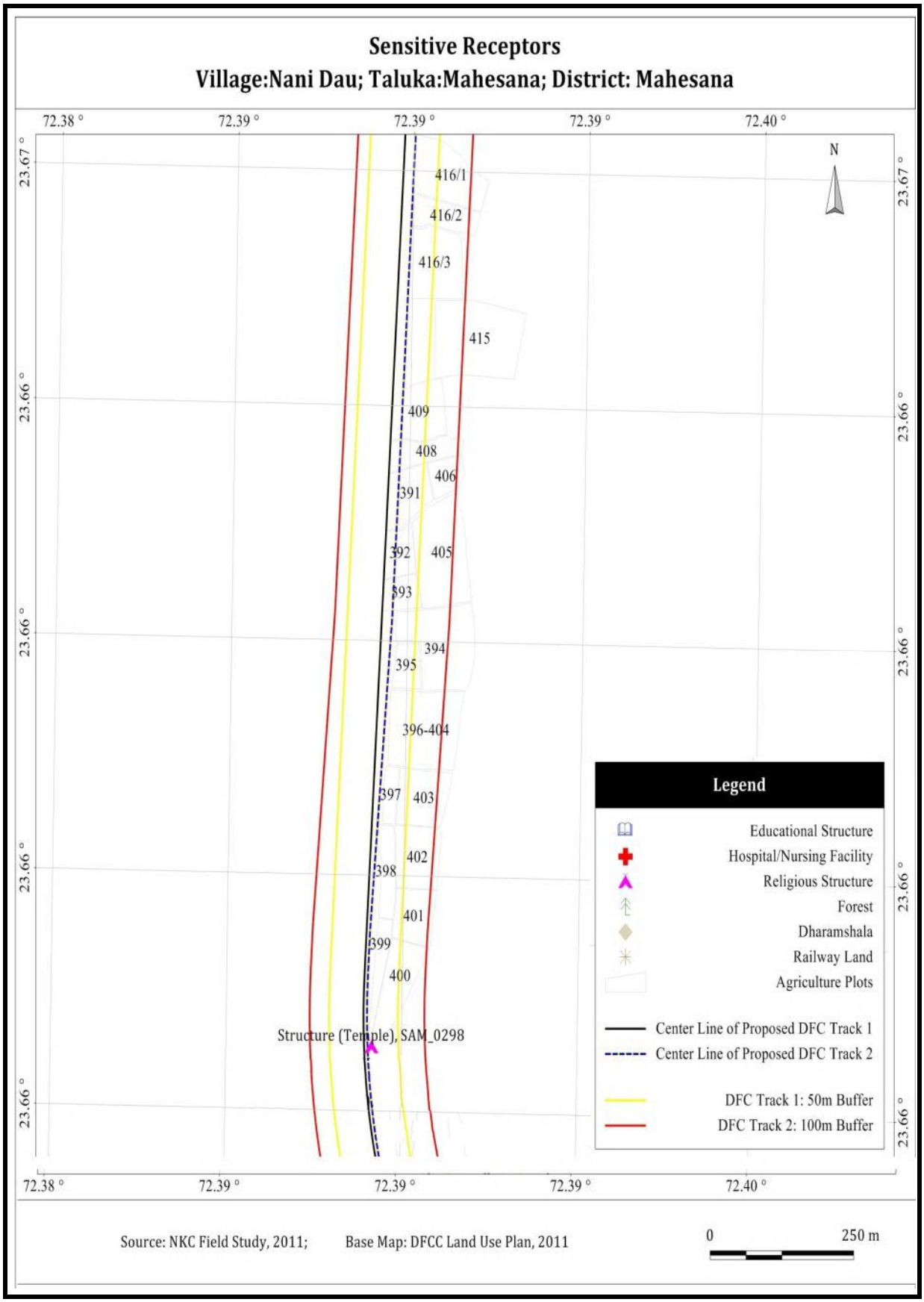
Village: Kamli; Taluka: Unjha; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SANY0657	159	74.67	78.04	23.86270	72.37548	School Building	<50 Mtr	150-300 Sqm	Campus area by land user


Sensitive Receptors
Village:Mahesana; Taluka:Mahesana; District:Mahesana
N
Structure (Temple), SANY0326
Structure (Temple), SANY0319
Structure (School), SANY0274
Structure (Temple), SANY0272
Structure (Temple), SANY0220
Structure (Temple), SANY0214
Structure (Temple), SANY0202
Structure (Temple), SANY0161
Structure (Temple), SANY0156
Structure (Temple), SANY0140
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

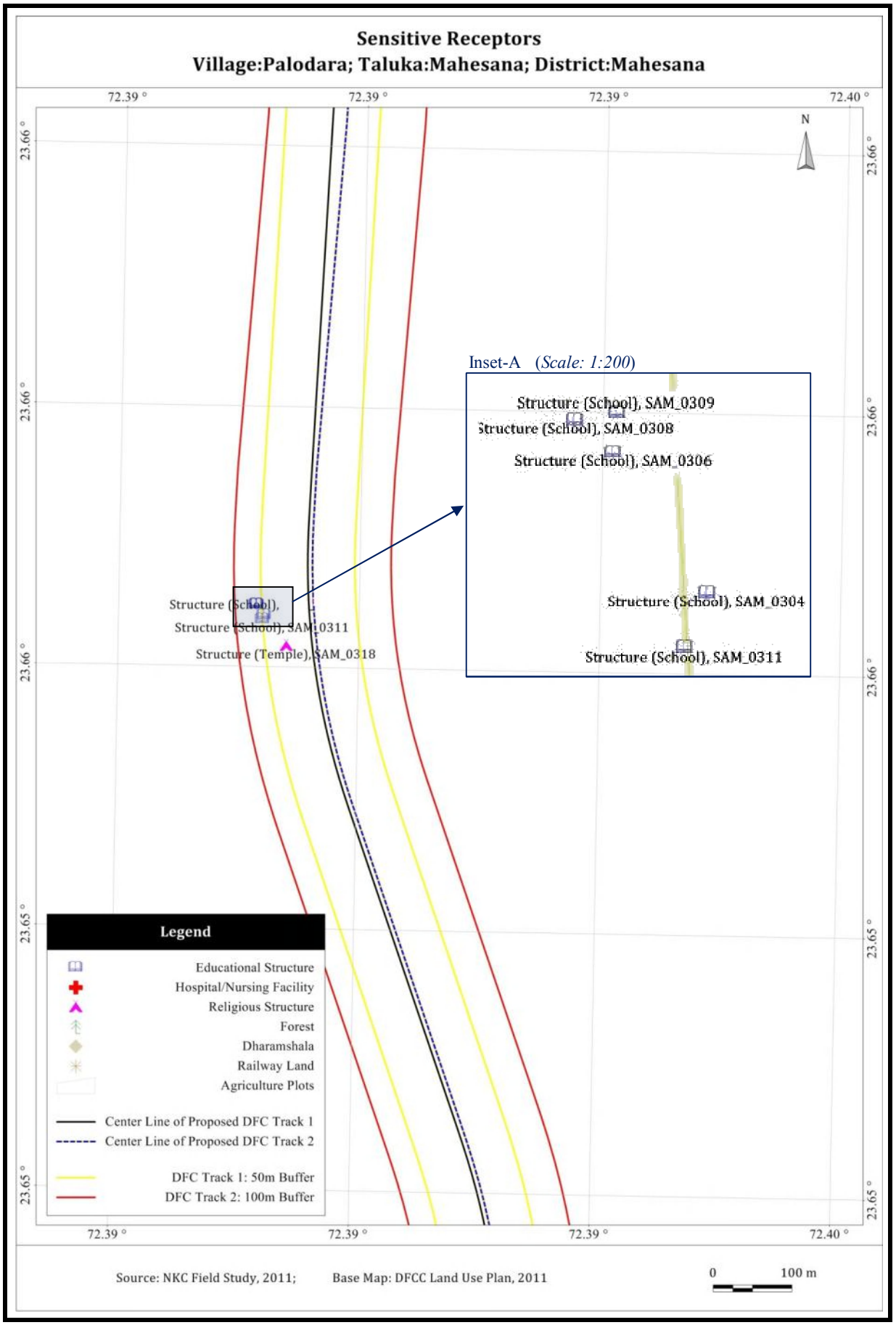
Appendix 5

Village: Mahesana; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SANY0140	214	46.00	51.15	23.59157	72.38888	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0156	223	46.00	51.15	23.59331	72.38876	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0161	227	46.00	51.15	23.59369	72.38890	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0202	262	46.00	51.15	23.59536	72.38865	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0214	272	46.00	51.15	23.59570	72.38904	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0220	277	46.00	51.15	23.59598	72.38898	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0272	302	46.00	51.15	23.59711	72.38945	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0274	304	46.00	51.15	23.59822	72.38888	Sarvajanik School	<50 Mtr	150-300 Sqm	Campus area by land user
SANY0319	319	46.00	51.15	23.60791	72.38906	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0326	323	46.00	51.15	23.60904	72.38894	Temple	<50 Mtr	<50 Sqm	Open Land

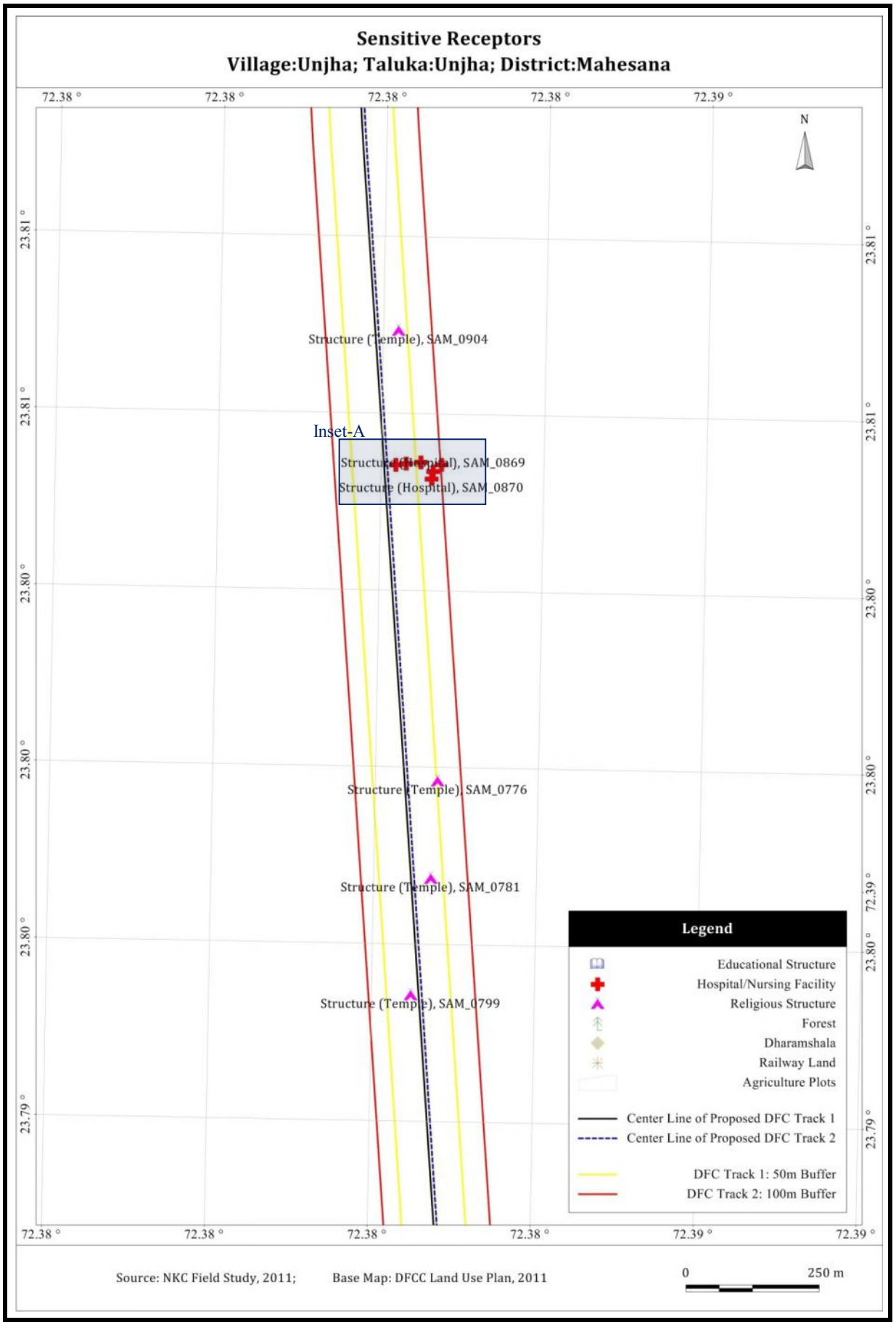



Sensitive Receptors
Village:Nani Dau; Taluka:Mahesana; District: Mahesana
72.38 °
72.39 °
72.39 °
72.39 °
72.40 °
23.67 °
23.66 °
N
416/1
416/2
416/3
415
409
408
406
391
392
405
393
394
395
396-404
397
403
402
398
401
399
400
Structure (Temple), SAM_0298
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Nani Dau; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_0298	361	46.00	51.15	23.65582	72.38949	Temple	<50 Mtr	<10 Sqm	Open Land

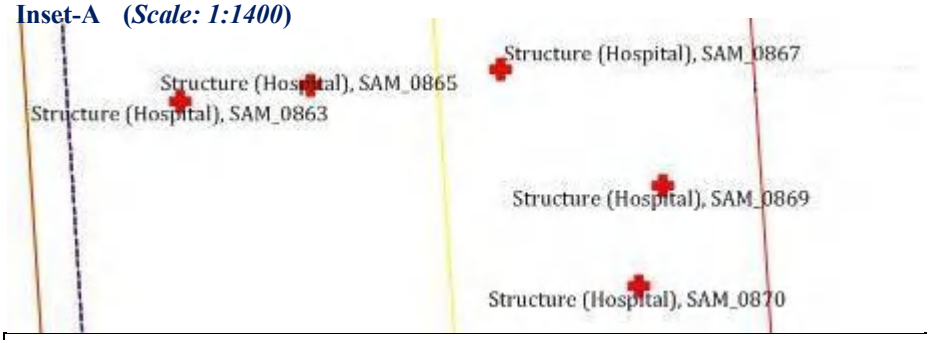

Sensitive Receptors
Village:Palodara; Taluka:Mahesana; District:Mahesana
72.39 °
72.40 °
23.66 °
23.65 °
N
Inset-A (Scale: 1:200)
Structure (School), SAM_0309
Structure (School), SAM_0308
Structure (School), SAM_0306
Structure (School), SAM_0304
Structure (School), SAM_0311
Structure (School),
Structure (School), SAM_0311
Structure (Temple), SAM_0318
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
100 m

Village: Palodar; Taluka: Mahesana; District: Mahesana									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_0304	365	0.38	0.16	23.65560	72.38881	School	<50M Mtr	150-300 Sqm	Campus area by land user
SAM_0306	366	0.38	0.16	23.65571	72.38872	Class Room	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0308	367	0.38	0.16	23.65572	72.38871		50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0309	368	0.38	0.16	23.65572	72.38872		50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0311	370	0.38	0.16	23.65555	72.38879	School & Kitchen	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0318	375	0.38	0.16	23.65525	72.38910	Temple	<50M Mtr	<10 Sqm	Open Land


Sensitive Receptors
Village:Unjha; Taluka:Unjha; District:Mahesana
72.38 °
72.39 °
23.81 °
23.80 °
23.79 °
N
Structure (Temple), SAM_0904
Inset-A
Structure (Hospital), SAM_0869
Structure (Hospital), SAM_0870
Structure (Temple), SAM_0776
Structure (Temple), SAM_0781
Structure (Temple), SAM_0799
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Appendix 5

Inset-A (*Scale: 1:1400*)



Village: Unjha; Taluka: Unjha; District: Mahesana

Photo ID	GPS Point No.	DFC Chainage (Km)		Lat	Long	Photo Description	Distance from Track 1	Approximate Size/ Capacity	Surrounding Environment
SAM_0776	66	66.63	72.16	23.79876	72.38215	Temple	50-100 Mtr	<10 Sqm	Open Land
SAM_0781	71	66.63	72.16	23.79711	72.38205	Temple	<50 Mtr	<10 Sqm	Open Land
SAM_0799	85	66.63	72.16	23.79513	72.38172	Old Temple	<50 Mtr	<50 Sqm	Open Land
SAM_0863	132	66.63	72.16	23.80412	72.38127	Mirat Hospital	<50 Mtr	150-300 Sqm	Campus area by land user
SAM_0865	133	66.63	72.16	23.80415	72.38146	Shradhha Hospital	<50 Mtr	150-300 Sqm	Campus area by land user
SAM_0867	134	66.63	72.16	23.80417	72.38173	Anand Hospital	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0869	135	66.63	72.16	23.80402	72.38196	Vikas Hospital	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0870	136	66.63	72.16	23.80389	72.38193	Vardan Hospital	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_0904	157	66.63	72.16	23.80640	72.38128	Temple	<50 Mtr	100-150 Sqm	Open Land


SAM_0776


SAM_0784


SAM_0799


SAM_0863

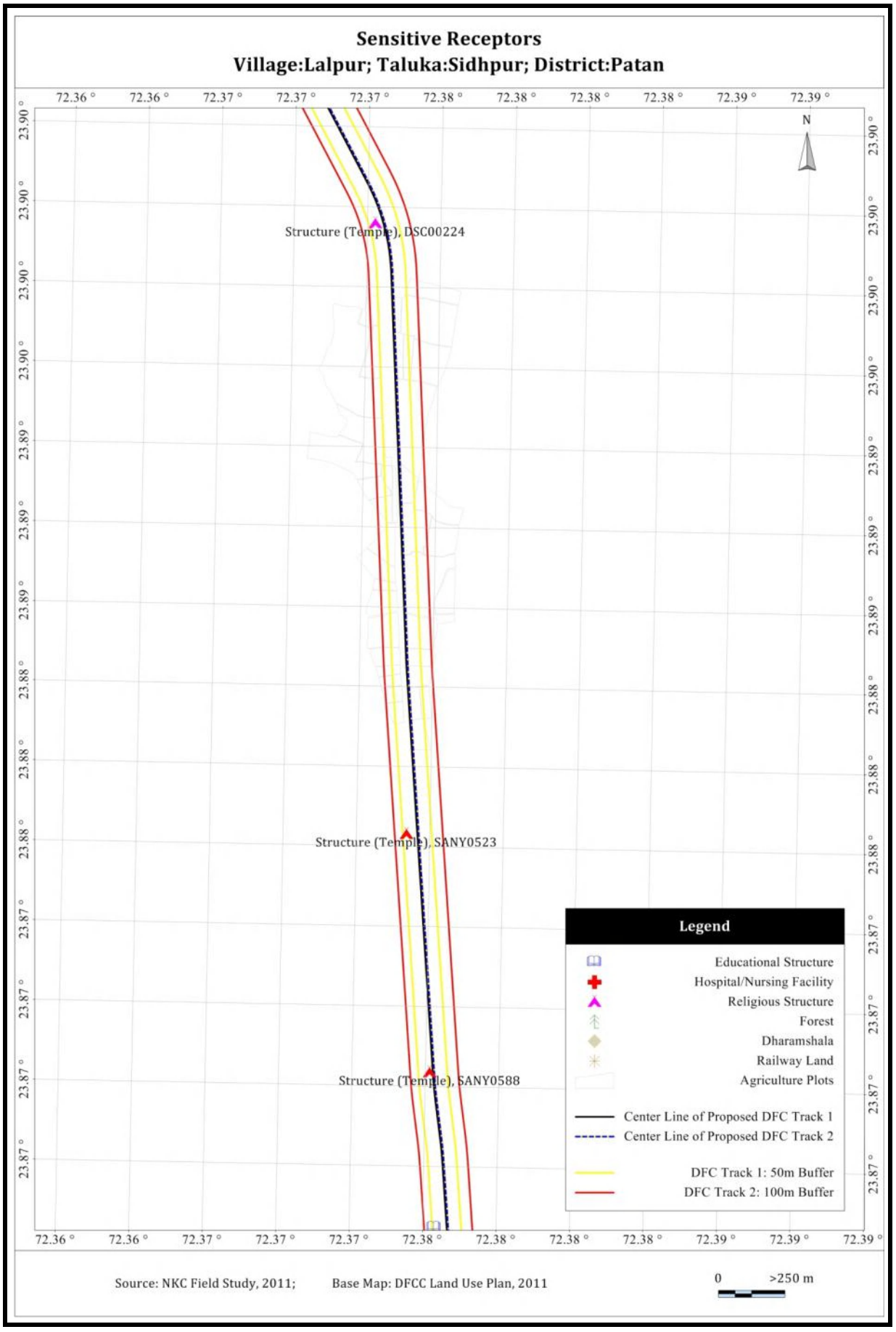

SAM_0865


SAM_0869


SAM_0870


SAM_0867


SAM_0904

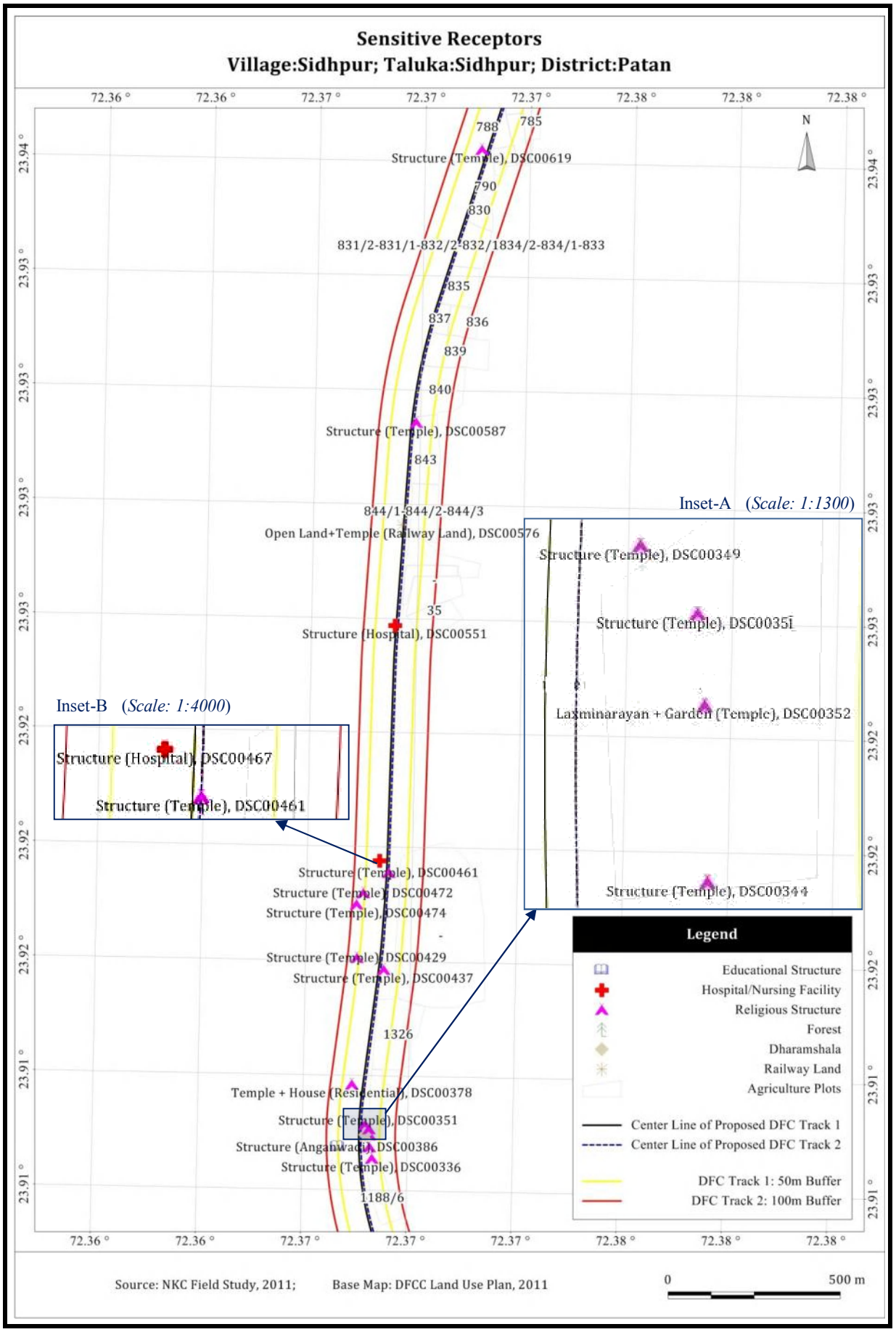

Sensitive Receptors
Village:Lalpur; Taluka:Sidhpur; District:Patan
72.36 °
72.36 °
72.37 °
72.37 °
72.37 °
72.38 °
72.38 °
72.38 °
72.38 °
72.39 °
72.39 °
23.90 °
23.90 °
23.90 °
23.90 °
23.89 °
23.89 °
23.89 °
23.88 °
23.88 °
23.88 °
23.87 °
23.87 °
23.87 °
23.87 °
N
Structure (Temple), DSC00224
Structure (Temple), SANY0523
Structure (Temple), SANY0588
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
>250 m

Village: Lalpur; Taluka: Sidhpur; District: Patan									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC00224	165	79.47	81.23	23.90038	72.37232	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0523	66	79.47	81.23	23.87747	72.37405	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0588	115	79.47	81.23	23.86853	72.37518	Temple	<50 Mtr	<50 Sqm	Open Land


DSC00224


SANY 0523


SANY 0588


Sensitive Receptors
Village:Sidhpur; Taluka:Sidhpur; District:Patan
N
788
785
Structure (Temple), DSC00619
790
830
831/2-831/1-832/2-832/1834/2-834/1-833
835
837
836
839
840
Structure (Temple), DSC00587
843
844/1-844/2-844/3
Open Land+Temple (Railway Land), DSC00576
35
Structure (Hospital), DSC00551
Inset-A (Scale: 1:1300)
Structure (Temple), DSC00349
Structure (Temple), DSC00351
Laxminarayan + Garden (Temple), DSC00352
Structure (Temple), DSC00344
Inset-B (Scale: 1:4000)
Structure (Hospital), DSC00467
Structure (Temple), DSC00461
Structure (Temple), DSC00461
Structure (Temple), DSC00472
Structure (Temple), DSC00474
Structure (Temple), DSC00429
Structure (Temple), DSC00437
1326
Temple + House (Residential), DSC00378
Structure (Temple), DSC00351
Structure (Anganwadi), DSC00386
Structure (Temple), DSC00336
1188/6
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
72.36 °
72.37 °
72.38 °
23.94 °
23.93 °
23.92 °
23.91 °
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
500 m

Appendix 5

Village: Sidhpur; Taluka: Sidhpur; District: Patan									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC00336	227	81.23	88.03	23.91083	72.36799	Temple	<50 Mtr	<10 Sqm	Open Land
DSC00344	231	81.23	88.03	23.91113	72.36792	Temple	<50 Mtr	<50 Sqm	Open Land
DSC00349	234	81.23	88.03	23.91171	72.36779	Temple	<50 Mtr	50-100 Sqm	Open Land
DSC00351	235	81.23	88.03	23.91159	72.36790	Temple	<50 Mtr	50-100 Sqm	Open Land
DSC00352	236	81.23	88.03	23.91144	72.36791	Temple + Open space	<50 Mtr	100-150 Sqm	Campus area by land user
DSC00378	249	81.23	88.03	23.91276	72.36739	Temple + Residential	<50 Mtr	100-150 Sqm	Campus area by land user
DSC00386	255	81.23	88.03	23.91111	72.36701	Aanganwadi Center	50-100 Mtr	<50 Sqm	Covered Land by user
DSC00429	275	81.23	88.03	23.91608	72.36747	Temple	50-100Mtr	<10 Sqm	Open Land
DSC00437	281	81.23	88.03	23.91578	72.36824	Temple	<50 Mtr	<50 Sqm	Open Land
DSC00461	296	81.23	88.03	23.91832	72.36834	Temple	<50 Mtr	<10 Sqm	Open Land
DSC00467	299	81.23	88.03	23.91863	72.36807	Dr. Bhargav Hospital Building	<50 Mtr	150-300 Sqm	Campus area by land user
DSC00472	303	81.23	88.03	23.91778	72.36762	Temple	50-100 Mtr	<50 Sqm	Open Land
DSC00474	304	81.23	88.03	23.91747	72.36743	Temple	50-100 Mtr	100-150 Sqm	Open Land
DSC00551	345	81.23	88.03	23.92482	72.36838	Khadijabri Maternity Hospital	<50 Mtr	100-150 Sqm	Campus area by land user
DSC00576	362	81.23	88.03	23.92746	72.36854	Open Land+Mandir	<50 Mtr	<10 Sqm	Campus area by land user
DSC00587	371	81.23	88.03	23.93014	72.36889	Temple	<50 Mtr	<10 Sqm	Open Land
DSC00619	393	81.23	88.03	23.93732	72.37061	Temple	<50 Mtr	<10 Sqm	Open Land


DSC00378


DSC00386


DC00429


DSC00437


DSC00461


DC00467


DSC00472

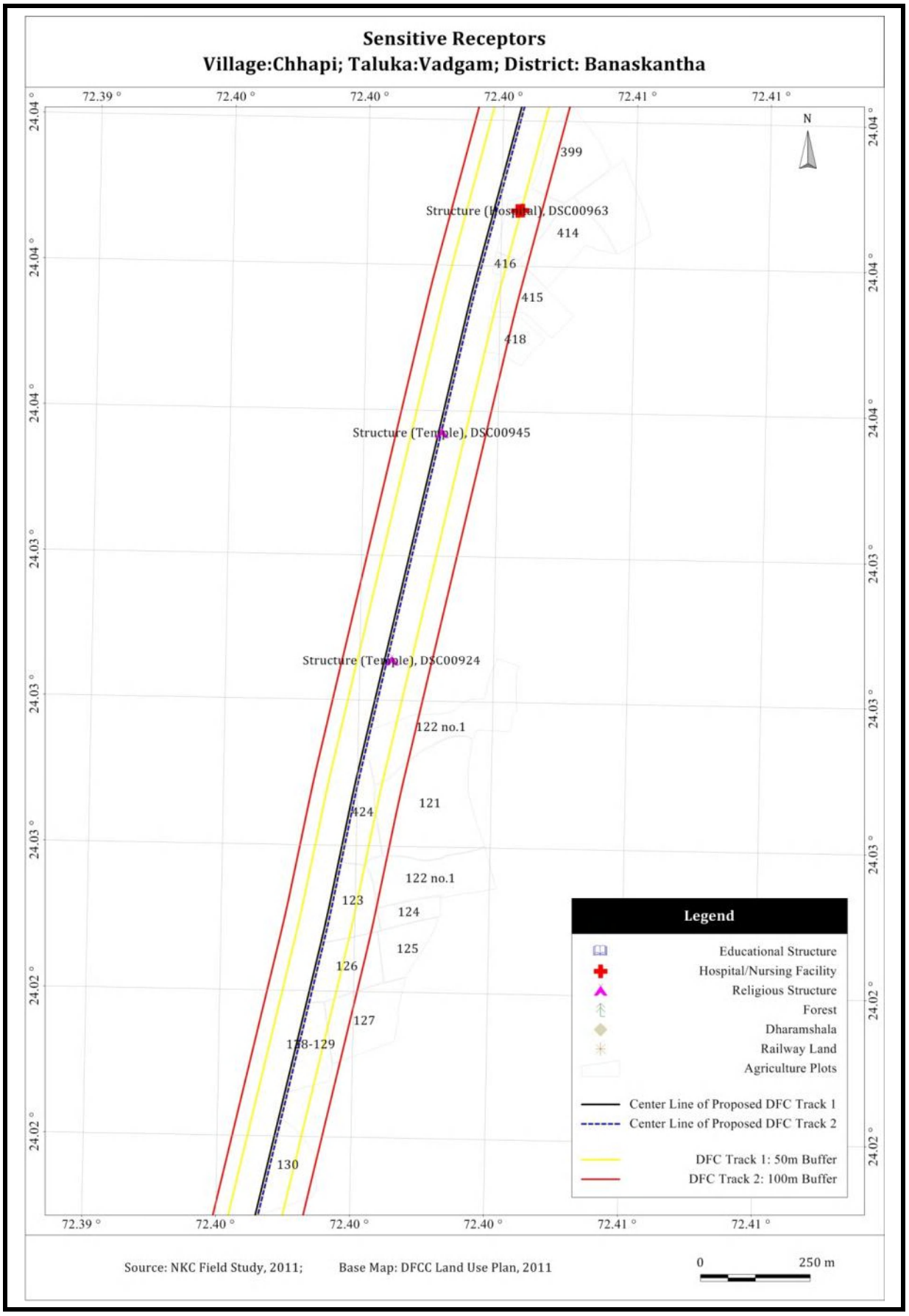

DSC00474


DC00551


DSC00576


DSC00587


DC00619

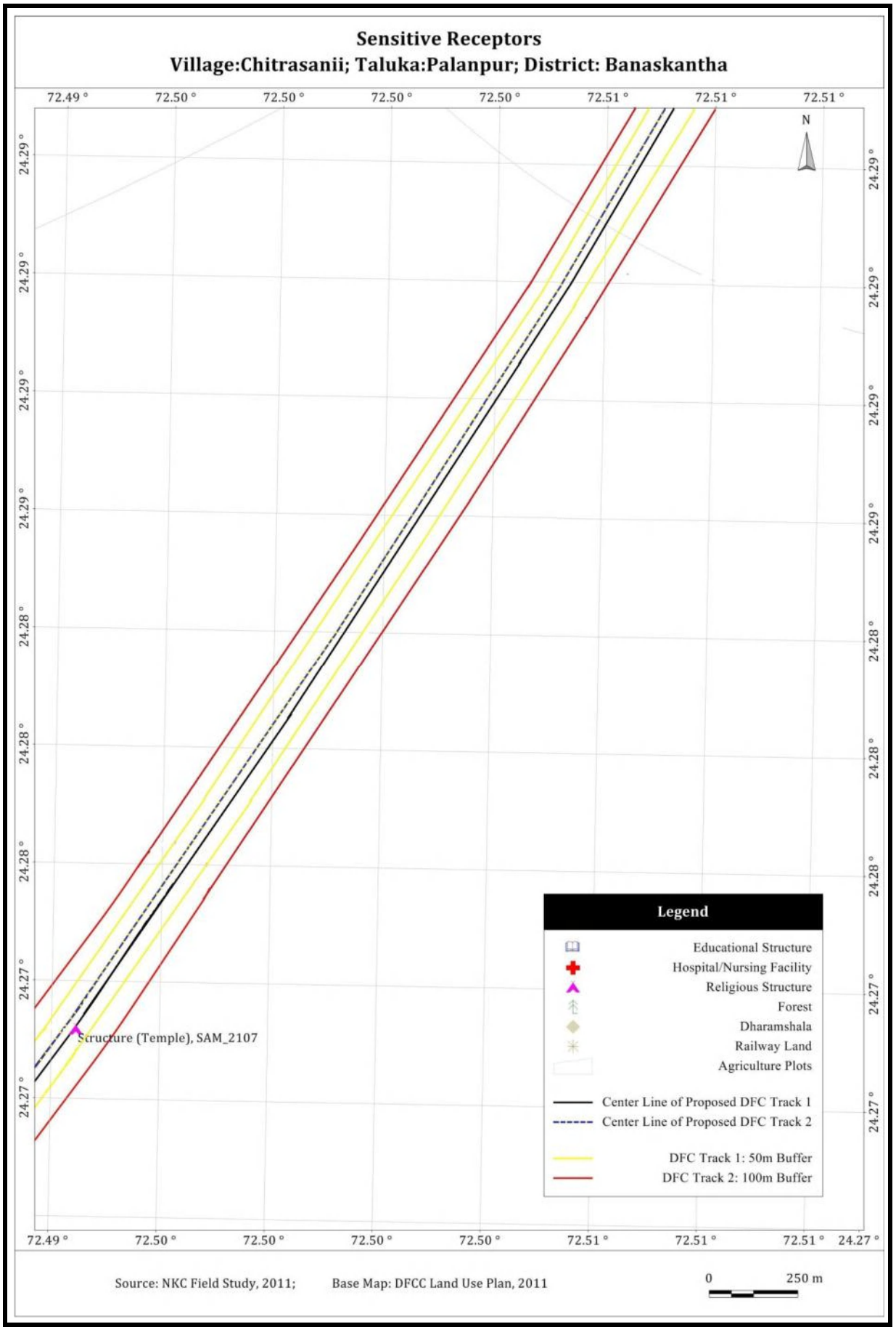

Sensitive Receptors
Village:Chhapi; Taluka:Vadgam; District: Banaskantha
72.39 °
72.40 °
72.40 °
72.40 °
72.41 °
72.41 °
24.04 °
24.03 °
24.02 °
N
399
Structure (Hospital), DSC00963
414
416
415
418
Structure (Temple), DSC00945
Structure (Temple), DSC00924
122 no.1
121
124
122 no.1
123
124
125
126
127
128-129
130
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Chhapi; Taluka: Vadgam; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC00924	257	94.98	97.67	24.03082	72.39972	Temple	<50M Mtr	50-100 Sqm	Open Land
DSC00945	277	94.98	97.67	24.03554	72.40075	Temple	<50M Mtr	50-100 Sqm	Open Land
DSC00961	294	97.67	100.52	24.04014	72.40236	Primary Heath Centre, Chhapi	<50M Mtr	150-300 Sqm	Campus area by land user


DSC00924

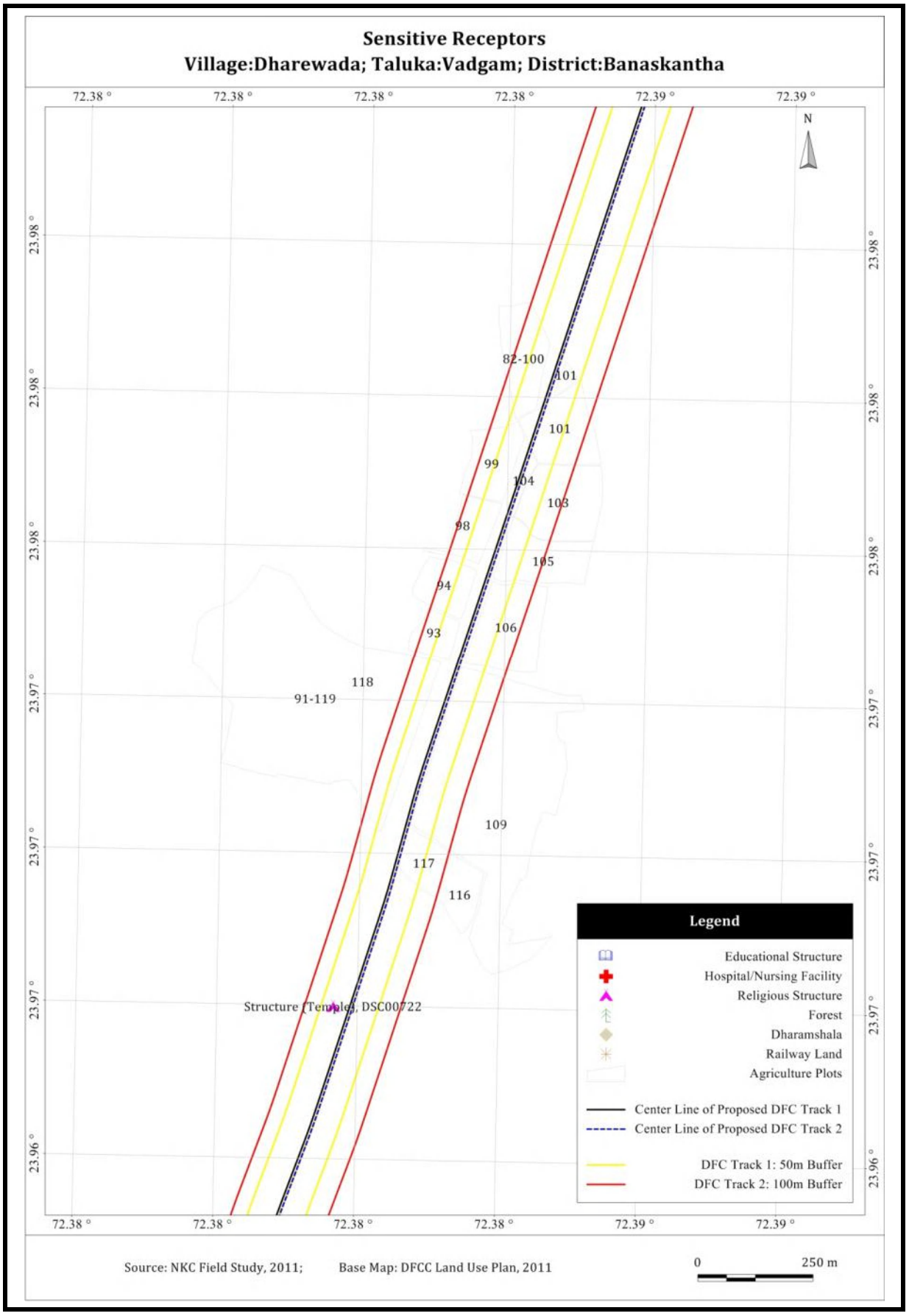

DSC00945


DC00961

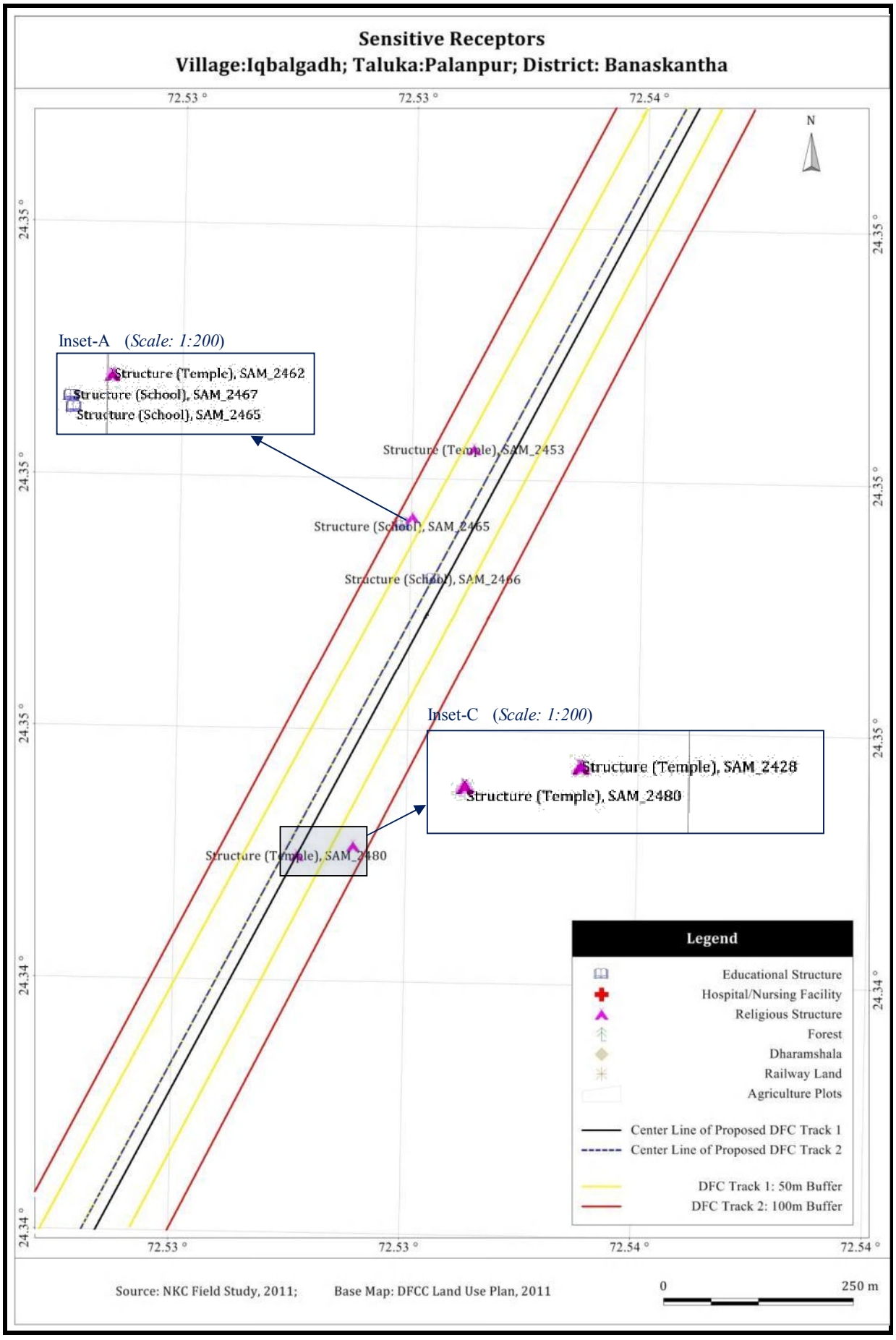

Sensitive Receptors
Village:Chitrasanii; Taluka:Palanpur; District: Banaskantha
72.49 °
72.50 °
72.50 °
72.50 °
72.50 °
72.51 °
72.51 °
72.51 °
24.29 °
24.28 °
24.27 °
N
Structure (Temple), SAM_2107
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Appendix 5

Village: Chitrasani; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_2107	22	18.44	20.72	24.27175	72.49268	Temple	<50M Mtr	<50 Sqm	Open Land

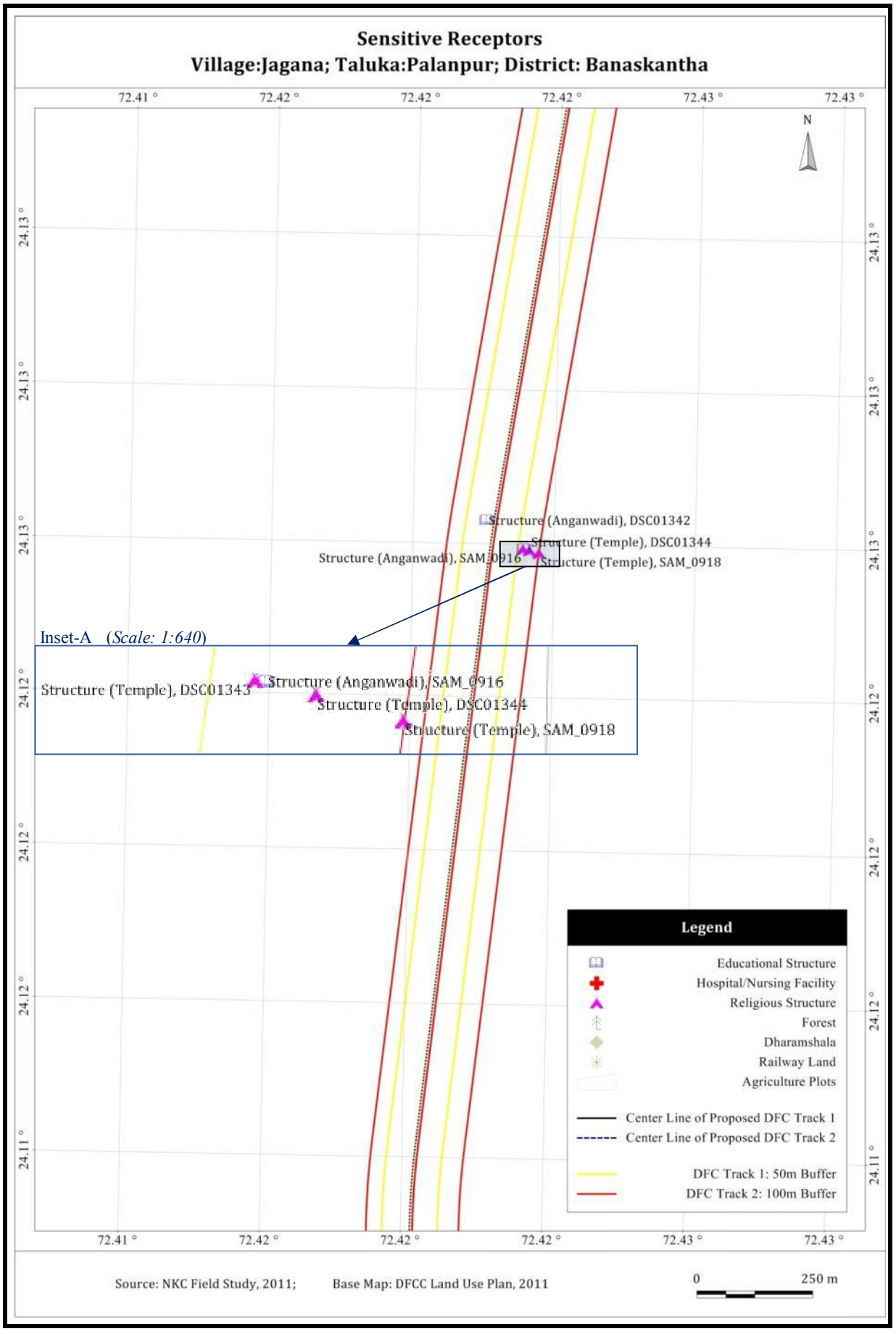

Sensitive Receptors
Village:Dharewada; Taluka:Vadgam; District:Banaskantha
72.38 °
72.39 °
23.98 °
23.97 °
23.96 °
N
82-100
101
101
99
104
103
98
105
94
93
106
118
91-119
109
117
116
Structure (Temple), DSC00722
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Dharewada; Taluka: Vadgam; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance From Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC00722	90	89.56	90.73	23.96697	72.38049	Temple	<50M Mtr	<50 Sqm	Open Land

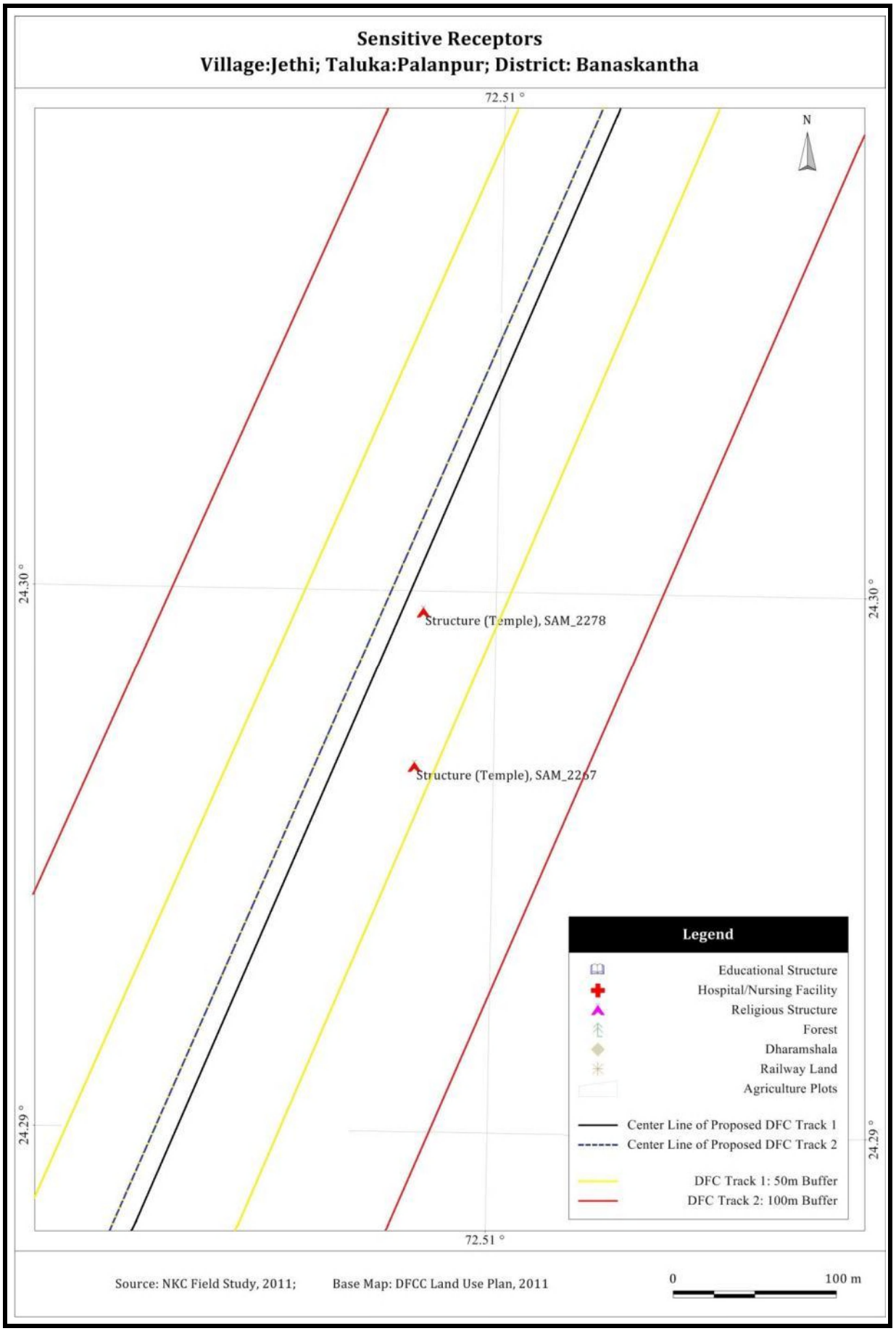

Sensitive Receptors
Village:Iqbalgadh; Taluka:Palanpur; District: Banaskantha
72.53 °
72.53 °
72.54 °
N
24.35 °
24.34 °
Inset-A (Scale: 1:200)
Structure (Temple), SAM_2462
Structure (School), SAM_2467
Structure (School), SAM_2465
Structure (Temple), SAM_2453
Structure (School), SAM_2465
Structure (School), SAM_2466
Inset-C (Scale: 1:200)
Structure (Temple), SAM_2428
Structure (Temple), SAM_2480
Structure (Temple), SAM_2480
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Appendix 5

Village: Iqbalgadh; Taluka: Amirgadh; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_2428	270	25.29	28.80	24.34360	72.53331	Temple	50-100 Mtr	50-100 Sqm	Open Land
SAM_2453	287	25.29	28.80	24.34835	72.53480	Temple	<50M Mtr	<50 Sqm	Open Land
SAM_2462	295	25.29	28.80	24.34753	72.53402	Temple	50-100 Mtr	50-100 Sqm	Open Land
SAM_2465	296	25.29	28.80	24.34743	72.53389	K.G.B.V. School Iqbalgadh	50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_2466	298	25.29	28.80	24.34680	72.53430		<50M Mtr	150-300 Sqm	Campus area by land user
SAM_2467	297	25.29	28.80	24.34746	72.53387		50-100 Mtr	150-300 Sqm	Campus area by land user
SAM_2480	307	25.29	28.80	24.34348	72.53259	Temple	<50M Mtr	<50 Sqm	Open Land

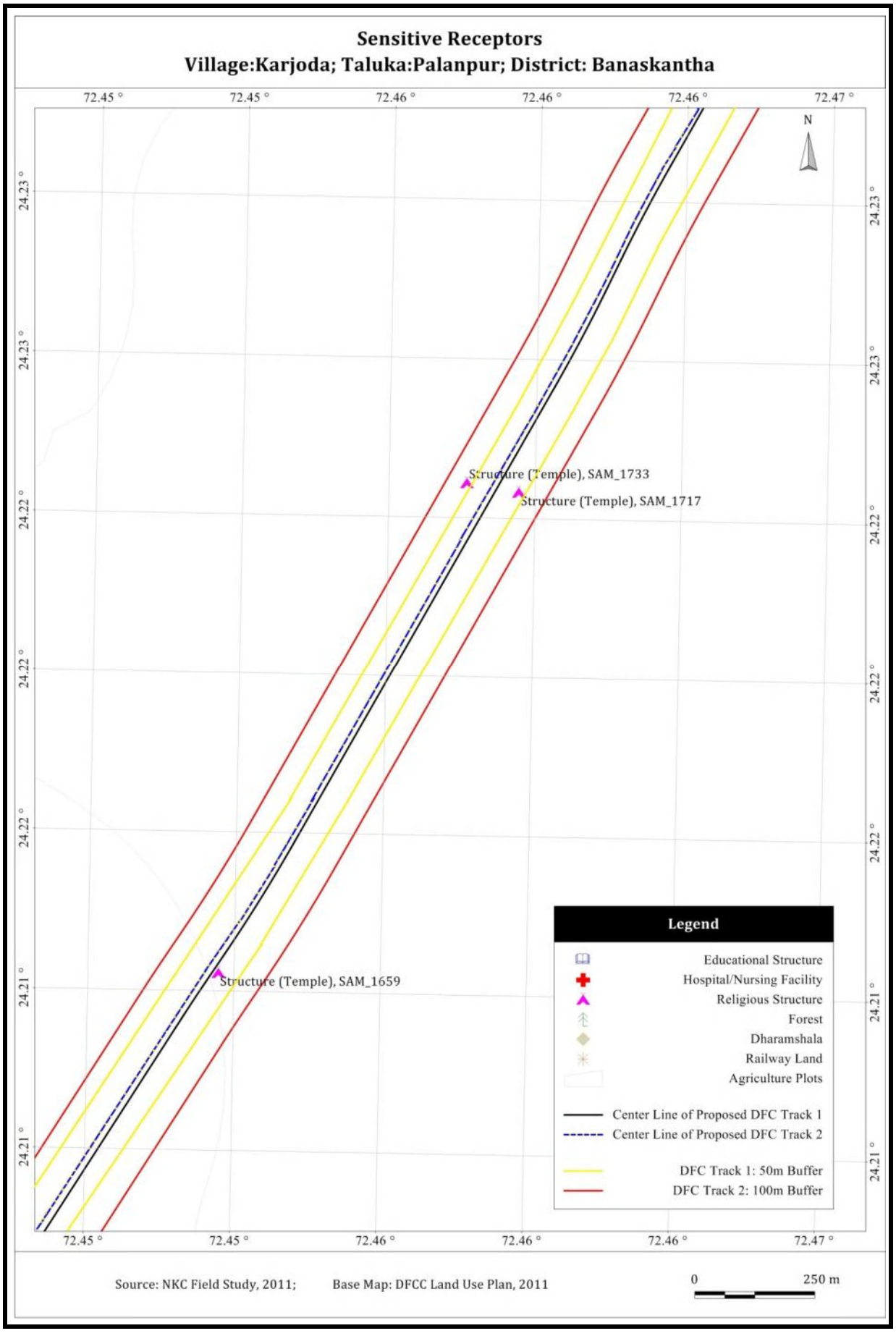

Sensitive Receptors
Village:Jagana; Taluka:Palanpur; District: Banaskantha
72.41 °
72.42 °
72.42 °
72.42 °
72.43 °
72.43 °
N
24.13 °
24.12 °
24.11 °
Structure (Anganwadi), DSC01342
Structure (Temple), DSC01344
Structure (Anganwadi), SAM_0916
Structure (Temple), SAM_0918
Inset-A (Scale: 1:640)
Structure (Temple), DSC01343
Structure (Anganwadi), SAM_0916
Structure (Temple), DSC01344
Structure (Temple), SAM_0918
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Jagana; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01342	64	105.63	109.55	24.12644	72.42156	Aanganwadi Center	<50M Mtr	<50 Sqm	Campus area by land user
DSC01343	65	105.63	109.55	24.12590	72.42233	Temple	50-100 Mtr	50-100 Sqm	Open Land
DSC01344	66	105.63	109.55	24.12587	72.42247	Temple	50-100 Mtr	50-100 Sqm	Open Land
SAM_0916	163	105.63	109.55	24.12589	72.42236	Aanganwadi Center	50-100 Mtr	<50 Sqm	Campus area by land user
SAM_0918	164	105.63	109.55	24.12582	72.42267	Shiv Temple	50-100 Mtr	100-150 Sqm	Open Land


Sensitive Receptors
Village:Jethi; Taluka:Palanpur; District: Banaskantha
72.51 °
N
24.30 °
24.29 °
Structure (Temple), SAM_2278
Structure (Temple), SAM_2267
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
100 m

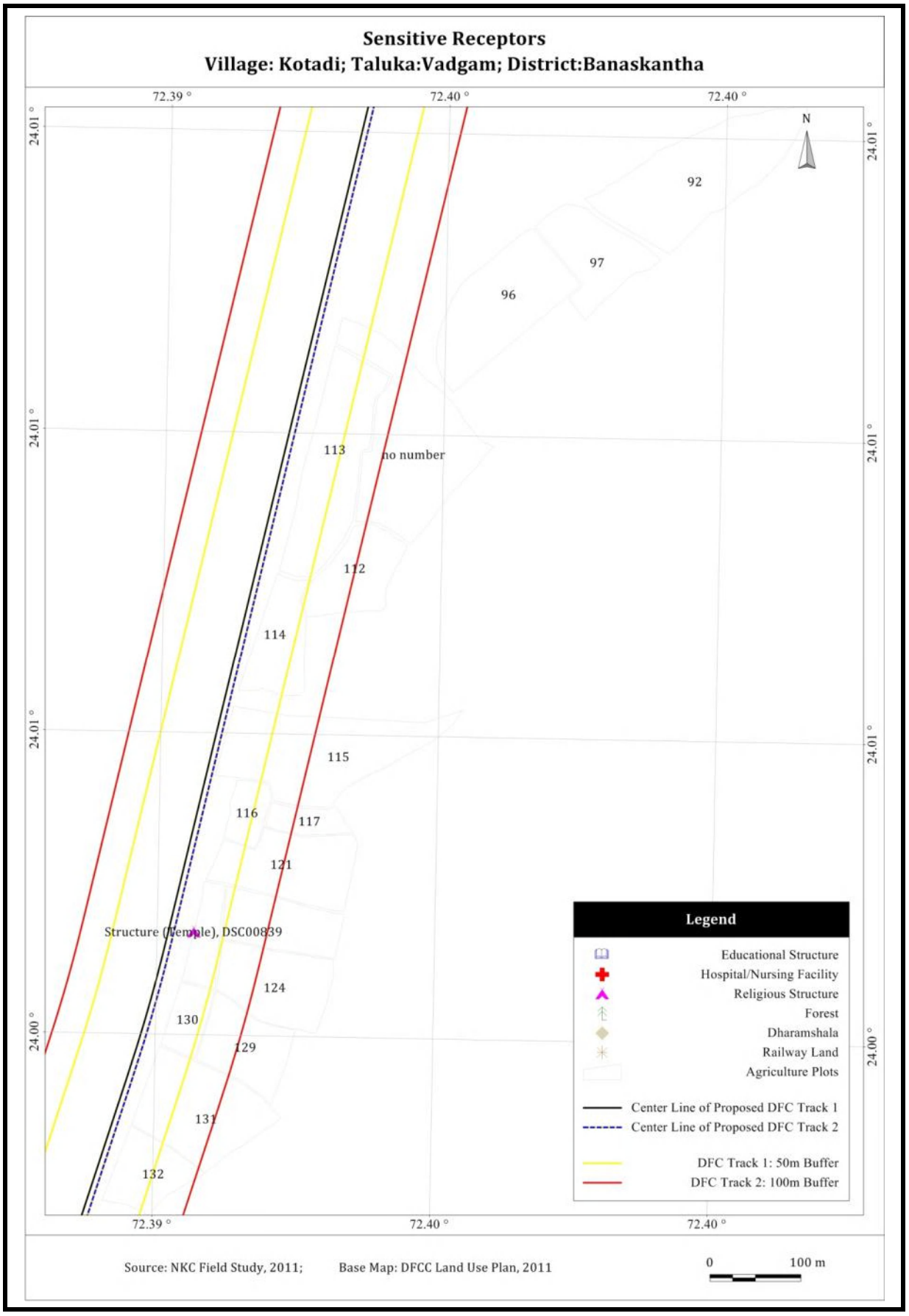
Appendix 5

Village: Jethi; Taluka: Amirgadh; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_2267	144	21.07	25.29	24.29602	72.50952	Temple	<50M Mtr	50-100 Sqm	Open Land
SAM_2280	150	21.07	25.29	24.29688	72.50956	Temple	<50M Mtr	<10 Sqm	Open Land

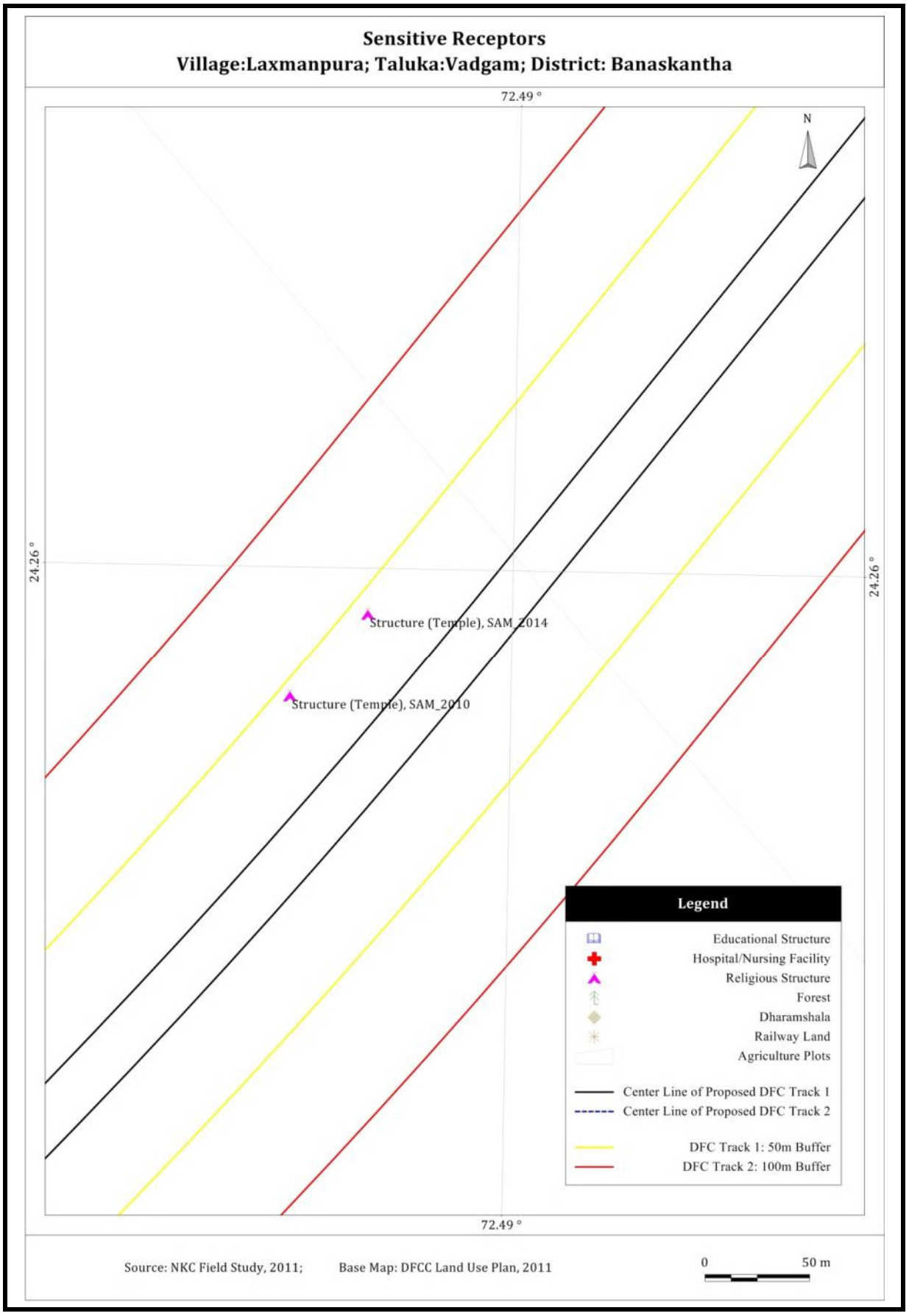

Sensitive Receptors
Village:Karjoda; Taluka:Palanpur; District: Banaskantha
72.45 °
72.45 °
72.46 °
72.46 °
72.46 °
72.47 °
N
24.23 °
24.22 °
24.21 °
Structure (Temple), SAM_1733
Structure (Temple), SAM_1717
Structure (Temple), SAM_1659
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Appendix 5

Village: Karjoda; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_1659	33	9.84	10.97	24.21333	72.45267	Temple	<50M Mtr	<10 Sqm	Open Land
SAM_1717	81	9.84	10.97	24.22249	72.45866	Temple	<50M Mtr	<50 Sqm	Open Land
SAM_1733	93	9.84	10.97	24.22265	72.45760	Temple	50-100 Mtr	<50 Sqm	Open Land


Sensitive Receptors
Village: Kotadi; Taluka:Vadgam; District:Banaskantha
72.39 °
72.40 °
72.40 °
24.01 °
24.00 °
N
92
97
96
113
no number
112
114
115
116
117
121
124
130
129
131
132
Structure (Temple), DSC00839
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
100 m

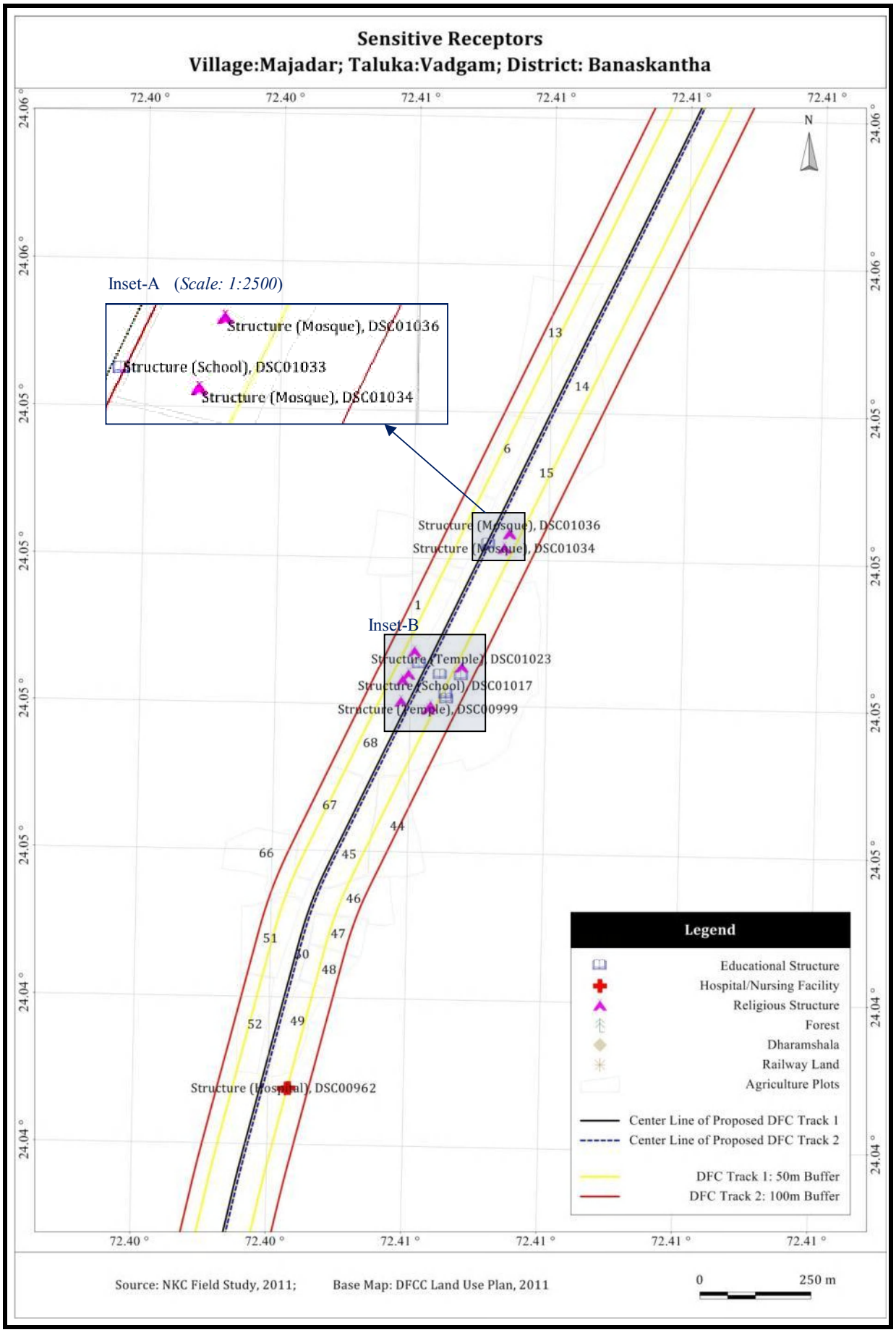
Village: Kotadi; Taluka: Vadgam; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC00839	192	93.14	94.98	24.00402	72.39340	Temple	<50M Mtr	50-100 Sqm	Open Land

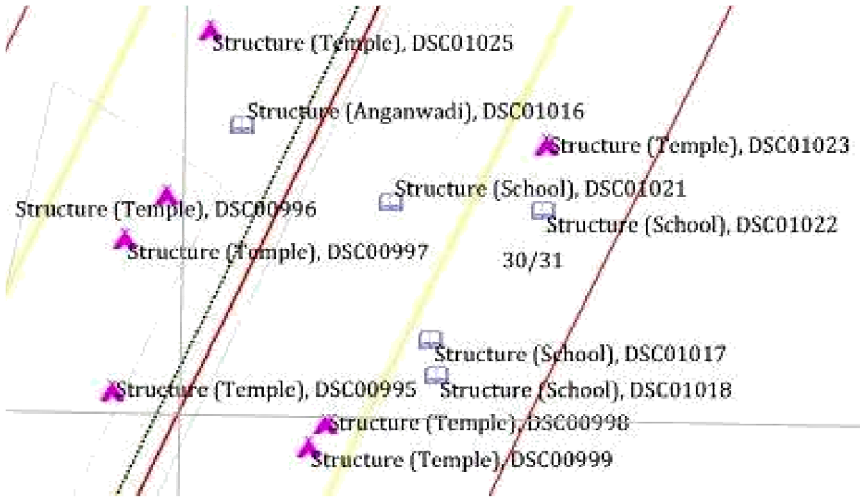

Sensitive Receptors
Village:Laxmanpura; Taluka:Vadgam; District: Banaskantha
72.49 °
N
24.26 °
24.26 °
Structure (Temple), SAM_2014
Structure (Temple), SAM_2010
72.49 °
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
50 m

Village: Laxmanpura; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_2010	317	14.90	18.44	24.26344	72.48496	Temple	<50M Mtr	<50 Sqm	Open Land
SAM_2014	320	14.90	18.44	24.26380	72.48532	Temple	<50M Mtr	<50 Sqm	Open Land


SAM_2010


SAM_2014


Sensitive Receptors
Village:Majadar; Taluka:Vadgam; District: Banaskantha
72.40 °
72.41 °
24.06 °
24.05 °
24.04 °
N
Inset-A (Scale: 1:2500)
Structure (Mosque), DSC01036
Structure (School), DSC01033
Structure (Mosque), DSC01034
Inset-B
Structure (Temple), DSC01023
Structure (School), DSC01017
Structure (Temple), DSC00999
Structure (Hospital), DSC00962
1
6
13
14
15
44
45
46
47
48
49
51
52
66
67
68
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m



Inset-B (*Scale: 1:2500*)

Village: Majadar; Taluka: Vadgam; District: Banaskantha

Photo ID	GPS Point No.	DFC Chainage (Km)		Lat	Long	Photo Description	Distance from Track 1	Approximate Size/ Capacity	Surrounding Environment
DSC00962	293	97.67	100.52	24.04015	72.40246	Sarkari Hospital Room	50-100 Mtr	<50 Sqm	Campus area by land user
DSC00995	319	97.67	100.52	24.04806	72.40479	Temple	<50M Mtr	50-100 Sqm	Open Land
DSC00996	320	97.67	100.52	24.04862	72.40495	Temple	<50M Mtr	50-100 Sqm	Open Land
DSC00997	321	97.67	100.52	24.04850	72.40482		<50M Mtr	50-100 Sqm	Open Land
DSC00998	322	97.67	100.52	24.04798	72.40545	Temple	<50M Mtr	50-100 Sqm	Open Land
DSC00999	323	97.67	100.52	24.04791	72.40540	Temple	<50M Mtr	150-300 Sqm	Campus area by land user
DSC01016	328	97.67	100.52	24.04882	72.40519	Aanganwadi Center	<50M Mtr	<50 Sqm	Campus area by land user
DSC01017	329	97.67	100.52	24.04822	72.40578	Majadar School	50-100 Mtr	300-500 Sqm	Campus area by land user
DSC01018	330	97.67	100.52	24.04812	72.40580		50-100 Mtr	300-500 Sqm	Campus area by land user
DSC01021	332	97.67	100.52	24.04861	72.40565		<50M Mtr	100-150 Sqm	Campus area by land user
DSC01022	333	97.67	100.52	24.04860	72.40612		50-100 Mtr	300-500 Sqm	Campus area by land user
DSC01023	334	97.67	100.52	24.04879	72.40613	Temple	50-100 Mtr	50-100 Sqm	Open Land
DSC01025	335	97.67	100.52	24.04910	72.40507	Temple	<50M Mtr	150-300 Sqm	Campus area by land user
DSC01033	343	97.67	100.52	24.05130	72.40667	School	<50M Mtr	50-100 Sqm	Campus area by land user
DSC01034	344	97.67	100.52	24.05123	72.40702	Mosque	<50M Mtr	150-300 Sqm	Campus area by land user
DSC01036	345	97.67	100.52	24.05152	72.40713		<50M Mtr	150-300 Sqm	Campus area by land user


DSC00962


DSC00995


DC00996


DSC00997


DSC00998


DC00999


DSC01016


DSC01017


DC01018


DSC01021


DSC01022

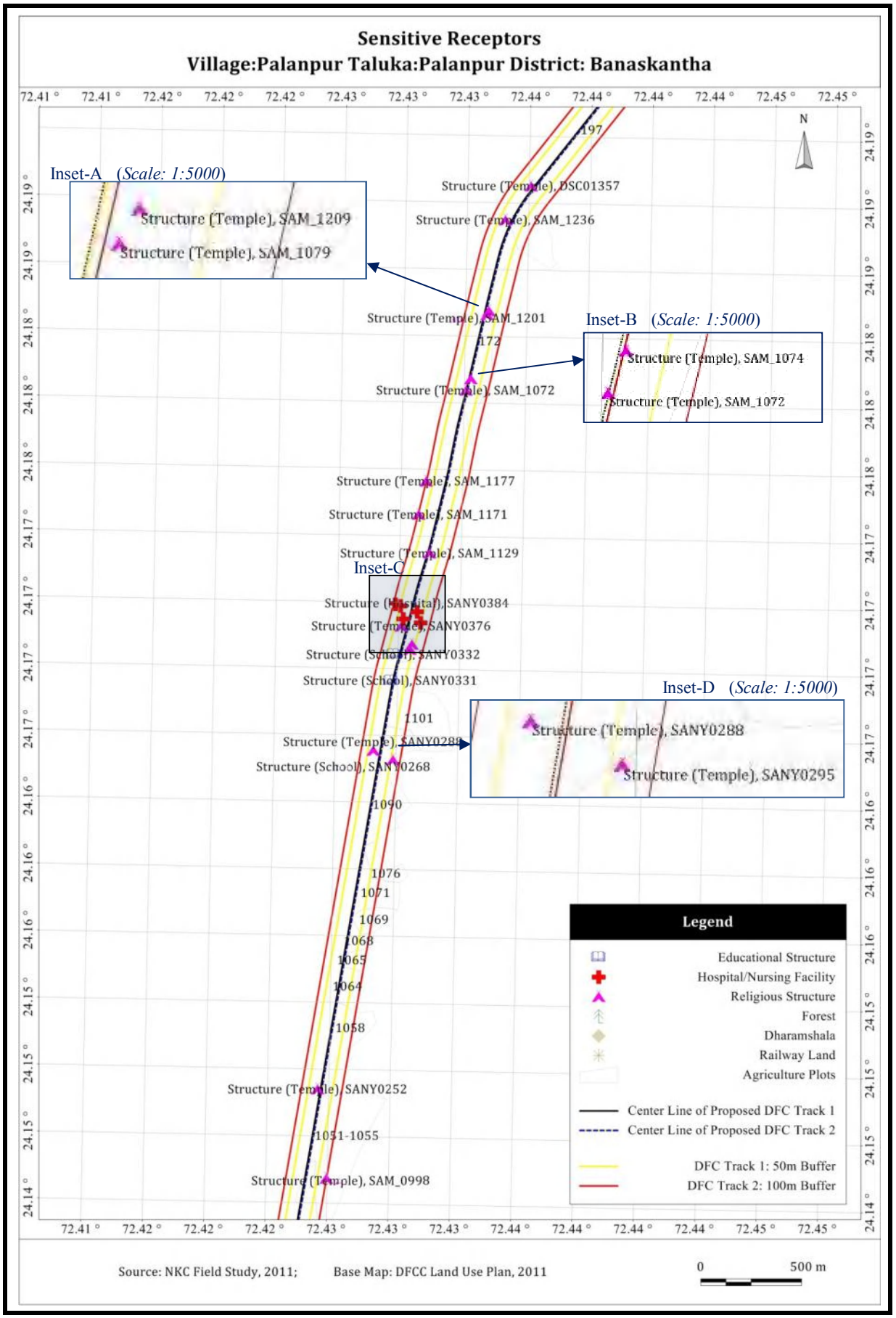

DC01023

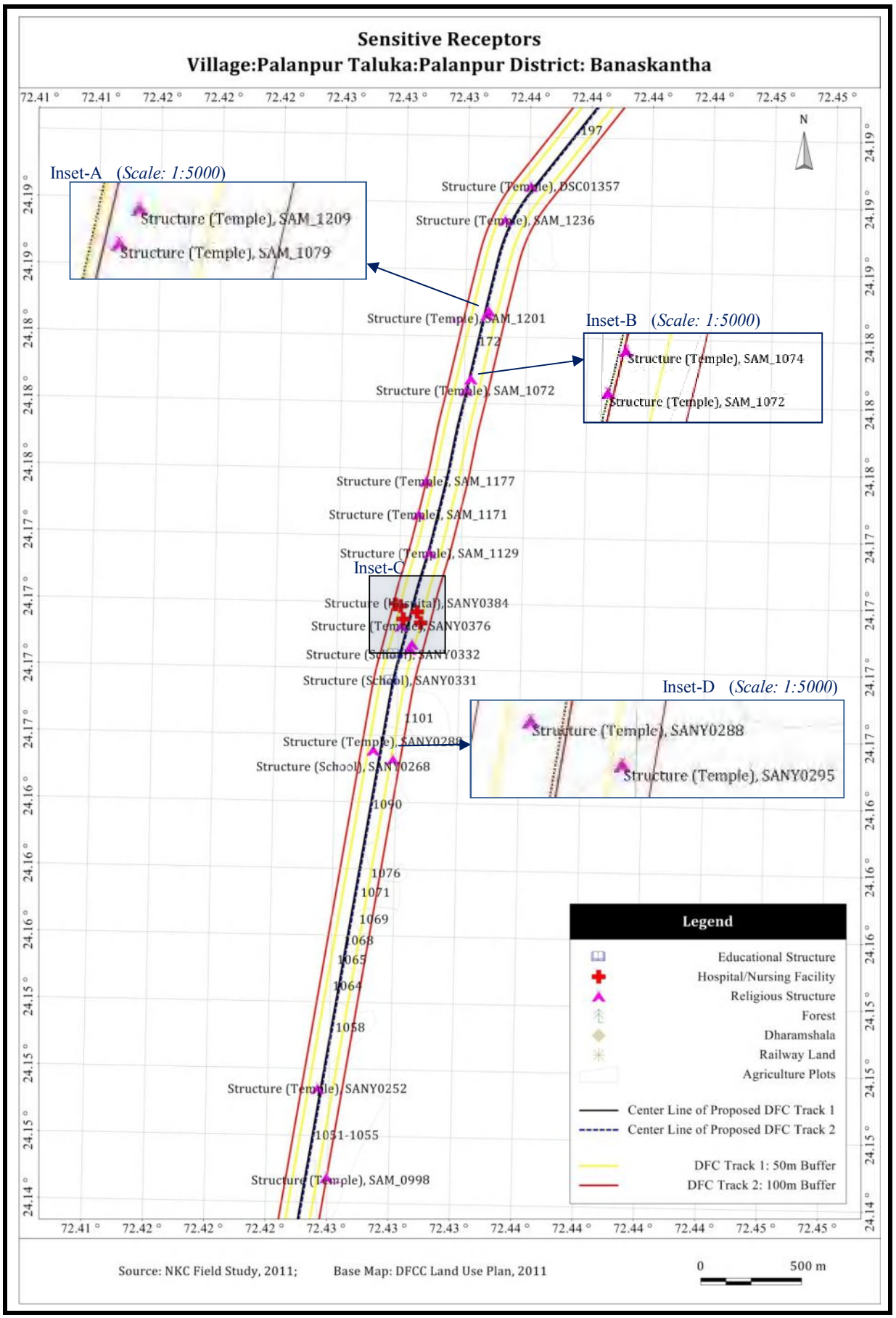

DSC01025


DSC01033


DC01034


DSC01036


Sensitive Receptors
Village:Palanpur Taluka:Palanpur District: Banaskantha
N
Inset-A (Scale: 1:5000)
Structure (Temple), SAM_1209
Structure (Temple), SAM_1079
Inset-B (Scale: 1:5000)
Structure (Temple), SAM_1074
Structure (Temple), SAM_1072
Inset-C
Inset-D (Scale: 1:5000)
Structure (Temple), SANY0288
Structure (Temple), SANY0295
197
Structure (Temple), DSC01357
Structure (Temple), SAM_1236
Structure (Temple), SAM_1201
172
Structure (Temple), SAM_1072
Structure (Temple), SAM_1177
Structure (Temple), SAM_1171
Structure (Temple), SAM_1129
Structure (Hospital), SANY0384
Structure (Temple), SANY0376
Structure (School), SANY0332
Structure (School), SANY0331
1101
Structure (Temple), SANY0289
Structure (School), SANY0268
1090
1076
1071
1069
1068
1065
1064
1058
Structure (Temple), SANY0252
1051-1055
Structure (Temple), SAM_0998
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011; Base Map: DFCC Land Use Plan, 2011
0 500 m


Sensitive Receptors
Village:Palanpur Taluka:Palanpur District: Banaskantha
N
Inset-A (Scale: 1:5000)
Structure (Temple), SAM_1209
Structure (Temple), SAM_1079
Structure (Temple), DSC01357
Structure (Temple), SAM_1236
197
Structure (Temple), SAM_1201
Inset-B (Scale: 1:5000)
Structure (Temple), SAM_1074
Structure (Temple), SAM_1072
172
Structure (Temple), SAM_1072
Structure (Temple), SAM_1177
Structure (Temple), SAM_1171
Structure (Temple), SAM_1129
Inset-C
Structure (Hospital), SANY0384
Structure (Temple), SANY0376
Structure (School), SANY0332
Structure (School), SANY0331
Inset-D (Scale: 1:5000)
1101
Structure (Temple), SANY0288
Structure (School), SANY0268
Structure (Temple), SANY0288
Structure (Temple), SANY0295
1090
1076
1071
1069
1068
1065
1064
1058
Structure (Temple), SANY0252
1051-1055
Structure (Temple), SAM_0998
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
500 m

Village: Palanpur; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01357	76	109.55	115.40	24.18977	72.43509	Temple	<50 Mtr	<50 Sqm	Open Land
SAM_1072	267	109.55	115.40	24.18055	72.43208	Temple	<50 Mtr	<10 Sqm	Open Land
SAM_1074	269	109.55	115.40	24.18106	72.43231	Temple	<50M Mtr	<10 Sqm	Open Land
SAM_1079	274	109.55	115.40	24.18395	72.43304	Temple of Hanumandada	<50M Mtr	<50 Sqm	Open Land
SAM_1129	310	109.55	115.40	24.17322	72.43047	Temple of Shitla Mataji	<50 Mtr	100-150 Sqm	Campus area by land user
SAM_1171	341	109.55	115.40	24.17495	72.42988	Temple	50-100 Mtr	<50 Sqm	Open Land
SAM_1209	365	109.55	115.40	24.18412	72.43314	Temple	<50 Mtr	<50 Sqm	Open Land
SAM_1236	390	109.55	115.40	24.18822	72.43387	Temple	<50 Mtr	50-100 Sqm	Open Land
SANY0252	72	109.55	115.40	24.14909	72.42547	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0288	95	109.55	115.40	24.16431	72.42787	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0295	98	109.55	115.40	24.16389	72.42885	Temple	50-100 Mtr	<50 Sqm	Open Land
SANY0331	115	109.55	115.40	24.16745	72.42866	School Building, Palanpur	<50 Mtr	300-500 Sqm	Campus area by land user
SANY0332	116	109.55	115.40	24.16865	72.42878		<50 Mtr	300-500 Sqm	
SANY0376	135	109.55	115.40	24.16994	72.42914	Temple	<50 Mtr	<10 Sqm	Open Land
SANY0377	136	109.55	115.40	24.17026	72.42921	Dental Care Clinic	<50 Mtr	50-100 Sqm	Covered Land by user
SANY0384	140	109.55	115.40	24.17059	72.42989	Hospital Building	<50 Mtr	150-300 Sqm	Covered Land by user
SANY0388	142	109.55	115.40	24.16912	72.42967	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0389	143	109.55	115.40	24.16889	72.42957	Temple	<50 Mtr	<50 Sqm	Open Land
SANY0398	147	109.55	115.40	24.17010	72.43007	Hospital Building	50-100 Mtr	100-150 Sqm	Campus area by land user
SANY0401	148	109.55	115.40	24.17084	72.42909	Ashirwad Hospital Building	<50 Mtr	150-300 Sqm	Campus area by land user
SANY0402	149	109.55	115.40	24.17092	72.42881	Sagar Nursing Home	50-100 Mtr	100-150 Sqm	Campus area by land user


DSC01357


SAM_1072


SAM_1074


SAM_1079


SAM_1129


SAM_1171


SAM_1209


SAM_1236


SANY0252


SANY0288


SANY0295


SANY0331


SANY0332


SANY0376

SANY0377


SANY0384

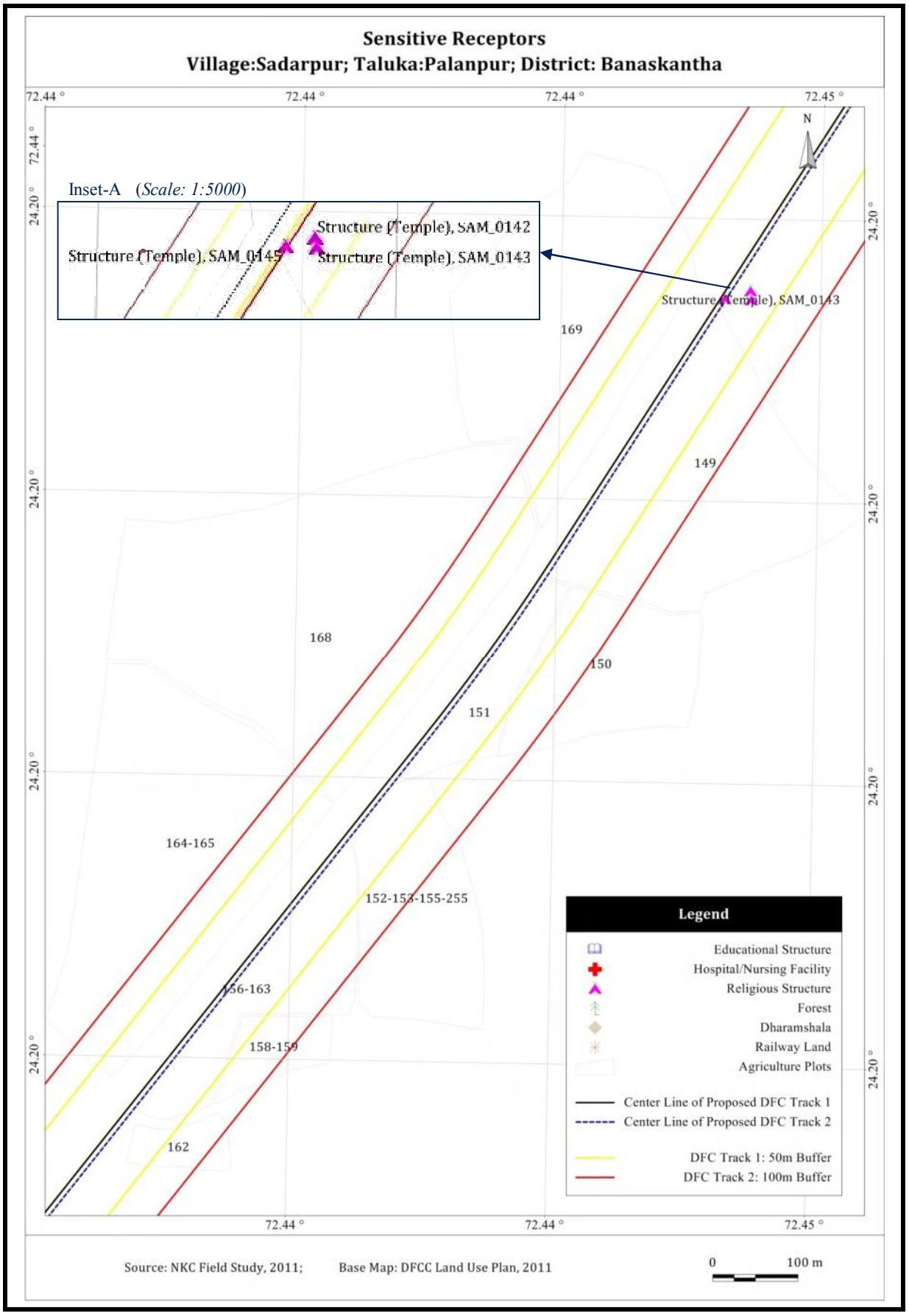

SANY0388


SANY0389

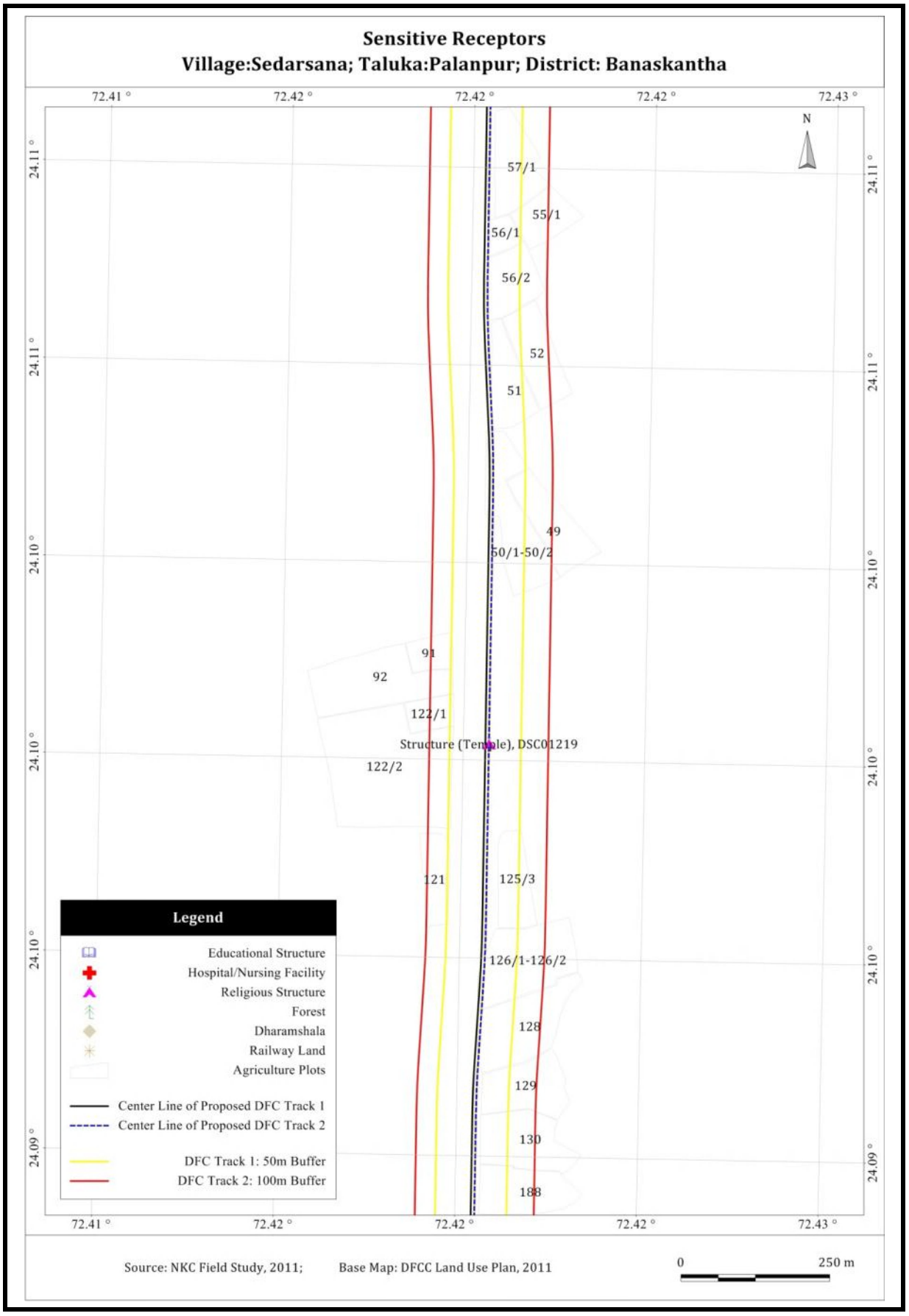

SANY0398


SANY0401


SANY0402


Sensitive Receptors
Village:Sadarpur; Taluka:Palanpur; District: Banaskantha
72.44 °
72.44 °
72.44 °
72.45 °
N
Inset-A (Scale: 1:5000)
Structure (Temple), SAM_0142
Structure (Temple), SAM_0145
Structure (Temple), SAM_0143
Structure (Temple), SAM_0143
169
149
168
150
151
164-165
152-153-155-255
156-163
158-159
162
24.20 °
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
100 m

Village: Sadarpur; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
SAM_0142	68	115.40	116.58	24.20324	72.44618	Temple	<50 Mtr	<50 Sqm	Open Land
SAM_0143	69	115.40	116.58	24.20314	72.44619	Temple	<50 Mtr	<50 Sqm	Open Land
SAM_0145	70	115.40	116.58	24.20315	72.44589	Temple	<50 Mtr	<10 Sqm	Open Land


Sensitive Receptors
Village:Sedarsana; Taluka:Palanpur; District: Banaskantha
72.41 °
72.42 °
72.42 °
72.42 °
72.43 °
24.11 °
24.10 °
24.09 °
N
57/1
55/1
56/1
56/2
52
51
49
50/1-50/2
91
92
122/1
Structure (Temple), DSC01219
122/2
121
125/3
126/1-126/2
128
129
130
188
Legend
Educational Structure
Hospital/Nursing Facility
Religious Structure
Forest
Dharamshala
Railway Land
Agriculture Plots
Center Line of Proposed DFC Track 1
Center Line of Proposed DFC Track 2
DFC Track 1: 50m Buffer
DFC Track 2: 100m Buffer
Source: NKC Field Study, 2011;
Base Map: DFCC Land Use Plan, 2011
0
250 m

Village: Sedrasana; Taluka: Palanpur; District: Banaskantha									
Photo ID	**GPS Point No.**	**DFC Chainage (Km)**		**Lat**	**Long**	**Photo Description**	**Distance from Track 1**	**Approximate Size/ Capacity**	**Surrounding Environment**
DSC01219	467	103.52	105.63	24.09924	72.42043	Temple	<50 Mtr	<50 Sqm	Open Land

Appendix-6a
Noise Survey

1. Railway and Background Noise

1-1 Photographs of Measurement Sites

(1) Palanpur

Photographs of each measurement site and surrounding land use in Palanpur are given in Figure 6a-1.

No.1	
	
Measurement Site	Surrounding Land Use
No.2	
	
Measurement Site	Surrounding Land Use

Source: NKC

Figure 6a-1 Measurement Sites and Surrounding Land Use in Palanpur

(2) Sidhpur

Photographs of each measurement site and surrounding land use in Sidhpur are given in Figure 6a-2.

No.1	
	
Measurement Site	Surrounding Land Use
No.2	
	
Measurement Site	Surrounding Land Use

Source: NKC

Figure 6a-2 Measurement Sites and Surrounding Land Use in Sidpur

(3) Mehsana

Photographs of each measurement site and surrounding land use in Mehsana are given in Figure 6a-3.

No.1	
	
Measurement Site	Surrounding Land Use
No.2	
	
Measurement Site	Surrounding Land Use

Source: NKC

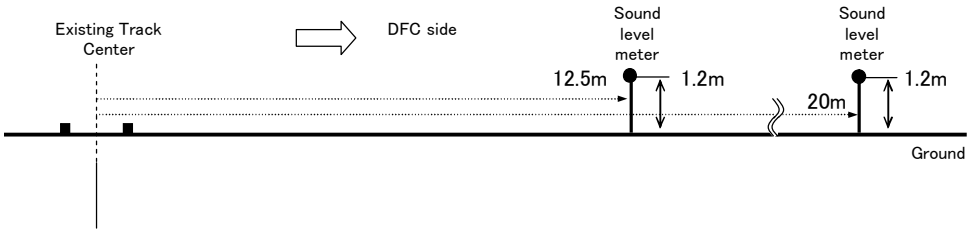
Figure 6a-3 Measurement Sites and Surrounding Land Use in Mehsana

1-2 Results of Railway and Background Noise

(1) Palanpur

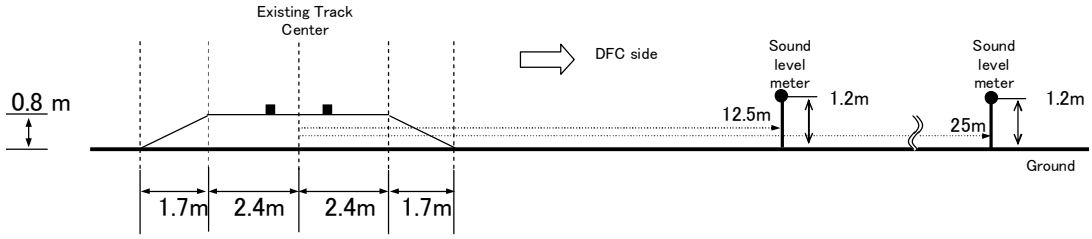
1) Cross-section View

Cross-section views of measurement site in Palanpur are given in Figures 6a-4.



Source: NKC

Figure 6a-4(1) Cross-section view of Measurement Site in Palanpur No.1



Source: NKC

Figure 6a-4(2) Cross-section view of Measurement Site in Palanpur No.2

2) Result of Background Noise

Results of background noise measurement in Palanpur are given in Table 6a-1.

Table 6a-1 Results of Background Noise Measurement in Palanpur

Station	date	No.	Background Noise Level L_{Aeq} [dB(A)]				
			10:00～12:00	12:00～14:00	14:00～16:00	16:00～18:00	Overall 10:00～18:00
Palanpur	31-Aug	1	52.4	49.8	50.6	50.7	51.0
	30-Aug	2	49.6	49.5	52.8	52.5	51.3

Source: NKC

3) Result of Railway Noise

Results of railway noise measurement in Palanpur are given in Tables 6a-2 and 6a-3.

Table 6a-2 Results of Railway Noise measurement in Palanpur No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	20.0m	12.5m	20.0m
1	31-Aug	10:36	Passenger	23	50	59	312	Down	-	-	-	-
2	31-Aug	10:50	Passenger	30	51	65	423	Up	98.7	97.9	94.6	94.7
3	31-Aug	10:56	Passenger	26	70	86	512	Down	99.8	97.5	91.5	88.3
4	31-Aug	11:17	Freight	22	106	98	657	Down	99.3	97.4	88.6	86.6
5	31-Aug	11:41	Passenger	97	18	23	490	Up	102.4	103.2	96.5	96.4
6	31-Aug	11:53	Passenger	22	65	77	401	Up	91.2	88.9	85.5	82.7
7	31-Aug	12:33	Freight	36	52	26	519	Up	-	-	-	-
8	31-Aug	12:43	Passenger	31	54	73	468	Up	-	-	-	-
9	31-Aug	13:58	Passenger	29	57	69	468	Down	104.3	103.2	93.6	90.8
10	31-Aug	14:28	Passenger	27	56	61	423	Down	93.0	91.2	83.0	80.7
11	31-Aug	16:22	Freight	30	58	110	491	Up	98.5	97.3	95.2	93.3
Average		Passenger(P)		45	47	60	445	Up	97.4	96.7	92.2	91.3
				26	58	69	429	Down	99.0	97.3	89.4	86.6
		Freight(F)		33	55	68	505	Up	98.5	97.3	95.2	93.3
				22	106	98	657	Down	99.3	97.4	88.6	86.6

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

Table 6a-3 Results of Railway Noise Measurement in Palanpur No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	25.0m	12.5m	25.0m
1	30-Aug	10:16	Passenger	52	22	33	312	Down	98.2	97.3	94.9	92.9
2	30-Aug	10:29	Freight	29	86	128	687	Down	95.8	93.5	80.1	79.0
3	30-Aug	10:40	Passenger	89	21	26	512	Down	-	-	-	-
4	30-Aug	11:37	Freight	13	131	162	477	Up	93.5	92.0	79.2	73.8
5	30-Aug	11:55	Passenger	34	42	52	401	Up	99.1	97.0	90.3	87.4
6	30-Aug	12:48	Freight	15	111	144	477	Up	-	-	-	-
7	30-Aug	13:21	Passenger	35	50	60	490	Up	103.3	102.7	93.4	90.5
8	30-Aug	13:32	Passenger	26	58	70	423	Up	90.8	88.4	81.0	77.7
9	30-Aug	13:53	Passenger	54	31	47	468	Down	-	-	-	-
10	30-Aug	14:07	Passenger	23	63	70	401	Down	94.1	91.3	86.0	81.4
11	30-Aug	15:35	Freight	18	97	149	484	Down	-	-	-	-
12	30-Aug	15:52	Freight	18	129	158	657	Down	94.0	91.4	84.5	79.9
13	30-Aug	16:10	Freight	15	115	146	472	Up	**103.9**	**100.0**	83.3	79.4
14	30-Aug	16:40	Freight	29	82	107	657	Down	93.0	90.1	78.7	74.8
15	30-Aug	17:18	Freight	18	96	151	483	Up	-	-	-	-
Average		Passenger(P)		32	50	61	438	Up	97.7	96.0	88.2	85.2
				55	34	44	423	Down	96.2	94.3	90.5	87.2
		Freight(F)		15	113	151	477	Up	98.7	96.0	81.3	76.6
				25	99	131	667	Down	94.3	91.7	81.1	77.9

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6a-4 and 6a-5. In Palanpur No.1, in consideration of all results roughly, the frequency of 400 Hz was mainly dominated. In Palanpur No.2, in consideration of all results roughly, the frequency from 800 to 1,250 Hz was mainly dominated. In Japan, the main noise of train includes[1] (1) traction, (2) structures and (3) machines equipped to the train, and predominant frequency from each noise is said to be almost from 250 to 2,000 Hz as well. Therefore, result of predominant frequency was similar to the case in Japan, and this would be suitable value. In addition, in case of countermeasure (e.g. soundproof) for railway noise, Japanese countermeasure method might be available.

Table 6a-4 Results of 1/3 Octave Band Frequency Analysis of Railway Noise In Palanpur No.1

No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passenger	Noise Level [dB(A)]	36	36	35	38	42	45	44	45	50	52	53	55	58	60	59	54	54	59	56	55	54	54	52	50	49	46	38	68
2	Passenger		29	32	37	41	45	48	49	48	52	55	55	57	61	63	63	57	55	57	55	55	57	57	54	52	49	47	42	71
3	Passenger		20	31	37	42	44	46	48	46	50	53	54	59	59	62	61	57	54	62	59	59	61	60	58	54	50	47	41	71
4	Freight		24	32	37	42	47	50	49	51	53	57	60	61	58	60	62	60	57	58	60	59	60	61	59	57	54	51	46	72
5	Passenger		40	40	48	53	50	47	51	56	60	64	65	68	71	77	78	74	75	78	76	75	77	77	72	71	68	64	59	87
6	Passenger		31	34	38	38	41	44	46	46	48	52	53	60	59	59	58	52	51	53	53	53	54	54	51	48	46	45	39	68
7	Freight		40	40	44	46	50	52	55	55	58	63	63	64	69	69	66	62	61	63	63	64	64	66	64	62	62	57	53	77
8	Passenger		31	32	37	41	44	45	48	47	49	52	55	60	64	65	62	57	55	57	55	55	58	60	55	53	50	47	41	72
9	Passenger		32	34	41	44	47	48	50	52	55	57	59	61	66	68	66	61	59	60	58	59	61	62	58	56	55	50	46	74
10	Passenger		38	39	39	43	44	47	47	48	50	53	54	58	61	62	62	56	53	54	54	55	56	57	54	51	49	46	42	70
11	Freight		23	31	39	46	50	54	58	59	62	65	67	66	66	67	66	67	67	68	68	69	67	66	66	62	62	58	56	79

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

Table 6a-5 Results of 1/3 Octave Band Frequency Analysis of Railway Noise In Palanpur No.2

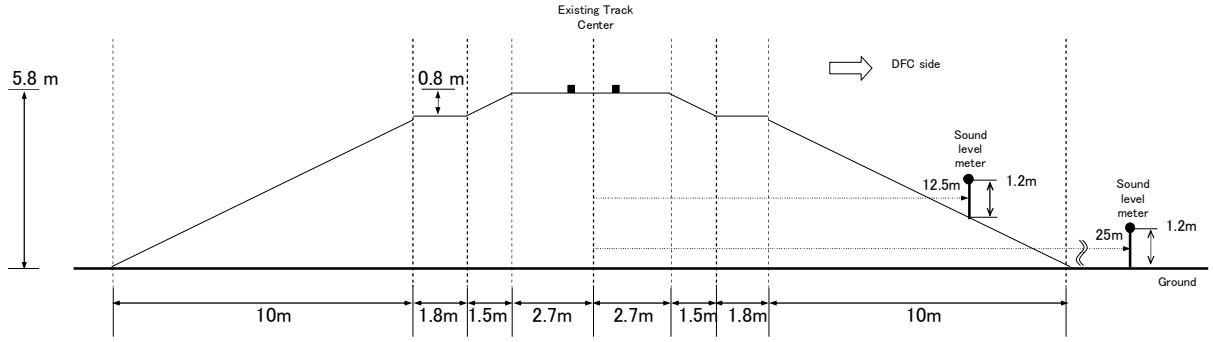
No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passenger	Noise Level [dB(A)]	37	36	35	39	47	47	50	54	60	63	65	66	63	60	59	59	61	63	60	60	61	62	61	60	59	55	49	74
2	Freight		38	37	37	39	49	52	53	55	55	57	57	58	56	54	52	53	58	61	60	60	59	61	61	59	57	55	53	71
3	Passenger		38	37	38	45	52	51	51	56	63	69	72	73	72	73	71	70	75	77	74	73	74	75	72	72	70	67	61	85
4	Freight		18	26	32	37	49	50	54	54	56	58	58	57	55	57	57	62	63	62	61	60	58	58	57	56	54	52	48	72
5	Passenger		30	30	31	41	44	46	51	54	57	62	63	61	59	58	56	58	60	66	64	64	63	63	60	58	57	53	47	74
6	Freight		24	27	33	37	51	51	55	56	57	57	57	57	56	56	57	59	60	59	59	59	58	59	57	54	52	49	45	71
7	Passenger		33	32	33	38	45	47	52	56	62	61	61	63	61	60	58	61	62	64	69	67	63	63	64	61	61	56	50	76
8	Passenger		38	37	36	38	43	47	49	51	52	55	55	56	56	53	50	50	53	56	55	54	56	57	53	53	51	48	42	68
9	Passenger		40	39	38	39	45	48	51	52	55	57	57	57	56	54	53	55	55	59	60	56	57	59	55	55	54	51	45	70
10	Passenger		39	38	38	38	45	46	48	48	51	54	56	56	55	52	50	49	52	56	54	54	54	58	52	51	50	47	43	68
11	Freight		37	36	35	38	47	51	53	53	53	54	55	55	55	54	51	52	56	59	58	57	57	58	56	55	54	52	49	70
12	Freight		39	38	39	42	47	47	49	48	49	51	54	52	49	48	48	50	54	57	57	57	55	56	56	56	54	54	51	68
13	Freight		41	40	40	45	47	51	53	53	58	61	57	54	53	50	51	54	56	60	61	62	65	60	61	61	60	56	52	73
14	Freight		22	31	35	42	49	53	55	56	59	59	60	58	56	56	55	56	60	62	61	61	59	61	60	58	57	54	52	72
15	Freight		26	33	37	44	52	56	55	57	57	57	58	57	55	54	55	57	58	60	57	57	56	56	54	53	51	49	45	70

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

(2) Sidhpur

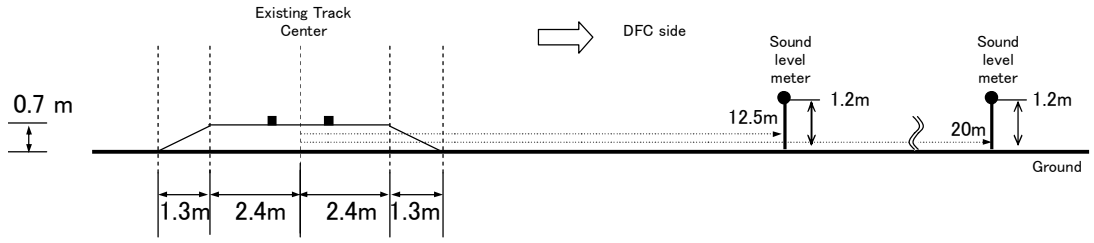
1) Cross-section View

Cross-section views of measurement site in Sidhpur are given in Figure 6a-5.



Source : NKC

Figure 6a-5(1) Cross-section view of Measurement Site in Sidhpur No.1



Source : NKC

Figure6a-5(2) Cross-section view of Measurement Site in Sidhpur No.2

2) Result of Background Noise

Results of background noise measurement in Sidhpur are given in Table 6a-6.

Table 6a-6 Results of Background Noise Measurement in Sidhpur

Station	date	No.	Background Noise Level L_{Aeq} [dB(A)]				
			10:00～12:00	12:00～14:00	14:00～16:00	16:00～18:00	Overall 10:00～18:00
Sidhpur	3-Sep	1	52.6	51.9	55.4	53.1	53.4
	2-Sep	2	55.5	53.3	50.8	54.0	53.6

Source: NKC

3) Result of Railway Noise

Results of railway noise measurement in Sidhpur are given in Table 6a-7 and 6a-8.

Table 6a-7 Results of Railway Noise Measurement in Sidhpur No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	25.0m	12.5m	25.0m
1	3-Sep	9:37	Passenger	50	22	31	312	Down	99.1	98.2	92.9	90.2
2	3-Sep	10:13	Passenger	60	31	41	512	Down	102.2	100.7	96.8	92.9
3	3-Sep	10:31	Passenger	39	45	53	490	Down	-	-	-	-
4	3-Sep	11:14	Passenger	74	21	26	423	Up	-	-	-	-
5	3-Sep	11:19	Freight	38	23	35	243	Down	99.4	99.0	92.0	90.3
6	3-Sep	11:41	Freight	29	68	68	542	Down	97.4	96.9	87.7	84.8
7	3-Sep	12:29	Passenger	50	35	46	490	Up	-	-	-	-
8	3-Sep	12:38	Passenger	50	29	41	401	Up	-	-	-	-
9	3-Sep	13:10	Passenger	41	43	52	490	Down	99.9	98.4	92.7	89.8
10	3-Sep	13:42	Passenger	40	36	38	401	Down	99.1	98.3	92.4	90.1
11	3-Sep	13:53	Passenger	58	31	42	490	Up	-	-	-	-
12	3-Sep	14:12	Freight	25	93	97	646	Up	89.6	88.0	75.1	71.8
13	3-Sep	14:45	Freight	46	52	68	657	Down	102.1	101.5	95.2	92.2
14	3-Sep	16:12	Freight	56	42	45	657	Up	-	-	-	-
15	3-Sep	18:00	Passenger	50	18	24	245	Down	89.1	88.9	84.1	83.0
16	3-Sep	18:32	Passenger	52	21	30	312	Up	-	-	-	-
17	3-Sep	18:38	Passenger	34	44	52	423	Down	96.1	96.1	87.7	84.8
18	3-Sep	19:00	Passenger	52	39	52	557	Up	**98.7**	**95.4**	82.8	79.5
Average		Passenger(P)		56	29	40	445	Up	98.7	95.4	82.8	79.5
				45	34	42	410	Down	97.6	96.8	91.1	88.5
		Freight(F)		40	68	71	651	Up	89.6	88.0	75.1	71.8
				37	48	57	481	Down	99.6	99.1	91.6	89.1

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

Table 6a-8 Results of Railway Noise Measurement in Sidhpur No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	20.0m	12.5m	20.0m
1	3-Sep	9:35	Passenger	29	38	45	312	Down	94.3	95.2	87.6	92.9
2	3-Sep	9:56	Passenger	34	55	68	512	Down	95.5	93.9	83.2	79.8
3	3-Sep	10:20	Freight	29	58	75	471	Up	**96.2**	**93.3**	78.6	75.7
4	3-Sep	11:47	Freight	34	68	80	643	Down	103.9	101.5	95.2	92.0
5	3-Sep	12:17	Passenger	67	26	35	490	Up	-	-	-	-
6	3-Sep	12:39	Passenger	28	62	73	490	Down	99.5	97.8	89.2	87.1
7	3-Sep	12:43	Freight	21	79	102	471	Up	104.8	104.2	91.2	91.1
8	3-Sep	12:55	Passenger	33	46	56	423	Up	99.5	97.8	89.2	85.5
9	3-Sep	13:40	Passenger	25	59	72	401	Down	94.7	91.9	85.8	82.4
10	3-Sep	13:49	Passenger	28	60	61	468	Up	97.3	95.7	88.0	86.4
11	3-Sep	14:38	Freight	21	81	155	471	Up	99.4	98.9	94.3	94.6
12	3-Sep	15:25	Freight	27	51	80	379	Up	-	-	-	-
13	3-Sep	18:00	Passenger	32	25	33	223	Down	89.4	86.2	76.6	72.8
14	3-Sep	18:09	Passenger	23	49	57	312	Down	91.9	90.6	80.0	77.1
15	3-Sep	18:15	Freight	23	101	101	657	Up	-	-	-	-
16	3-Sep	18:42	Freight	28	59	87	450	Down	106.2	103.5	97.2	94.0
Average		Passenger(P)		43	44	51	460	Up	98.4	96.8	88.6	86.0
				28	48	58	375	Down	94.2	92.6	83.7	82.0
		Freight(F)		24	80	108	518	Up	100.1	98.8	88.0	87.1
				31	63	84	547	Down	105.1	102.5	96.2	93.0

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6a-9 and 6a-10. In Sidhpur No.1, in consideration of all results roughly, the frequency from 500 to 800 Hz was mainly dominated. In Sidhpur No.2, in consideration of all results roughly, the frequency from 1000 to 2500 Hz was mainly dominated. In Japan, the main noise of train includes[1] (1) traction, (2) structures and (3) machines equipped to the train, and predominant frequency from each noise is said to be almost from 250 to 2,000 Hz as well. Therefore, result of predominant frequency was similar to the case in Japan, and this would be suitable value. In addition, in case of countermeasure (e.g. soundproof) for railway noise, Japanese countermeasure method might be available.

Table 6a-9 Results of 1/3 Octave Band Frequency Analysis of Railway Noise in Sidhpur No.1

No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passenger		32	32	33	38	43	45	50	55	57	57	56	55	56	57	62	64	63	61	61	59	61	62	60	60	64	53	48	73
2	Passenger		35	34	35	40	48	49	54	57	60	61	62	62	60	61	66	67	67	64	62	62	62	62	60	60	62	54	49	75
3	Passenger		36	35	34	37	43	43	47	51	54	53	53	53	55	54	59	58	58	57	53	53	56	56	54	53	51	47	42	68
4	Passenger		37	36	39	46	57	57	56	59	62	60	60	63	60	68	68	70	75	70	73	67	69	66	63	61	58	55	51	81
5	Freight		38	37	37	42	47	48	50	57	62	60	57	59	57	58	61	64	63	62	62	62	64	65	63	64	67	58	55	75
6	Freight		23	26	29	40	46	51	56	59	63	64	63	62	61	60	62	62	61	61	62	62	62	62	60	58	56	54	51	74
7	Passenger		39	38	37	38	42	45	47	49	50	52	51	50	50	51	56	55	58	54	54	56	54	56	53	51	49	46	43	67
8	Passenger		39	38	37	39	42	44	46	49	50	50	50	51	52	52	57	57	55	54	54	51	53	54	53	54	49	46	42	67
9	Passenger	Noise Level [dB(A)]	39	37	36	38	43	47	52	52	59	56	55	54	55	58	61	62	62	60	57	55	57	58	56	56	56	50	45	71
10	Passenger		39	38	37	39	44	45	49	51	53	52	52	53	53	57	60	59	60	57	56	56	59	61	58	58	54	51	47	70
11	Passenger		39	38	37	40	45	45	48	49	52	54	51	53	55	54	59	58	58	56	51	52	55	55	51	51	47	45	40	68
12	Freight		30	31	31	36	44	51	53	56	55	58	57	55	54	55	57	56	56	56	57	58	58	58	55	54	53	50	48	70
13	Freight		29	31	37	43	48	52	52	54	58	59	60	58	59	59	64	64	63	62	61	60	61	62	60	61	58	56	53	74
14	Freight		38	39	39	44	52	56	51	55	60	59	59	58	56	60	66	67	67	66	65	64	65	66	64	63	61	58	55	76
15	Passenger		38	37	36	37	42	44	46	49	52	53	50	51	54	57	62	65	61	60	60	58	61	60	55	54	51	48	44	71
16	Passenger		37	36	36	38	42	43	45	49	51	52	50	53	51	60	60	59	62	61	60	55	55	55	53	52	49	46	42	70
17	Passenger		37	36	35	38	42	44	47	49	52	52	51	49	49	56	60	58	56	54	53	55	56	54	51	50	47	45	40	68
18	Passenger		36	35	34	39	43	44	46	52	55	53	51	51	51	53	58	58	56	54	51	51	53	52	50	49	47	45	41	67

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

Table 6a-10 Results of 1/3 Octave Band Frequency Analysis of Railway Noise in Sidhpur No.2

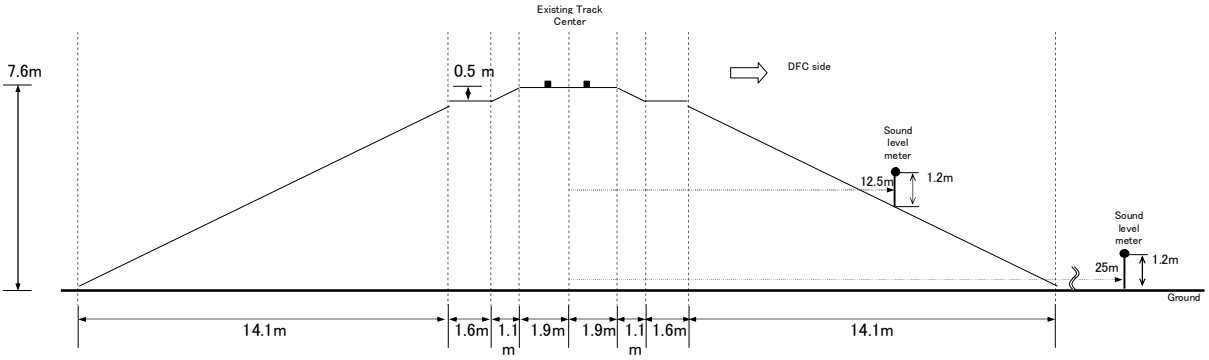
No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passenger		30	30	29	35	40	41	49	47	50	53	54	60	58	56	58	57	60	62	61	60	63	64	59	60	55	53	50	72
2	Passenger		32	32	31	35	42	44	47	50	51	56	56	57	59	60	59	59	62	64	62	61	65	64	60	58	54	51	46	73
3	Freight		39	38	38	40	44	50	52	54	56	59	61	62	64	61	60	61	64	66	66	64	66	67	65	65	62	60	56	76
4	Freight		38	37	37	45	48	51	52	53	56	59	62	61	62	62	62	64	67	68	68	68	69	71	67	65	63	61	58	79
5	Passenger		38	37	37	40	49	55	56	58	60	64	64	69	69	69	69	71	75	76	73	70	71	72	69	69	67	63	61	83
6	Passenger		38	37	36	37	42	44	46	47	49	54	52	59	58	58	58	58	62	64	63	62	65	65	60	59	54	51	46	74
7	Freight		37	36	36	38	46	50	52	54	56	58	59	61	64	60	58	60	63	65	66	64	65	65	64	64	62	61	61	76
8	Passenger		38	37	36	38	42	45	48	48	50	55	55	59	63	63	63	64	66	66	65	62	63	64	61	61	57	54	50	75
9	Passenger	Noise Level [dB(A)]	36	35	35	36	41	41	45	44	45	49	51	55	58	55	56	57	61	63	61	60	61	62	56	56	50	47	43	71
10	Passenger		41	39	38	39	41	43	47	48	51	55	54	61	61	63	63	62	64	66	64	60	62	63	60	58	54	52	48	74
11	Freight		33	33	33	33	38	39	42	47	45	48	46	48	49	48	46	48	52	55	53	51	52	51	49	49	47	46	42	65
12	Freight		36	36	37	42	47	50	55	58	59	60	61	61	63	62	63	64	66	67	65	64	63	64	63	61	58	56	51	76
13	Passenger		39	38	37	37	39	41	45	46	49	56	55	56	57	58	60	63	64	64	62	61	65	62	58	56	52	50	46	73
14	Passenger		36	35	35	36	40	40	47	49	49	54	54	55	59	58	57	58	61	63	62	61	63	65	57	57	53	49	44	72
15	Freight		32	35	43	47	49	52	52	53	56	59	59	59	57	58	60	64	64	65	66	62	64	65	64	62	58	57	53	75
16	Freight		27	29	31	39	46	51	54	55	58	60	60	62	68	62	61	65	67	69	69	69	69	70	67	66	64	61	58	79

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

(3) Mehsana

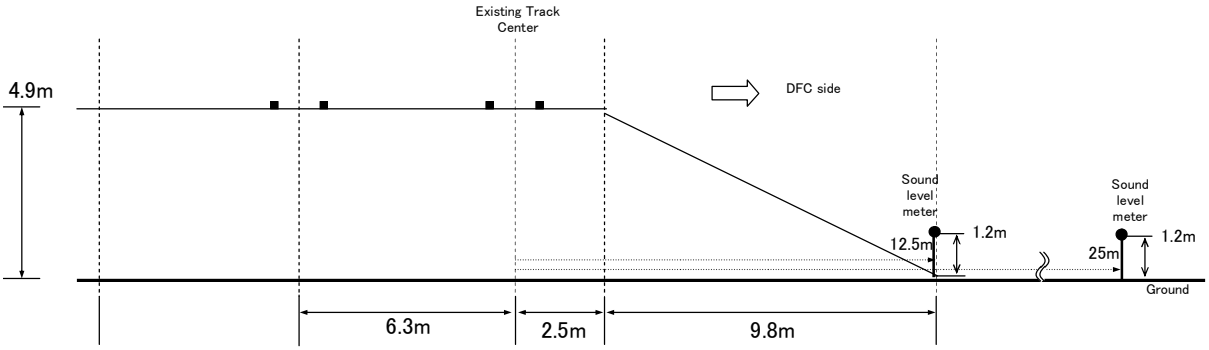
1) Cross-section View

Cross-section views of measurement site in Mehsana are given in Figure 6a-6.



Source : NKC

Figure 6a-6(1) Cross-section view of Measurement Site in Mehsana No.1



Source : NKC

Figure 6a-6(2) Cross-section view of Measurement Site in Mehsana No.2

2) Result of Background Noise

The results of background noise measurement in Mehsana are given in Table 6a-11.

Table 6a-11 Results of Background Noise Measurement in Mehsana

Station	date	No.	Background Noise Level L_{Aeq} [dB(A)]				
			10:00～12:00	12:00～14:00	14:00～16:00	16:00～18:00	Overall 10:00～18:00
Mehsana	5-Sep	1	51.5	54.9	52.0	52.2	52.8
	6-Sep	2	55.1	52.9	58.0	54.3	55.5

Note: Measurement lower limits of noise level meter are 30dB for X and Y-direction and 25dB for Z-direction, therefore, measurement value under these limits indicate with [<]

Source: NKC

3) Result of Railway Noise

Results of railway noise measurement in Mehsana are given in Tables 6a-12 and 6a-13.

Table 6a-12 Results of Railway Noise Measurement in Mehsana No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	25.0m	12.5m	25.0m
1	5-Sep	10:00	Passanger	58	25	33	401	Down	96.2	93.7	90.6	85.8
2	5-Sep	11:10	Freight	44	53	65	657	Up	**95.6**	**88.6**	78.3	71.3
3	5-Sep	11:34	Passanger	84	18	23	423	Up	-	-	-	-
4	5-Sep	12:23	Passanger	49	35	42	468	Down	100.7	99.1	94.0	89.9
5	5-Sep	12:56	Passanger	68	26	30	490	Up	99.6	97.8	95.1	93.8
6	5-Sep	13:03	Passanger	46	31	39	401	Down	94.7	91.6	88.7	82.7
7	5-Sep	13:39	Passanger	93	16	27	423	Up	-	-	-	-
8	5-Sep	14:18	Freight	35	46	65	450	Up	-	-	-	-
9	5-Sep	14:30	Passanger	90	20	31	490	Up	-	-	-	-
10	5-Sep	16:13	Freight	77	31	60	657	Up	-	-	-	-
11	5-Sep	17:18	Passanger	52	16	19	223	Down	89.2	84.2	80.5	74.6
12	5-Sep	18:08	Passanger	55	28	34	423	Down	98.6	96.3	92.5	88.4
13	5-Sep	18:23	Freight	41	58	97	657	Up	-	-	-	-
14	5-Sep	19:00	Passanger	65	20	27	356	Down	101.7	99.9	95.1	91.5
Average		Passenger(P)		84	20	28	456	Up	99.6	97.8	95.1	93.8
				54	26	32	378	Down	96.9	94.1	90.2	85.5
		Freight(F)		52	43	63	588	Up	95.6	88.6	78.3	71.3
				-	-	-	-	Down	-	-	-	-

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

Table 6a-13 Results of Railway Noise Measurement in Mehsana No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Noise Level [dB]			
									LAE		LAmax	
									12.5m	25.0m	12.5m	25.0m
1	6-Sep	9:45	Passenger	52	34	34	490	Down	-	-	-	-
2	6-Sep	12:00	Passenger	28	64	110	490	Down	90.0	89.7	82.9	80.6
3	6-Sep	12:41	Passenger	38	40	62	423	Down	88.7	87.8	80.5	78.0
4	6-Sep	13:05	Passenger	22	22	32	133	Down	81.7	80.3	72.3	71.2
5	6-Sep	13:11	Passenger	43	33	39	401	Up	**101.8**	**99.7**	86.6	84.5
6	6-Sep	13:55	Passenger	26	58	62	423	Up	92.8	90.8	81.2	80.2
7	6-Sep	15:15	Passenger	19	25	35	133	Up	81.5	80.7	71.9	69.7
8	6-Sep	17:14	Passenger	31	26	44	223	Down	83.7	84.3	72.1	71.9
Average		Passenger(P)		30	39	45	319	Up	92.0	90.4	79.9	78.1
				34	37	56	352	Down	86.0	85.5	77.0	75.4
		Freight(F)		-	-	-	-	Up	-	-	-	-
				-	-	-	-	Down	-	-	-	-

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway noise measurement time for L_{AE} and L_{Amax} in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
"-" means unavailable data because a lot of alarm whistle sounds that had a significant influence were included.
Bold face means that the L_{AE} value is calculated from the measured L_{Amax} value based on the formula ($L_{AE} = L_{Amax} + 10\log t$ *, t:passage time(s)) in the case where L_{AE} was not available and L_{Amax} was available. * refer to S-ESIMMS (JBIC's SAPROF study, 2009)
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6a-14 and 6a-15. In Mehsana No.1, in consideration of all results roughly, the frequency of 800 Hz was mainly dominated. In Mehsana No.2, in consideration of all results roughly, the frequency from 250 to 800 Hz was mainly dominated. In Japan, the main noise of train includes[1] (1) traction, (2) structures and (3) machines equipped to the train, and predominant frequency from each noise is said to be almost from 250 to 2,000 Hz as well. Therefore, result of predominant frequency was similar to the case in Japan, and this would be suitable value. In addition, in case of countermeasure (e.g. soundproof) for railway noise, Japanese countermeasure method might be available.

Table 6a-14 Results of 1/3 Octave Band Frequency Analysis of Railway Noise In Mehsana No.1

No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passanger	Noise Level [dB(A)]	32	32	34	40	43	50	56	58	62	63	61	64	65	64	67	68	70	67	63	61	64	63	59	58	54	50	45	77
2	Freight		32	33	35	41	46	50	52	53	58	58	60	57	58	59	59	62	65	63	61	60	61	62	60	57	57	53	47	73
3	Passanger		37	38	39	48	55	56	57	61	64	66	64	66	67	70	70	73	80	75	76	72	73	71	67	65	60	56	52	85
4	Passanger		39	38	37	39	41	45	53	56	59	59	57	61	63	61	61	63	65	64	59	58	61	62	58	58	53	48	43	74
5	Passanger		39	38	39	43	50	50	52	56	61	63	60	64	68	67	68	70	73	72	68	65	66	67	63	62	58	54	48	80
6	Passanger		37	35	35	37	42	48	54	53	56	57	57	60	61	59	62	61	64	62	58	59	60	61	56	54	51	48	43	72
7	Passanger		38	37	37	41	46	51	55	57	60	62	61	61	65	65	66	70	72	71	68	67	67	67	65	63	60	55	49	79
8	Freight		30	30	32	38	47	52	54	58	60	63	64	61	63	59	58	59	61	63	62	64	63	65	64	61	61	57	54	75
9	Passanger		37	36	38	42	50	53	58	60	61	65	65	66	70	71	71	74	79	78	74	73	75	74	70	69	65	61	55	85
10	Freight		33	34	36	43	45	51	54	55	58	58	60	59	59	60	60	63	66	65	61	61	62	62	60	57	53	50	45	74
11	Passanger		36	35	35	37	41	45	50	54	57	57	57	62	59	61	62	63	67	65	60	58	63	62	58	57	53	50	46	74
12	Passanger		35	35	37	43	52	54	56	58	61	62	62	66	64	66	65	68	69	68	66	63	64	63	60	59	55	52	48	77
13	Freight		30	38	42	46	48	46	46	46	48	49	50	50	50	50	50	51	53	51	50	49	48	48	47	44	42	43	38	63
14	Passanger		32	32	32	39	42	50	59	58	63	64	63	69	66	67	69	71	72	71	67	66	67	69	64	62	60	53	47	80

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

Table 6a-15 Results of 1/3 Octave Band Frequency Analysis of Railway Noise In Mehsana No.2

No.	train type	Frequency [Hz]	20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	AP
1	Passenger	Noise Level [dB(A)]	25	31	37	44	46	48	50	54	56	59	63	66	67	68	71	71	71	71	71	70	71	70	68	64	61	57	51	81
2	Passenger		25	26	30	33	34	37	38	41	42	44	46	46	48	50	50	52	51	51	48	48	49	48	45	43	42	43	37	61
3	Passenger		31	31	34	36	39	39	40	46	48	49	51	54	54	55	57	56	60	59	54	54	56	55	53	47	46	46	39	68
4	Passenger		31	31	33	36	37	39	45	44	48	51	55	60	53	54	53	52	52	54	52	53	52	52	49	47	45	44	38	66
5	Passenger		31	32	37	42	46	47	50	56	54	56	59	62	64	64	65	68	67	66	64	62	63	63	59	56	52	50	44	76
6	Passenger		30	30	35	38	42	40	47	48	48	50	53	58	60	57	58	58	56	56	57	55	56	56	54	51	47	45	39	68
7	Passenger		35	34	34	37	41	41	42	45	48	52	50	50	51	53	55	53	54	52	53	55	54	53	52	53	48	46	42	66
8	Passenger		32	32	33	35	40	37	40	42	44	47	50	52	50	53	55	55	53	54	52	55	54	53	49	46	43	42	37	65

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.
Source: NKC

2. Impact Assessment

2-1 Time Table of Passenger Train

Time tables of passenger train used for setting of noise prediction are shown from Tables 6a-16 to 6a-18. These time tables were made based on actual time table of each station (as of July 2010).

Table 6a-16 Time Table (Palanpur)

Time		Up															Down													Total Trains
From	To	Daily		Stop per week						Through per week							Daily		Stop per week						Through per week							
		Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	
0:00	1:00	1														1	1														1	2
1:00	2:00			1	1	1										3				1	1										2	5
2:00	3:00						1									1															0	1
3:00	4:00			3												3	2			2											4	7
4:00	5:00			1	1											2															0	2
5:00	6:00	1														1			2												2	3
6:00	7:00	1														1															0	1
7:00	8:00	1		2												3															0	3
8:00	9:00															0															0	0
9:00	10:00															0	1														1	1
10:00	11:00															0	1		2	2					1						6	6
11:00	12:00			2	2					1		1				6			1						2						3	9
12:00	13:00	1														1			1												1	2
13:00	14:00															0	1														1	1
14:00	15:00	1														1	1														1	2
15:00	16:00															0															0	0
16:00	17:00															0															0	0
17:00	18:00	2														2															0	2
18:00	19:00															0	1														1	1
19:00	20:00															0	1		2												4	4
20:00	21:00															0	1														1	1
21:00	22:00	2														2						1									1	3
22:00	23:00						1									1															0	1
23:00	0:00				1											1						1									1	2
Daytime Total		7	0	4	2	0	0	0	0	1	0	1	0	0	0	15	7	0	6	2	0	1	0	0	3	0	1	0	0	0	20	35
Nighttime Total		3	0	5	3	1	2	0	0	0	0	0	0	0	0	14	3	0	2	3	1	1	0	0	0	0	0	0	0	0	10	24
Total		10	0	9	5	1	2	0	0	1	0	1	0	0	0	29	10	0	8	5	1	2	0	0	3	0	1	0	0	0	30	59

Note: Up : to Mumbai Down : to Delhi
Stop : This indicates number of trains which stops at this station.
Through : This indicates number of trains which pass through this station.
Daytime : 7:00-22:00 Nighttime : 22:00-7:00
Source: NKC

Table 6a-17 Time Table (Sidhpur)

Time		Up															Down													Total Trains
From	To	Daily		Stop per week						Through per week							Daily		Stop per week						Through per week							
		Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	
0:00	1:00										1					1										1	1				2	3
1:00	2:00		1													1															0	1
2:00	3:00			1							1	1				3	1	1													2	5
3:00	4:00												1			1										2					2	3
4:00	5:00			1						3	1					5									2						2	7
5:00	6:00		1													1															0	1
6:00	7:00															0															0	0
7:00	8:00	1	1							2						4															0	4
8:00	9:00															0	1														1	1
9:00	10:00															0	1								1						2	2
10:00	11:00															0				1					5	1					7	7
11:00	12:00											1				1									1						1	2
12:00	13:00				1					3	1					5	1														1	6
13:00	14:00	1														1	1														1	2
14:00	15:00	1														1															0	1
15:00	16:00															0															0	0
16:00	17:00															0															0	0
17:00	18:00															0	1								1						2	2
18:00	19:00	1														1			1		1										2	3
19:00	20:00	1														1		2													2	3
20:00	21:00															0															0	0
21:00	22:00															0						1						1			2	2
22:00	23:00		1										1			2															0	2
23:00	0:00	1														1	1														1	2
Daytime Total		5	1	0	1	0	0	0	0	5	1	1	0	0	0	14	5	2	1	1	1	1	0	0	8	1	0	1	0	0	21	35
Nighttime Total		1	3	2	0	0	0	0	0	3	3	1	2	0	0	15	2	1	0	0	0	0	0	0	2	3	1	0	0	0	9	24
Total		6	4	2	1	0	0	0	0	8	4	2	2	0	0	29	7	3	1	1	1	1	0	0	10	4	1	1	0	0	30	59

Note: Up : to Mumbai Down : to Delhi
Stop : This indicates number of trains which stops at this station.
Through : This indicates number of trains which pass through this station.
Daytime : 7:00-22:00 Nighttime : 22:00-7:00
Source: NKC

Table 6a-18 Time Table (Mehsana)

Time		Up														Down												Total Trains
From	To	Daily		Stop per week						Through per week							Daily		Stop per week						Through per week						
		Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	Stop	Through	1	2	3	4	5	6	1	2	3	4	5	6	Total	
0:00	1:00	1														1	1				1	1									3	4
1:00	2:00	1			1											2	2														2	4
2:00	3:00				1	1										2					1										2	4
3:00	4:00			1												1			2												2	3
4:00	5:00			2			1			1						4																0	4
5:00	6:00	1									1					2																0	2
6:00	7:00	1														1																0	1
7:00	8:00		1													1	1															1	2
8:00	9:00	1		2												3	1															1	4
9:00	10:00															0			3	2					3							8	8
10:00	11:00															0																0	0
11:00	12:00															0	1								1							2	2
12:00	13:00												1			1	1															1	2
13:00	14:00	1		2	2					1						6																0	6
14:00	15:00															0																0	0
15:00	16:00	1														1																0	1
16:00	17:00															0																0	0
17:00	18:00															0		1	2													3	3
18:00	19:00															0	1															2	2
19:00	20:00	1														1	1															1	2
20:00	21:00	1														1																0	1
21:00	22:00															0						1						1				2	2
22:00	23:00	1														1																0	1
23:00	0:00												1			1																0	1
Daytime Total		5	1	4	2	0	0	0	0	1	0	1	0	0	0	14	6	1	5	2	0	1	0	0	4	0	1	1	0	0	21	35
Nighttime Total		5	0	3	2	1	1	0	0	1	1	0	1	0	0	15	3	0	2	2	1	0	0	0	0	1	0	0	0	0	9	24
Total		10	1	7	4	1	1	0	0	2	1	1	1	0	0	29	9	1	7	4	1	1	0	0	4	1	1	1	0	0	30	59

Note: Up : to Mumbai Down : to Delhi
Stop : This indicates number of trains which stops at this station.
Through : This indicates number of trains which pass through this station.
Daytime : 7:00-22:00 Nighttime : 22:00-7:00
Source: NKC

2-2 Results of Noise Prediction

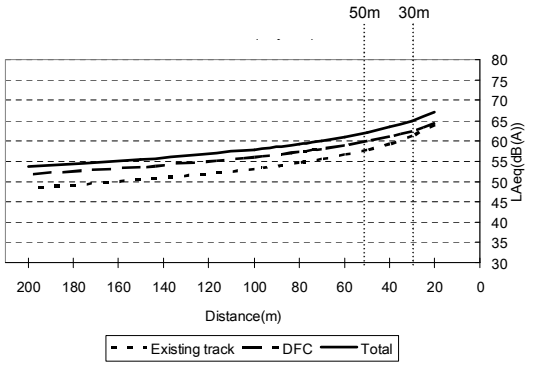
The results of noise prediction are given below. Range of distance from near railway to 200m is indicated on graphs. In addition, the results of noise prediction with countermeasure by soundproof wall are given below. Countermeasure 1 are the method of setting up the soundproof wall to meet the guideline value in 30m point (40m point at DFC side of Mehsana No.1) from the center of the existing railway, and countermeasure 2 are the method of setting up the soundproof wall to meet the guideline value in 50m point from the center of the existing railway.

Distance 0m in each graph indicates center position of each existing track, while prediction points (30m and 50m) were put down with each graph.

(1) Palanpur No.1

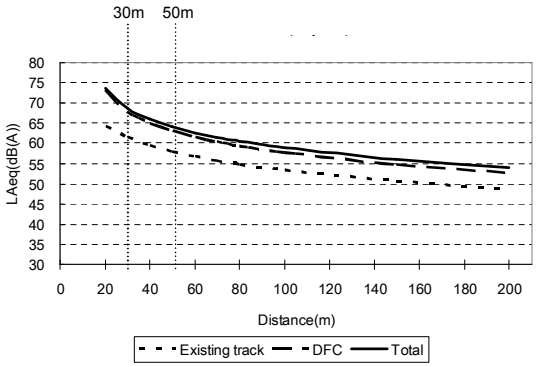
The results of noise prediction for Palanpur No.1 are given in Figure 6a-7.

1) without countermeasure



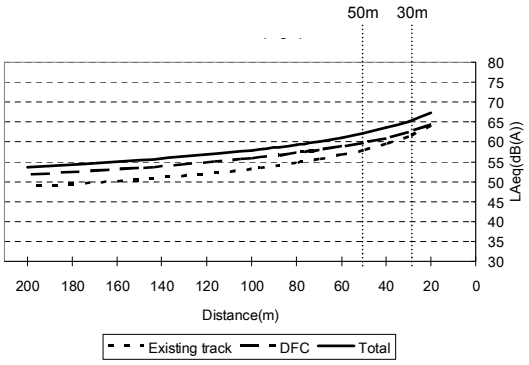
Source : NKC

Figure 6a-7(1) Result of Noise Prediction Without Countermeasure on Daytime At Palanpur-1 (Existing track side)



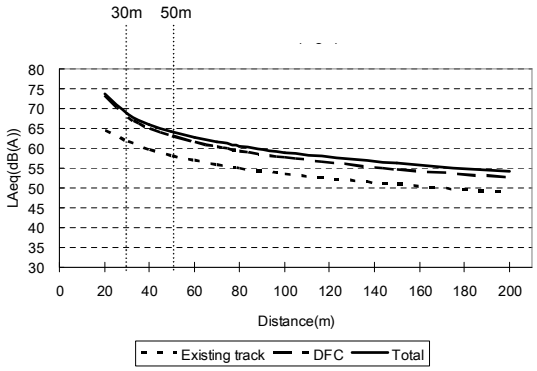
Source : NKC

Figure 6a-7(2) Result of Noise Prediction Without Countermeasure on Daytime At Palanpur-1 (DFC side)



Source : NKC

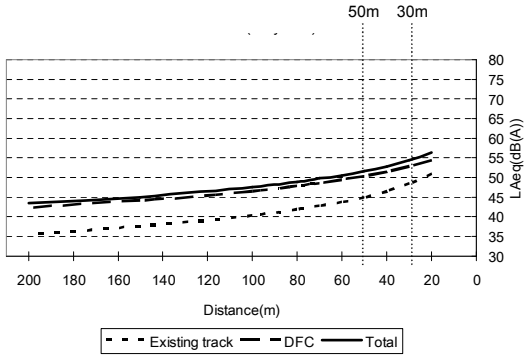
Figure 6a-7(3) Result of Noise Prediction Without Countermeasure on Nighttime At Palanpur-1 (Existing track side)



Source : NKC

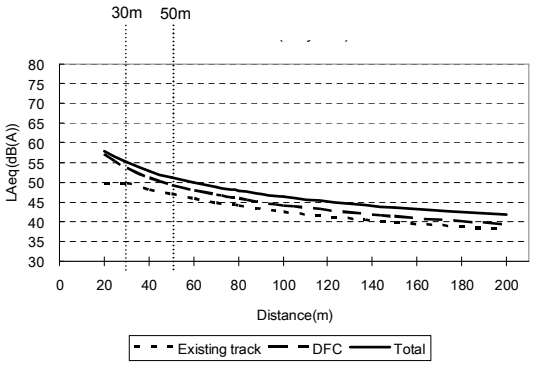
Figure 6a-7(4) Result of Noise Prediction Without Countermeasure on Nighttime At Palanpur-1 (DFC side)

2) with countermeasure1 (soundproof height　DFC side:3.5m　Existing track side:2.5m)



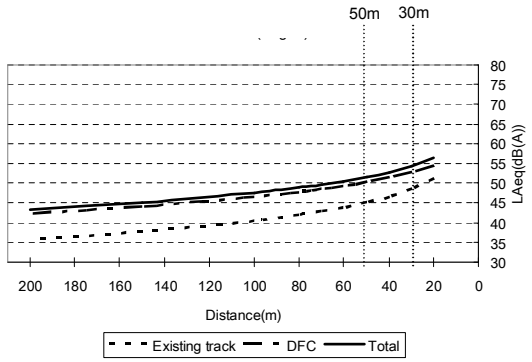
Source : NKC

Figure 6a-7(5) Result of Noise Prediction With Countermeasure1 on Daytime At Palanpur-1 (Existing track side)



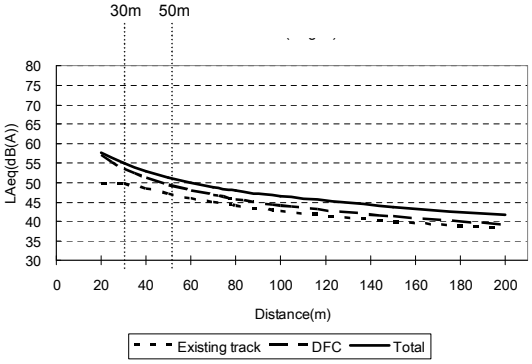
Source : NKC

Figure 6a(6) Result of Noise Prediction With Countermeasure1 on Daytime At Palanpur-1 (DFC side)



Source : NKC

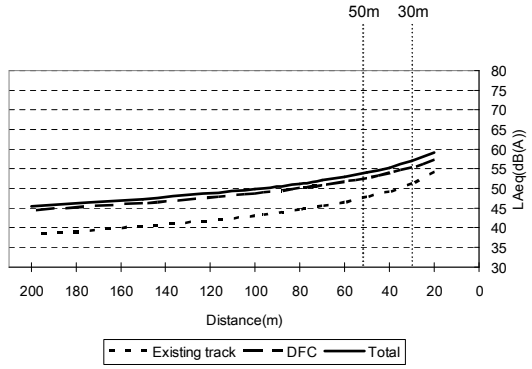
Figure 6a-7(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Palanpur-1 (Existing track side)



Source : NKC

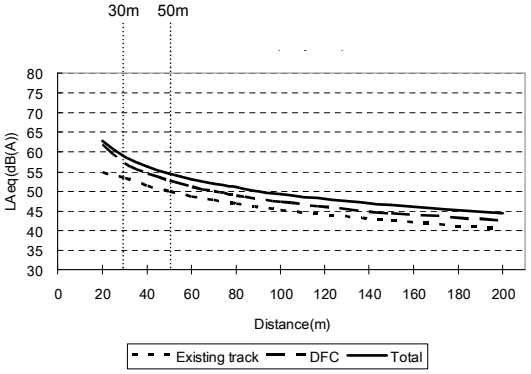
Figure 6a-7(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Palanpur-1 (DFC side)

3) with countermeasure2 (soundproof height DFC side:2.0m Existing track side:1.5m)



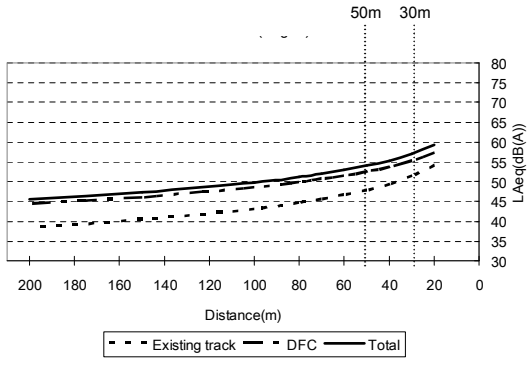
Source : NKC

Figure 6a-7(9) Result of Noise Prediction With Countermeasure2 on Daytime At Palanpur-1 (Existing track side)



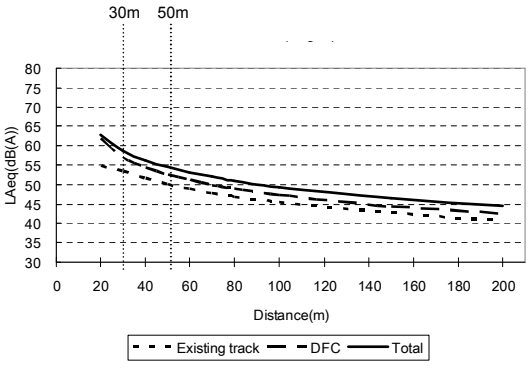
Source : NKC

Figure 6a-7(10) Result of Noise Prediction With Countermeasure2 on Daytime At Palanpur-1 (DFC side)



Source : NKC

Figure 6a-7(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Palanpur-1 (Existing track side)



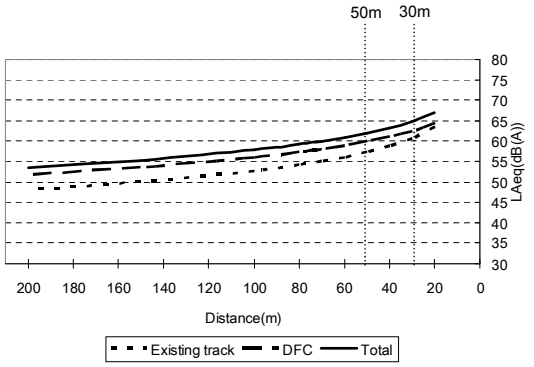
Source : NKC

Figure 6a-7(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Palanpur-1 (DFC side)

(2) Palanpur No.2

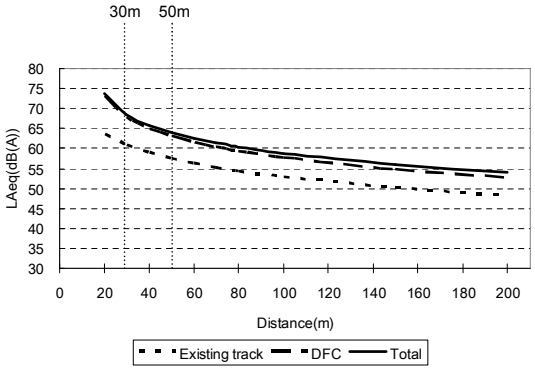
Results of noise prediction for Palanpur No.2 are given from Figure 6a-8.

1) without countermeasure



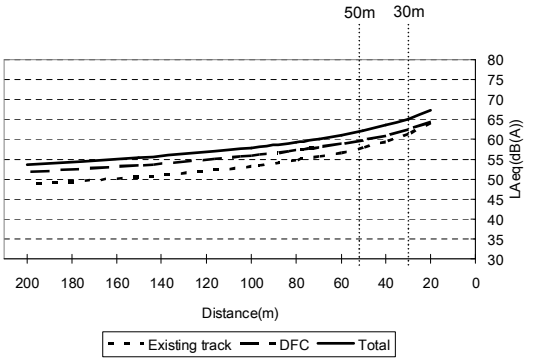
Source : NKC

Figure 6a-8(1) Result of Noise Prediction Without Countermeasure on Daytime At Palanpur-2 (Existing track side)



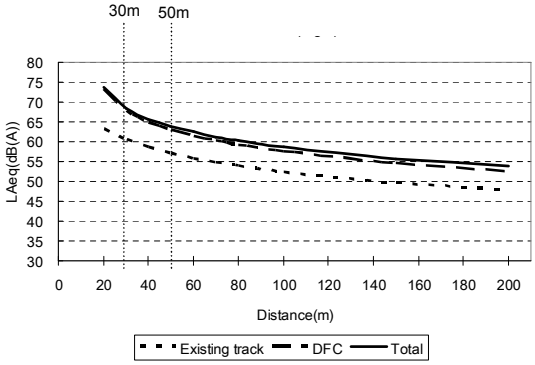
Source : NKC

Figure 6a-8(2) Result of Noise Prediction Without Countermeasure on Daytime At Palanpur-2 (DFC side)



Source : NKC

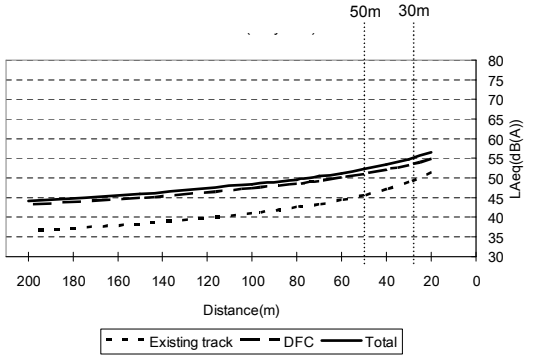
Figure 6a-8(3) Result of Noise Prediction Without Countermeasure on Nighttime At Palanpur-2 (Existing track side)



Source : NKC

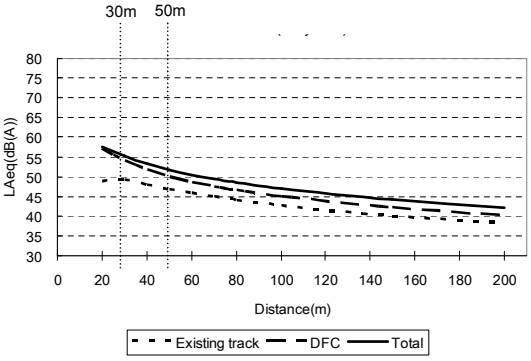
Figure 6a-8(4) Result of Noise Prediction Without Countermeasure on Nighttime At Palanpur-2 (DFC side)

2) with countermeasure1 (soundproof height　DFC side:3.0m　Existing track side:2.0m)



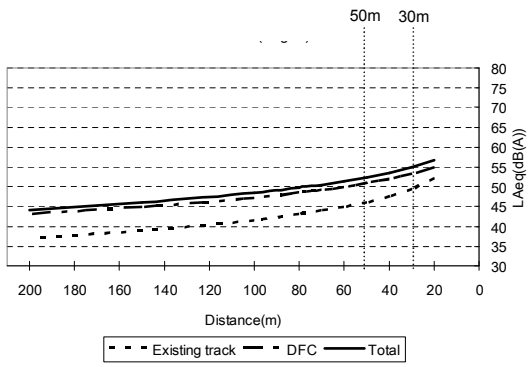
Source : NKC

Figure 6a-8(5) Result of Noise Prediction With Countermeasure1 on Daytime At Palanpur-2 (Existing track side)



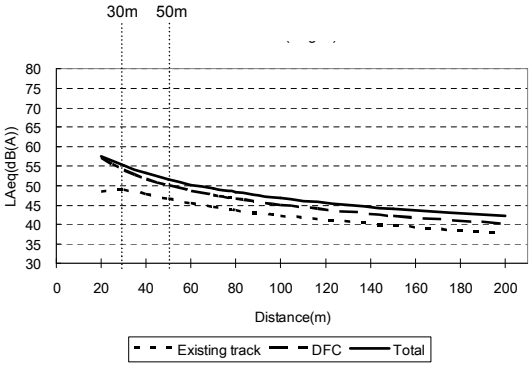
Source : NKC

Figure 6a-8(6) Result of Noise Prediction With Countermeasure1 on Daytime At Palanpur-2 (DFC side)



Source : NKC

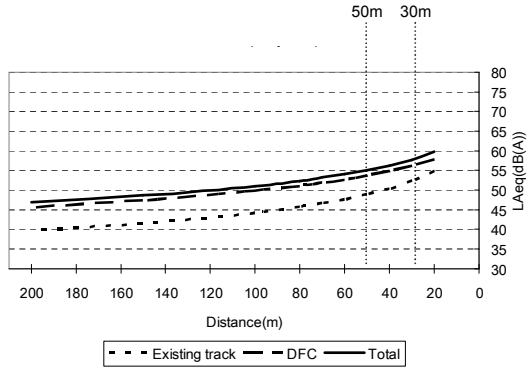
Figure 6a-8(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Palanpur-2 (Existing track side)



Source : NKC

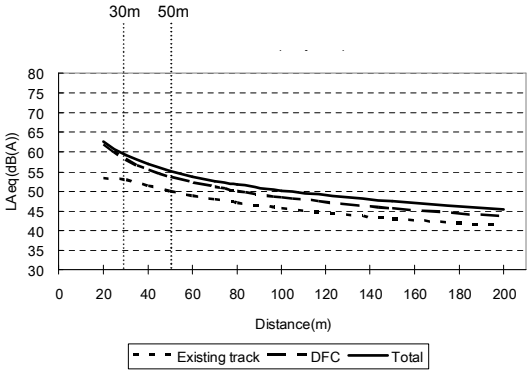
Figure 6a-8(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Palanpur-2 (DFC side)

3) <u>with countermeasure2 (soundproof height DFC side:1.5m Existing track side:1.0m)</u>



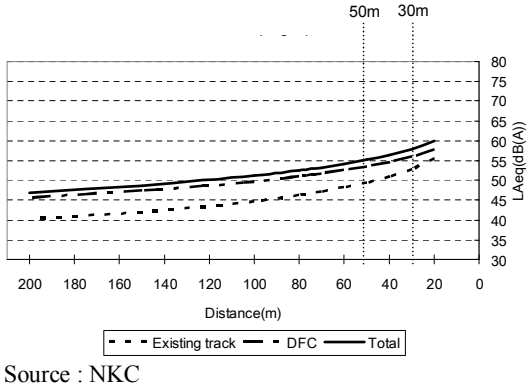
Source : NKC

Figure 6a-8(9) Result of Noise Prediction With Countermeasure2 on Daytime At Palanpur-2 (Existing track side)



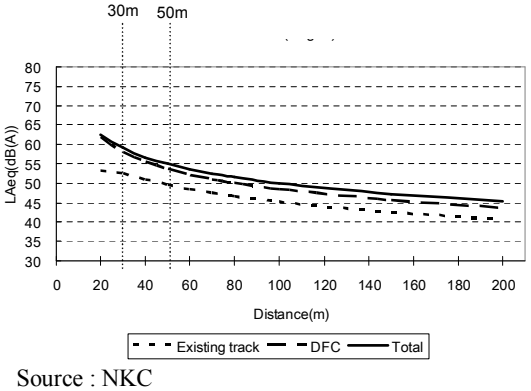
Source : NKC

Figure 6a-8(10) Result of Noise Prediction With Countermeasure2 on Daytime At Palanpur-2 (DFC side)



Source : NKC

Figure 6a-8(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Palanpur-2 (Existing track side)



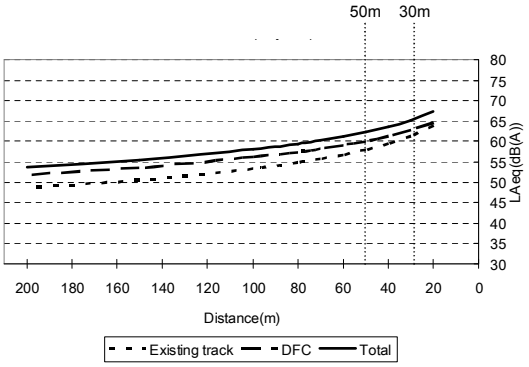
Source : NKC

Figure 6a-8(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Palanpur-2 (DFC side)

(3) Sidhpur No.1

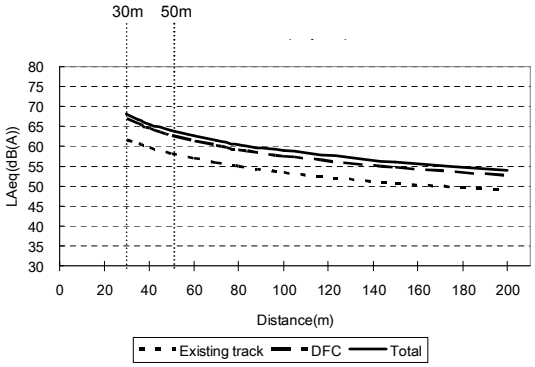
Results of noise prediction for Sidhpur No.1 are given from Figure 6a-9.

1) without countermeasure



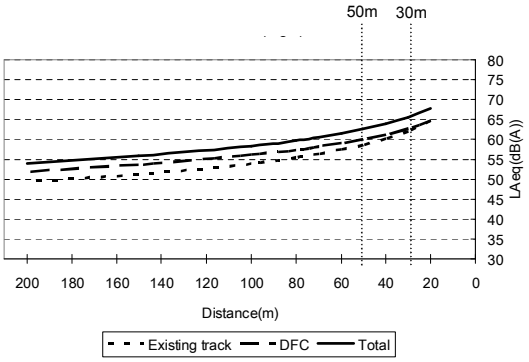
Source : NKC

Figure 6a-9(1) Result of Noise Prediction Without Countermeasure on Daytime At Sidhpur-1 (Existing track side)



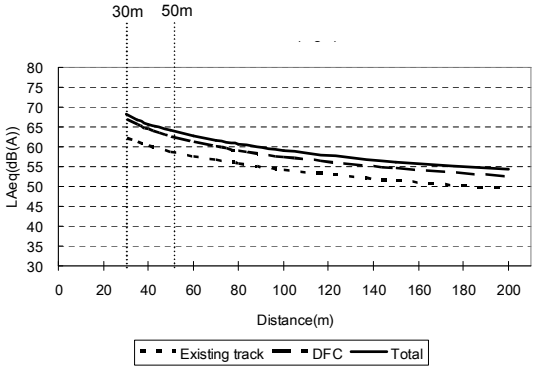
Source : NKC

Figure 6a-9(2) Result of Noise Prediction Without Countermeasure on Daytime At Sidhpur-1 (DFC side)



Source : NKC

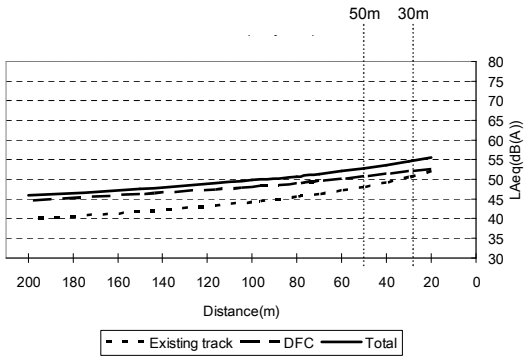
Figure 6a-9(3) Result of Noise Prediction Without Countermeasure on Nighttime At Sidhpur-1 (Existing track side)



Source : NKC

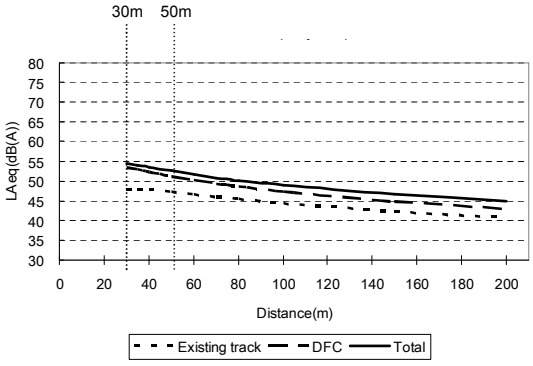
Figure 6a-9(4) Result of Noise Prediction Without Countermeasure on Nighttime At Sidhpur-1 (DFC side)

2) with countermeasure1 (soundproof height DFC side:1.5m Existing track side:1.0m)



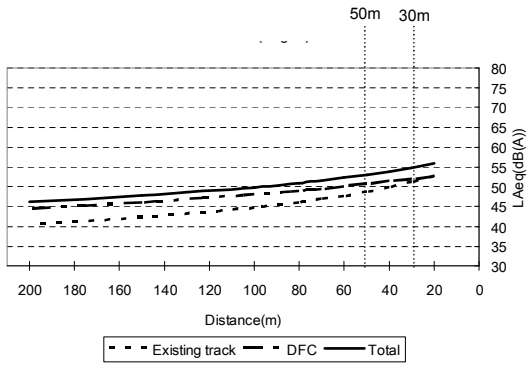
Source : NKC

Figure 6a-9(5) Result of Noise Prediction With Countermeasure1 on Daytime At Sidhpur-1 (Existing track side)



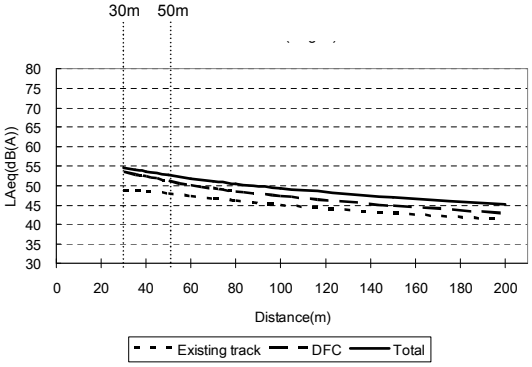
Source : NKC

Figure 6a-9(6) Result of Noise Prediction With Countermeasure1 on Daytime At Sidhpur-1 (DFC side)



Source : NKC

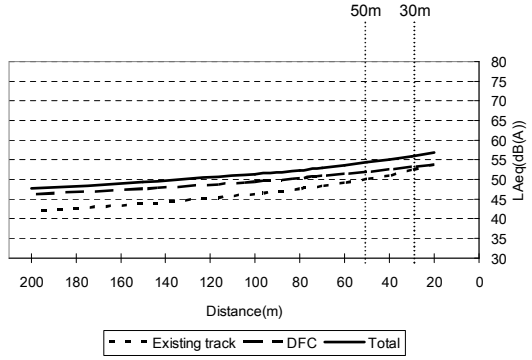
Figure 6a-9(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Sidhpur-1 (Existing track side)



Source : NKC

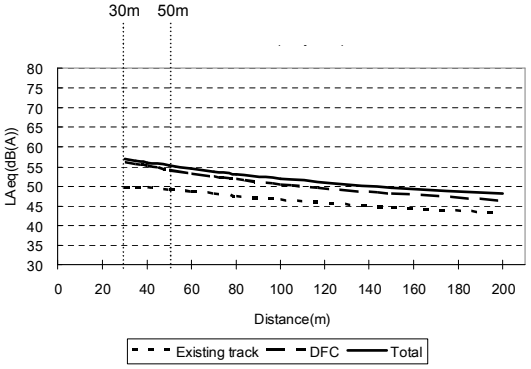
Figure 6a-9(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Sidhpur-1 (DFC side)

3) with countermeasure2 (soundproof height DFC side:0.5m Existing track side:0.5m)



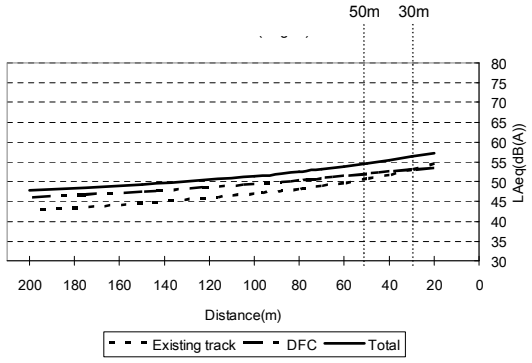
Source : NKC

Figure 6a-9(9) Result of Noise Prediction With Countermeasure2 on Daytime At Sidhpur-1 (Existing track side)



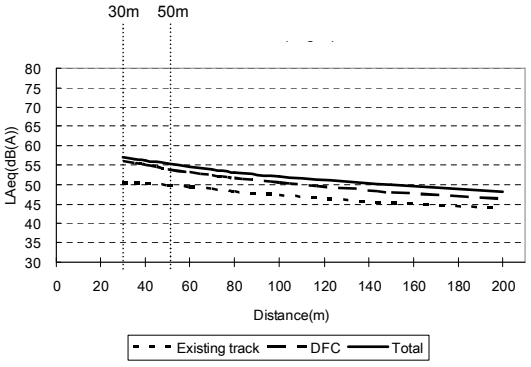
Source : NKC

Figure 6a-9(10) Result of Noise Prediction With Countermeasure2 on Daytime At Sidhpur-1 (DFC side)



Source : NKC

Figure 6a-9(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Sidhpur-1 (Existing track side)



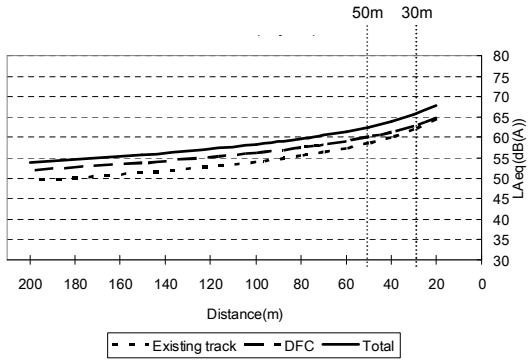
Source : NKC

Figure 6a-9(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Sidhpur-1 (DFC side)

(4) Sidhpur No.2

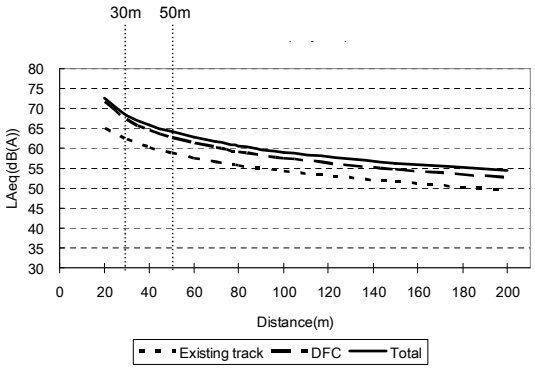
Results of noise prediction for Sidhpur No.2 are given from Figure 6a-10.

1) without countermeasure



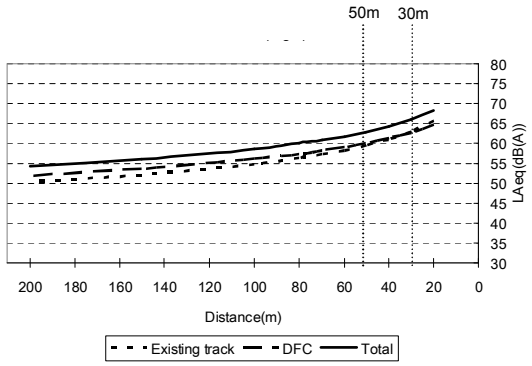
Source : NKC

Figure 6a-10(1) Result of Noise Prediction Without Countermeasure on Daytime At Sidhpur-2 (Existing track side)



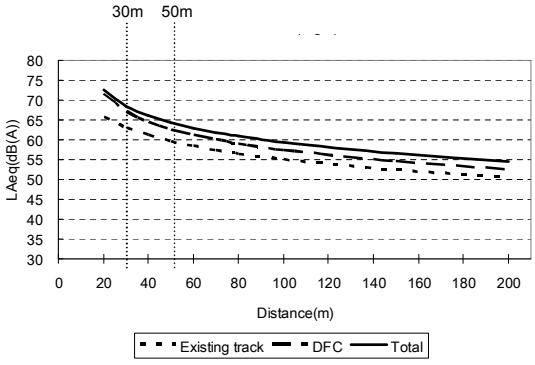
Source : NKC

Figure 6a-10(2) Result of Noise Prediction Without Countermeasure on Daytime At Sidhpur-2 (DFC side)



Source : NKC

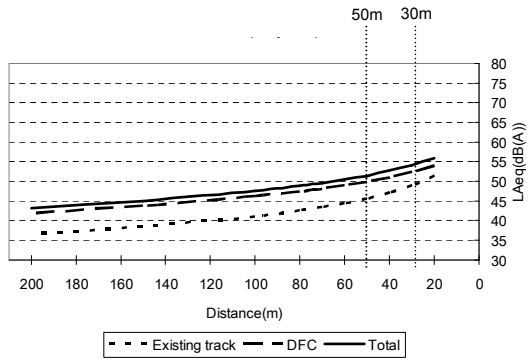
Figure 6a-10(3) Result of Noise Prediction Without Countermeasure on Nighttime At Sidhpur-2 (Existing track side)



Source : NKC

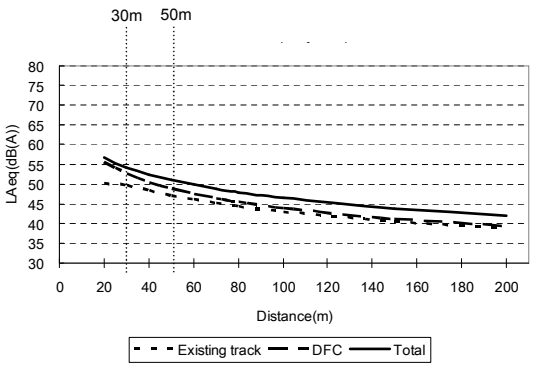
Figure 6a-10(4) Result of Noise Prediction Without Countermeasure on Nighttime At Sidhpur-2 (DFC side)

1) with countermeasure1 (soundproof height DFC side:3.5m Existing track side:2.5m)



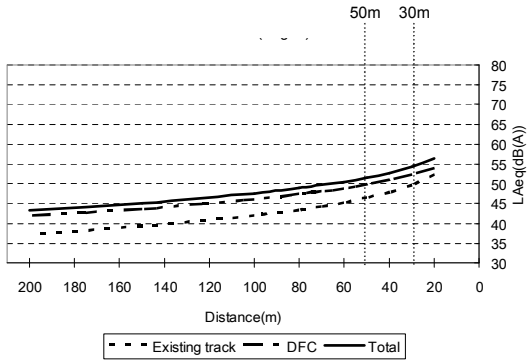
Source : NKC

Figure 6a-10(5) Result of Noise Prediction With Countermeasure1 on Daytime At Sidhpur-2 (Existing track side)



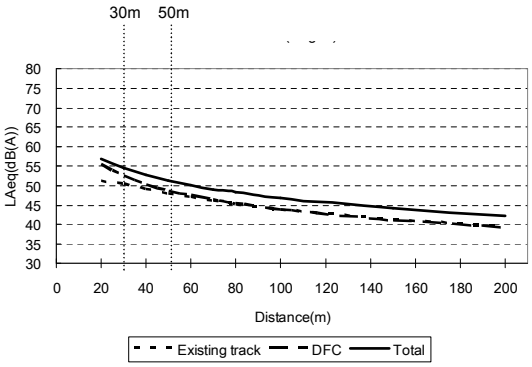
Source : NKC

Figure 6a-10(6) Result of Noise Prediction With Countermeasure1 on Daytime At Sidhpur-2 (DFC side)



Source : NKC

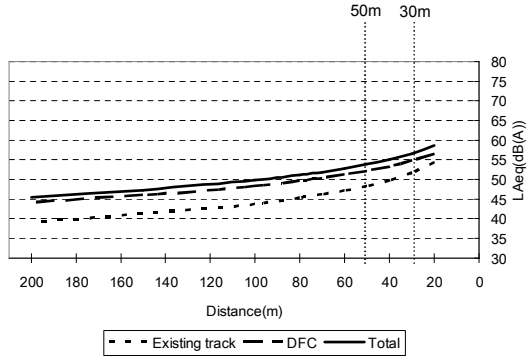
Figure 6a-10(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Sidhpur-2 (Existing track side)



Source : NKC

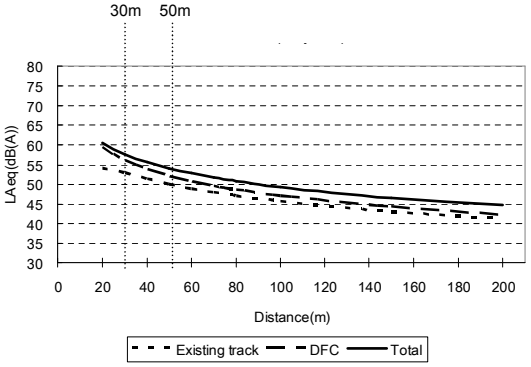
Figure 6a-10(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Sidhpur-2 (DFC side)

2) with countermeasure2 (soundproof height DFC side:2.0m Existing track side:1.5m)



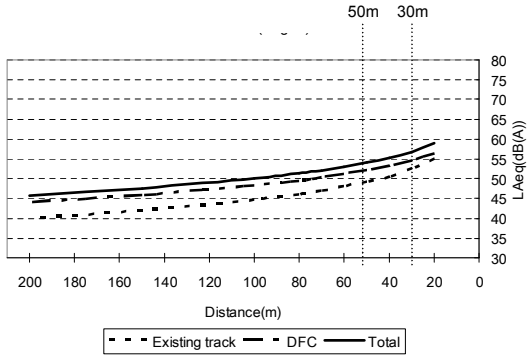
Source : NKC

Figure 6a-10(9) Result of Noise Prediction With Countermeasure2 on Daytime At Sidhpur-2 (Existing track side)



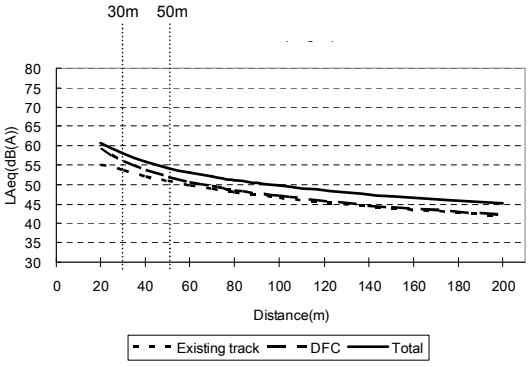
Source : NKC

Figure 6a-10(10) Result of Noise Prediction With Countermeasure2 on Daytime At Sidhpur-2 (DFC side)



Source : NKC

Figure 6a-10(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Sidhpur-2 (Existing track side)



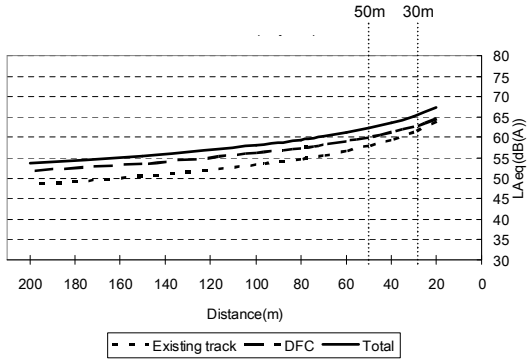
Source : NKC

Figure 6a-10(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Sidhpur-2 (DFC side)

(5) Mehsana No.1

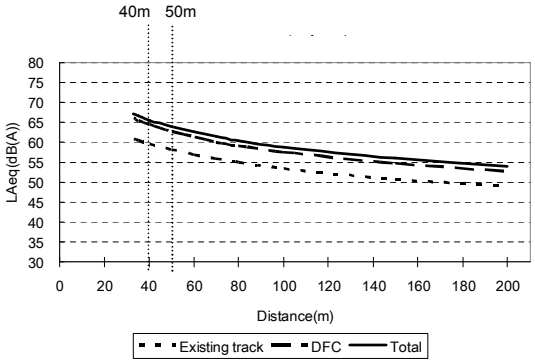
Results of noise prediction for Mehsana No.1 are given from Figure 6a-11.

1) without countermeasure



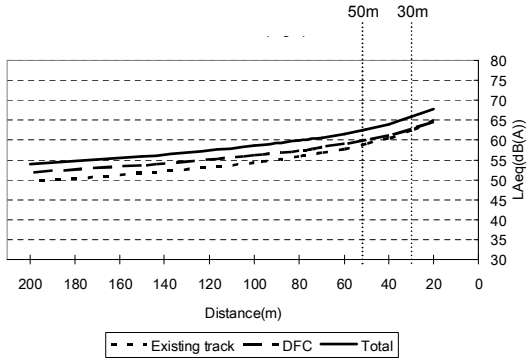
Source : NKC

Figure 6a-11(1) Result of Noise Prediction Without Countermeasure on Daytime At Mehsana-1 (Existing track side)



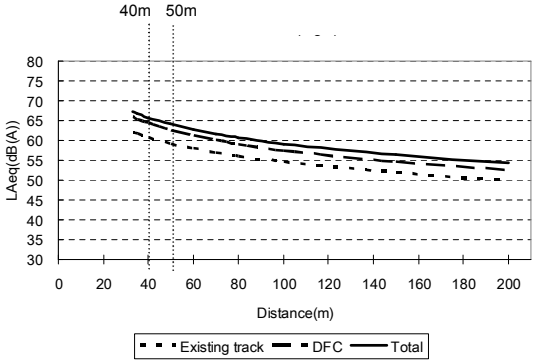
Source : NKC

Figure 6a-11(2) Result of Noise Prediction Without Countermeasure on Daytime At Mehsana-1 (DFC side)



Source : NKC

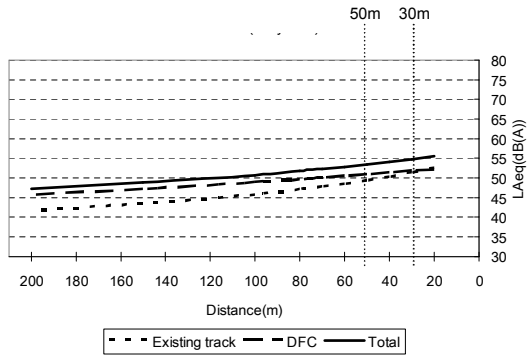
Figure 6a-11(3) Result of Noise Prediction Without Countermeasure on Nighttime At Mehsana-1 (Existing track side)



Source : NKC

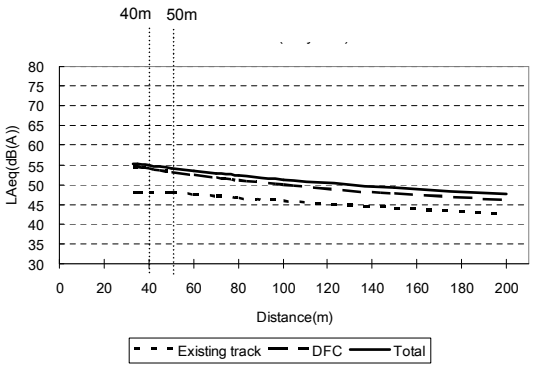
Figure 6a-11(4) Result of Noise Prediction Without Countermeasure on Nighttime At Mehsana-1 (DFC side)

2) with countermeasure1 (soundproof height DFC side:0.5m Existing track side:0.5m)



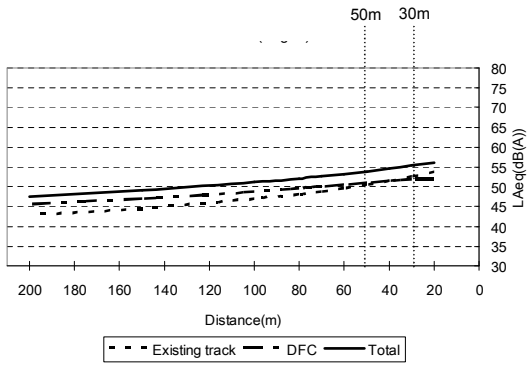
Source : NKC

Figure 6a-11(5) Result of Noise Prediction With Countermeasure1 on Daytime At Mehsana-1 (Existing track side)



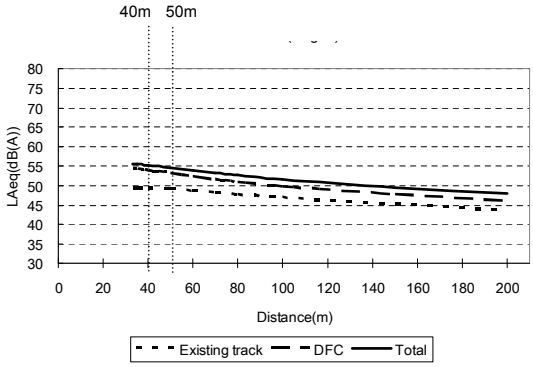
Source : NKC

Figure 6a-11(6) Result of Noise Prediction With Countermeasure1 on Daytime At Mehsana-1 (DFC side)



Source : NKC

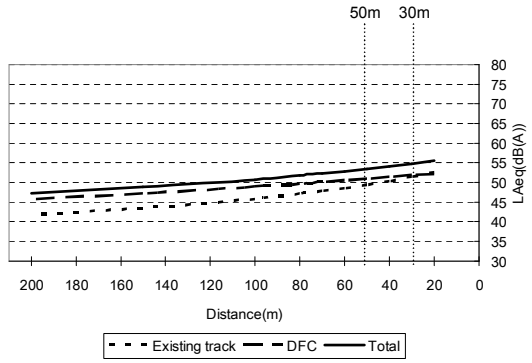
Figure 6a-11(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Mehsana-1 (Existing track side)



Source : NKC

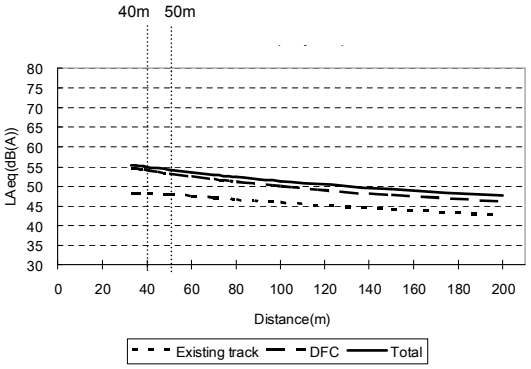
Figure 6a-11(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Mehsana-1 (DFC side)

3) with countermeasure2 (soundproof height DFC side:0.5m Existing track side:0.5m)



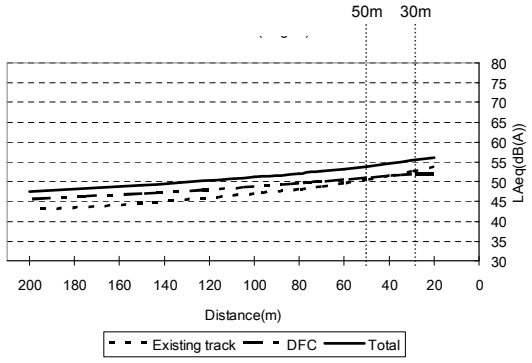
Source : NKC

Figure 6a-11(9) Result of Noise Prediction With Countermeasure2 on Daytime At Mehsana-1 (Existing track side)



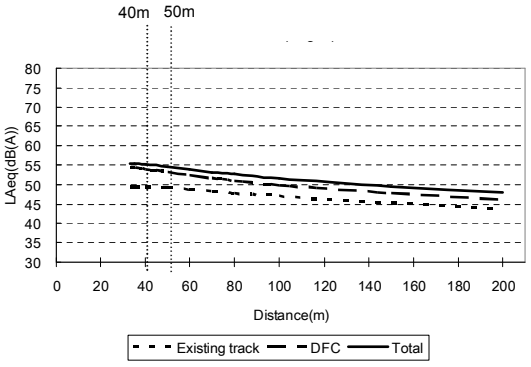
Source : NKC

Figure 6a-11(10) Result of Noise Prediction With Countermeasure2 on Daytime At Mehsana-1 (DFC side)



Source : NKC

Figure 6a-11(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Mehsana-1 (Existing track side)



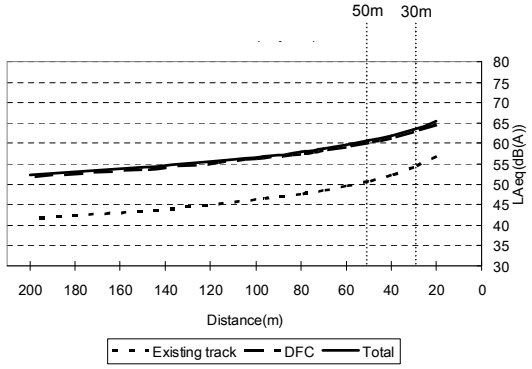
Source : NKC

Figure 6a-11(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Mehsana-1 (DFC side)

(6) Mehsana No.2

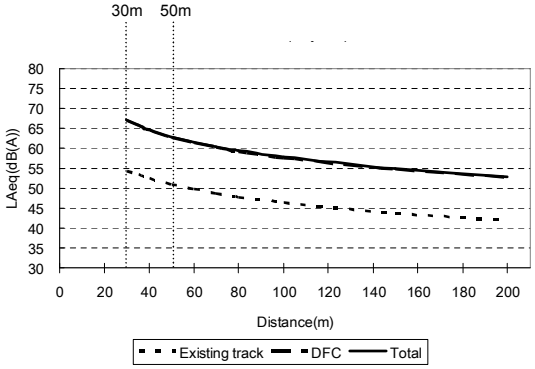
Results of noise prediction for Mehsana No.2 are given from Figure 6a-12.

1) without countermeasure



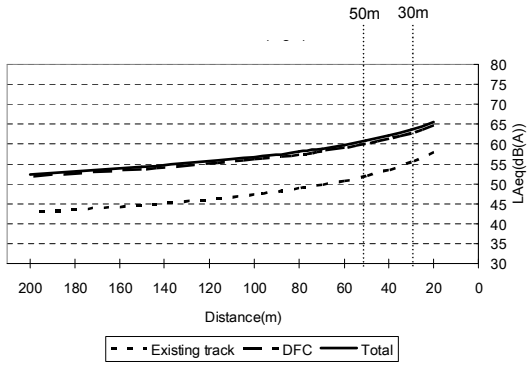
Source : NKC

Figure 6a-12(1) Result of Noise Prediction Without Countermeasure on Daytime At Mehsana-2 (Existing track side)



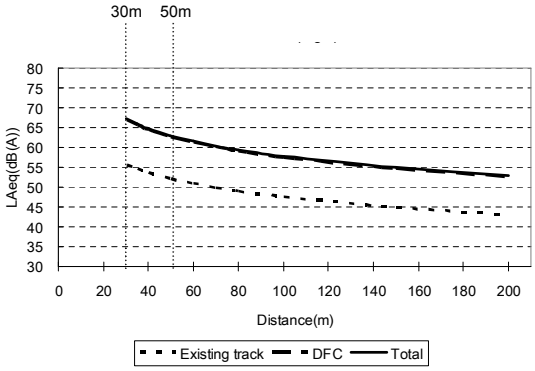
Source : NKC

Figure 6a-12(2) Result of Noise Prediction Without Countermeasure on Daytime At Mehsana-2 (DFC side)



Source : NKC

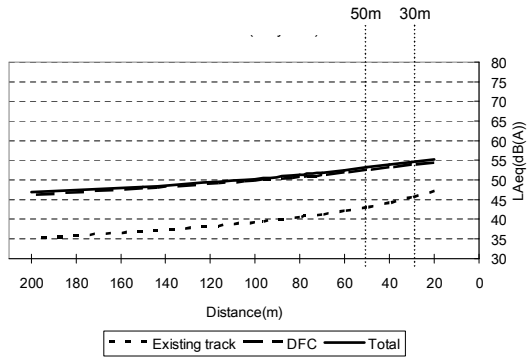
Figure 6a-12(3) Result of Noise Prediction Without Countermeasure on Nighttime At Mehsana-2 (Existing track side)



Source : NKC

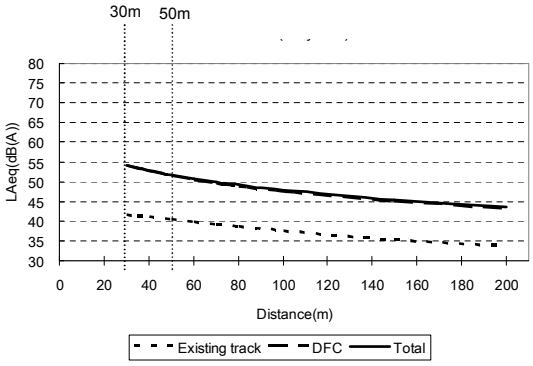
Figure 6a-12(4) Result of Noise Prediction Without Countermeasure on Nighttime At Mehsana-2 (DFC side)

2) with countermeasure 1 (soundproof height DFC side:1.5m Existing track side:0.5m)



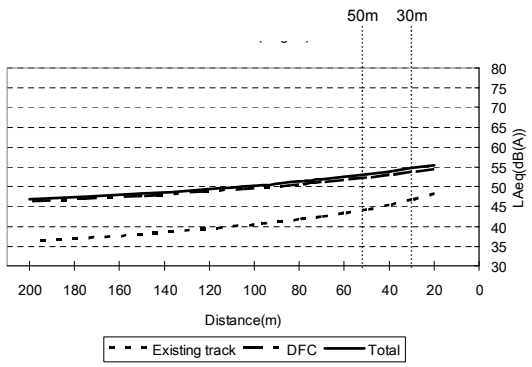
Source : NKC

Figure 6a-12(5) Result of Noise Prediction With Countermeasure1 on Daytime At Mehsana-2 (Existing track side)



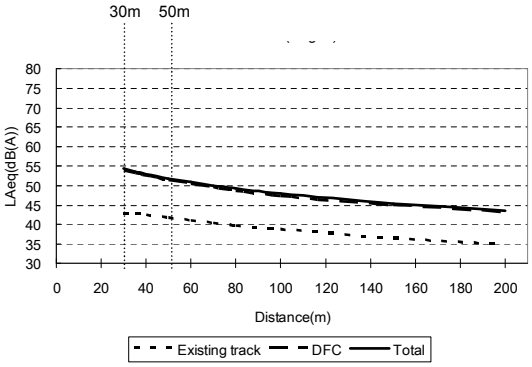
Source : NKC

Figure 6a-12(6) Result of Noise Prediction With Countermeasure1 on Daytime At Mehsana-2 (DFC side)



Source : NKC

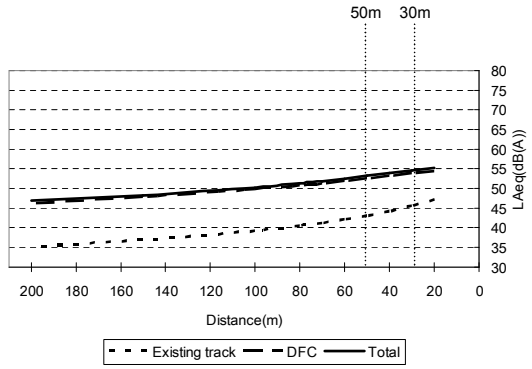
Figure 6a-12(7) Result of Noise Prediction With Countermeasure1 on Nighttime At Mehsana-2 (Existing track side)



Source : NKC

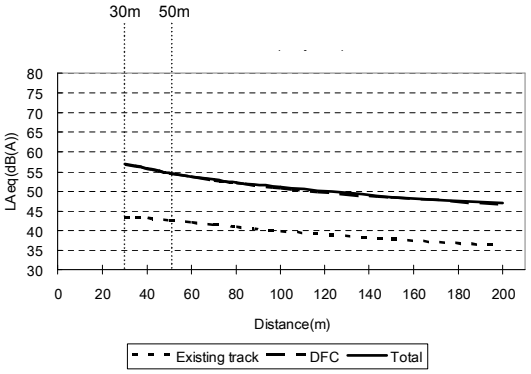
Figure 6a-12(8) Result of Noise Prediction With Countermeasure1 on Nighttime At Mehsana-2 (DFC side)

3) with countermeasure 2 (soundproof height DFC side:0.5m Existing track side:0.5m)



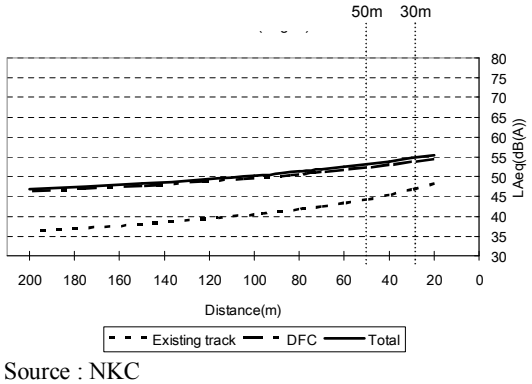
Source : NKC

Figure 6a-12(9) Result of Noise Prediction With Countermeasure2 on Daytime At Mehsana-2 (Existing track side)



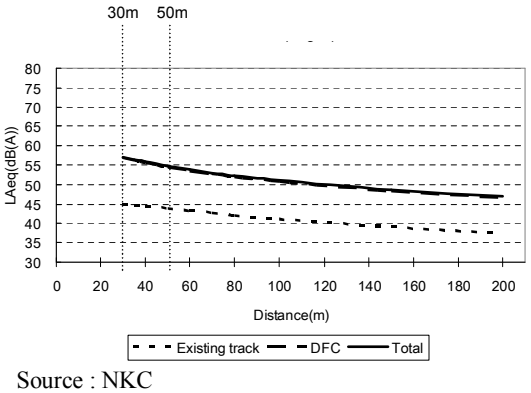
Source : NKC

Figure 6a-12(10) Result of Noise Prediction With Countermeasure2 on Daytime At Mehsana-2 (DFC side)



Source : NKC

Figure 6a-12(11) Result of Noise Prediction With Countermeasure2 on Nighttime At Mehsana-2 (Existing track side)



Source : NKC

Figure 6a-12(12) Result of Noise Prediction With Countermeasure2 on Nighttime At Mehsana-2 (DFC side)

Appendix-6b
Vibration Survey

1. Railway and Background Vibration

1-1 Photographs of Measurement Sites

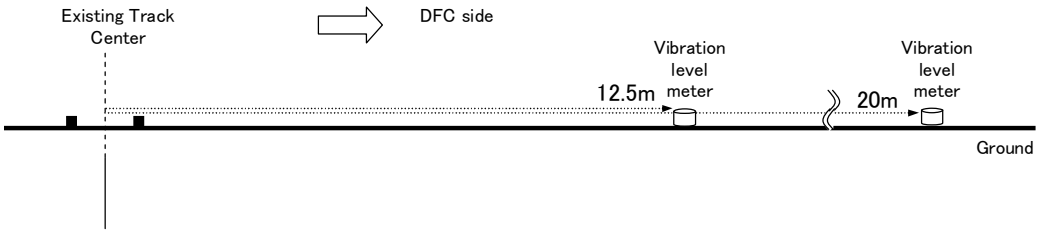
Refer to APPENDIX-6a NOISE SURVEY.

1-2 Results of Railway and Background Vibration

(1) Palanpur

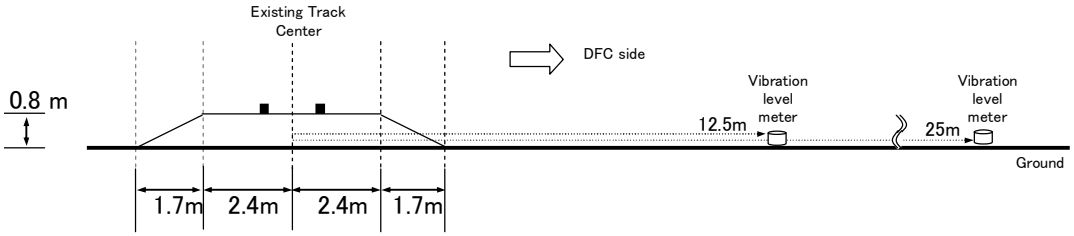
1) Cross-section View

Cross-section views of measurement site in Palanpur are given in Figure 6b-1.



Source: NKC

Figure 6b-1(1) Cross-section View of Measurement Site in Palanpur No.1



Source: NKC

Figure 6b-1(2) Cross-section View of Measurement Site in Palanpur No.2

2) Result of Background Vibration

The results of background vibration measurement in Palanpur are given in Table 6b-1.

Table 6b-1 Results of Background Vibration Measurement in Palanpur

Station	date	No.	Background Vibration Level Lp [dB]														
			10:00～12:00			12:00～14:00			14:00～16:00			16:00～18:00			Overall 10:00～18:00		
			X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Palanpur	31-Aug	1	<30	<30	<25	<30	<30	30	<30	<30	<25	<30	<30	<25	<30	<30	30
	30-Aug	2	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25

Note: Measurement lower limits of vibration level meter are 30dB for X and Y-direction and 25dB for Z-direction, therefore, measurement value under these limits indicate with [<]

Source: NKC

3) Result of Railway Vibration

Results of railway vibration measurement in Palanpur are given in Tables 6b-2 and 6b-3.

Table 6b-2 Results of Railway Vibration Measurement in Palanpur No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	20.0m	12.5m	20.0m	12.5m	20.0m
1	31-Aug	10:36	Passenger	23	50	59	312	Down	56.2	58.0	62.1	59.6	66.8	66.2
2	31-Aug	10:50	Passenger	30	51	65	423	Up	56.1	57.2	63.6	60.9	68.7	67.2
3	31-Aug	10:56	Passenger	26	70	86	512	Down	57.0	57.1	63.8	61.5	68.2	66.8
4	31-Aug	11:17	Freight	22	106	98	657	Down	56.6	58.0	63.5	59.9	69.3	67.9
5	31-Aug	11:41	Passenger	97	18	23	490	Up	65.6	65.3	72.9	66.7	76.6	74.0
6	31-Aug	11:53	Passenger	22	65	77	401	Up	54.3	57.1	61.4	59.2	68.0	65.5
7	31-Aug	12:33	Freight	36	52	26	519	Up	58.1	57.6	64.3	62.9	72.5	69.5
8	31-Aug	12:43	Passenger	31	54	73	468	Up	56.5	59.1	64.7	61.5	69.9	68.3
9	31-Aug	13:58	Passenger	29	57	69	468	Down	57.0	57.5	64.1	61.5	68.2	66.7
10	31-Aug	14:28	Passenger	27	56	61	423	Down	56.5	58.2	64.1	61.1	69.2	67.7
11	31-Aug	16:22	Freight	30	58	110	491	Up	58.9	61.3	65.2	62.6	72.1	69.7
Average		Passenger(P)		45	47	60	445	Up	58.1	59.7	65.7	62.1	70.8	68.8
				26	58	69	429	Down	56.7	57.7	63.5	60.9	68.1	66.9
		Freight(F)		33	55	68	505	Up	58.5	59.5	64.8	62.8	72.3	69.6
				22	106	98	657	Down	56.6	58.0	63.5	59.9	69.3	67.9

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi

Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point

Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.

Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train

Source: NKC

Table 6b-3 Results of Railway Vibration Measurement in Palanpur No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	25.0m	12.5m	25.0m	12.5m	25.0m
1	30-Aug	10:16	Passenger	52	22	33	312	Down	55.0	44.1	57.7	48.0	66.1	54.9
2	30-Aug	10:29	Freight	29	86	128	687	Down	54.0	44.8	59.1	47.5	66.1	55.9
3	30-Aug	10:40	Passenger	89	21	26	512	Down	57.1	48.1	58.6	51.2	67.7	57.2
4	30-Aug	11:37	Freight	13	131	162	477	Up	50.9	41.7	53.6	43.3	63.1	50.8
5	30-Aug	11:55	Passenger	34	42	52	401	Up	53.2	41.5	56.1	45.0	65.7	54.8
6	30-Aug	12:48	Freight	15	111	144	477	Up	51.5	42.6	54.2	44.1	63.6	53.4
7	30-Aug	13:21	Passenger	35	50	60	490	Up	55.0	43.3	57.0	46.2	66.4	55.3
8	30-Aug	13:32	Passenger	26	58	70	423	Up	53.8	41.4	54.6	45.6	66.3	55.6
9	30-Aug	13:53	Passenger	54	31	47	468	Down	53.3	46.9	56.2	45.7	61.3	50.7
10	30-Aug	14:07	Passenger	23	63	70	401	Down	52.3	40.3	54.5	43.6	63.1	52.6
11	30-Aug	15:35	Freight	18	97	149	484	Down	53.3	42.4	56.7	45.4	65.8	54.6
12	30-Aug	15:52	Freight	18	129	158	657	Down	53.2	41.9	55.3	45.7	65.8	54.9
13	30-Aug	16:10	Freight	15	115	146	472	Up	52.8	43.5	53.2	43.7	63.8	53.5
14	30-Aug	16:40	Freight	29	82	107	657	Down	53.3	42.3	55.9	45.4	64.6	53.7
15	30-Aug	17:18	Freight	18	96	151	483	Up	50.4	41.2	53.8	44.0	63.1	53.3
Average		Passenger(P)		32	50	61	438	Up	54.0	42.1	55.9	45.6	66.1	55.2
				55	34	44	423	Down	54.4	44.9	56.8	47.1	64.6	53.9
		Freight(F)		15	113	151	477	Up	51.4	42.3	53.7	43.8	63.4	52.8
				25	99	131	667	Down	53.5	43.0	56.8	46.2	65.5	54.8

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6b-4 and 6b-5. In Palanpur No.1, in consideration of all results roughly, frequency of the range from 25 to 40 Hz at X-axis excelled, range from 31.5 to 40 Hz at Y-axis excelled, range from 40 to 50 Hz at Z-axis excelled. In Palanpur No.2, in consideration of all results roughly, frequency of the range from 40 to 63 Hz at X-axis excelled, range from 40 to 50 Hz at Y-axis excelled, range from 25 to 50 Hz at Z-axis excelled. In Japan, in the example[1] of bullet train, existing train and subway, 20 Hz, 10 and 40 Hz and 60 Hz of predominant frequency at Z-axis have been confirmed respectively. Although result in this survey differs from such example, this reason might be due to difference situation between Japan and India. On the other hand, it is said to vary predominant frequency by type of train, structure of rail, and ground which vibration diffuses, and such a difference might have been confirmed.

Table 6b-4 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Palanpur No.1

№	train type	Vibration Level of X-direction [dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	1	5	8	8	8	9	8	-1	4	3	5	12	23	30	34	**45**	43	43	40	38	37	50
2	Passenger	10	10	8	16	9	6	6	0	6	6	13	15	25	32	39	46	**47**	45	42	43	39	52
3	Passenger	9	10	2	12	6	10	2	-1	5	6	17	13	26	32	37	41	42	**43**	43	40	40	50
4	Freight	15	9	9	8	0	3	3	3	17	27	20	21	26	29	33	43	47	**49**	46	45	39	54
5	Passenger	1	5	13	17	20	21	23	19	20	23	26	29	32	40	44	55	54	**56**	49	45	44	61
6	Passenger	14	14	14	9	1	3	2	1	2	8	14	19	26	28	38	38	**43**	40	42	38	37	49
7	Freight	9	12	14	16	16	17	15	16	30	25	23	21	24	36	40	43	46	**50**	48	47	47	56
8	Passenger	18	14	17	10	9	4	1	-1	8	5	9	11	23	27	32	**45**	44	43	42	41	40	51
9	Passenger	15	14	13	5	6	2	4	4	9	9	13	14	23	30	37	43	47	45	**48**	43	41	53
10	Passenger	5	8	9	12	11	6	9	6	5	5	14	16	25	31	38	**46**	42	44	44	42	41	51
11	Freight	11	3	3	-4	3	4	11	6	19	22	24	23	26	28	36	44	**49**	49	48	45	43	55

№	train type	Vibration Level of Y-direction[dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	5	9	11	12	12	9	11	9	7	9	9	14	22	32	36	46	**47**	45	43	41	38	52
2	Passenger	13	13	15	13	9	3	1	4	5	12	11	20	29	33	40	48	**52**	50	47	46	43	56
3	Passenger	5	12	10	8	5	5	2	6	7	7	17	24	28	29	39	50	**55**	50	45	46	42	58
4	Freight	12	12	9	-2	2	1	10	7	13	24	25	21	23	28	39	46	50	**51**	49	45	41	56
5	Passenger	6	12	20	20	26	33	29	28	30	30	29	40	34	38	50	56	60	**61**	50	46	44	65
6	Passenger	13	14	14	10	6	5	3	1	10	16	15	21	24	29	37	49	**55**	49	43	43	39	57
7	Freight	15	22	25	26	22	36	32	35	28	30	29	29	29	39	42	44	52	**61**	55	50	46	63
8	Passenger	16	16	13	13	4	3	4	4	6	3	11	19	23	30	35	48	**54**	51	43	45	42	57
9	Passenger	16	15	22	24	25	26	27	26	24	23	20	21	25	29	41	50	**57**	54	48	47	44	60
10	Passenger	6	10	12	15	14	13	9	9	7	8	15	24	28	33	40	55	**57**	51	44	45	41	60
11	Freight	13	10	4	6	3	7	13	13	20	23	24	22	28	32	40	47	**52**	51	52	51	43	58

№	train type	Vibration Level Z-direction[dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	5	9	11	13	14	15	14	13	15	13	15	18	22	34	41	46	50	53	**54**	49	48	59
2	Passenger	13	13	12	11	5	2	5	4	9	15	15	23	33	35	46	49	56	57	**59**	57	54	64
3	Passenger	5	-3	-2	0	-8	-1	-4	-4	7	13	18	27	34	33	40	46	53	55	**57**	54	52	62
4	Freight	12	8	3	3	-1	-7	6	8	24	34	34	32	27	33	39	43	54	60	**61**	57	52	65
5	Passenger	9	14	10	12	13	26	23	25	31	36	38	41	39	42	46	58	66	**69**	63	58	59	72
6	Passenger	15	14	13	10	5	3	2	0	8	15	20	21	29	34	43	48	50	**56**	54	51	50	60
7	Freight	12	14	13	19	22	32	33	38	46	42	38	38	38	41	42	55	60	**66**	66	61	60	71
8	Passenger	15	15	13	11	5	3	-2	0	14	13	20	22	28	34	41	48	54	**58**	57	55	53	63
9	Passenger	15	15	13	10	6	5	6	5	8	18	14	21	32	39	40	51	56	**61**	59	59	56	66
10	Passenger	6	9	11	14	14	12	11	9	11	13	23	27	34	40	46	50	53	56	**57**	55	53	63
11	Freight	12	8	1	0	-3	3	8	22	32	34	33	28	31	34	42	51	54	62	**63**	61	56	68

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

Table 6b-5 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Palanpur No.2

№	train type	Vibration Level of X-direction [dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	5	9	11	12	9	9	6	11	14	19	19	29	28	34	**39**	38	34	36	37	37	31	46
2	Freight	5	10	10	-2	11	12	11	25	30	31	30	30	31	31	33	34	36	38	**43**	42	32	48
3	Passenger	9	14	17	14	7	13	13	18	21	31	38	38	34	44	39	42	43	**44**	42	42	33	52
4	Freight	19	13	3	1	1	2	3	11	20	23	32	33	30	27	32	35	35	38	**39**	37	28	45
5	Passenger	12	12	7	11	6	1	2	13	14	19	15	19	31	37	37	39	40	**41**	40	39	32	48
6	Freight	19	8	10	5	2	8	6	13	17	26	32	27	28	30	30	33	37	41	**43**	37	29	47
7	Passenger	15	13	14	12	5	3	6	16	17	22	20	22	31	32	36	37	36	**39**	38	38	33	46
8	Passenger	12	13	12	13	13	12	8	8	11	15	20	24	26	30	30	33	34	37	37	**39**	32	44
9	Passenger	10	14	14	15	17	15	12	10	9	14	14	23	27	30	32	36	34	35	37	**39**	34	45
10	Passenger	5	8	12	15	16	12	10	10	10	13	18	26	26	30	30	35	36	37	**38**	38	32	45
11	Freight	10	15	12	11	11	11	11	28	30	26	36	29	24	30	31	34	35	37	**42**	41	30	47
12	Freight	7	10	11	11	11	11	9	18	18	31	31	29	29	27	31	32	37	40	**41**	37	28	46
13	Freight	8	11	13	15	16	11	14	28	29	23	26	24	28	28	30	30	34	36	34	**38**	28	43
14	Freight	-2	2	4	6	13	14	15	26	23	28	32	29	31	30	32	37	38	37	42	**43**	35	48
15	Freight	-2	1	-2	-3	-1	3	5	7	21	17	29	34	31	29	34	36	**42**	41	38	35	26	47

№	train type	Vibration Level of Y-direction[dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	7	8	12	16	14	11	9	13	13	15	31	31	28	32	40	41	38	42	**44**	39	35	49
2	Freight	6	9	8	7	9	17	17	25	32	37	33	30	31	33	38	39	38	43	**48**	46	34	52
3	Passenger	7	11	13	12	9	8	7	6	24	38	44	45	39	45	45	44	46	**51**	48	40	37	56
4	Freight	6	8	9	-7	10	8	8	11	21	23	27	24	25	30	35	38	38	41	**42**	36	28	47
5	Passenger	17	8	20	18	18	16	13	9	11	21	21	29	40	36	39	39	44	**45**	43	37	32	51
6	Freight	16	13	7	2	3	16	11	11	21	28	36	28	29	34	38	38	43	42	**43**	37	30	49
7	Passenger	16	15	14	12	7	9	0	7	18	22	26	24	30	34	37	37	41	**44**	41	39	33	49
8	Passenger	13	14	15	16	15	13	10	12	11	19	23	27	29	34	33	35	**39**	37	38	37	30	45
9	Passenger	9	13	15	16	16	15	13	11	12	16	24	30	34	36	35	36	40	38	**40**	38	32	47
10	Passenger	7	10	13	15	16	14	13	15	19	15	24	29	30	30	35	39	39	39	**41**	40	32	47
11	Freight	14	14	11	11	12	15	11	17	28	21	28	24	25	27	32	37	41	41	**46**	44	33	50
12	Freight	8	11	13	13	11	9	11	8	20	24	32	33	31	35	37	39	41	42	**45**	36	29	49
13	Freight	10	13	14	18	17	15	14	30	24	25	21	20	30	30	34	36	36	37	**40**	39	30	46
14	Freight	-7	-5	0	5	7	13	17	26	20	30	34	33	35	30	36	36	38	39	**43**	41	34	48
15	Freight	-3	1	1	0	11	10	13	7	17	24	28	25	29	32	43	40	**44**	43	42	35	28	50

№	train type	Vibration Level Z-direction[dB] Frequency [Hz]																					
		0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	5	9	11	13	14	13	10	13	19	21	26	35	37	39	48	51	48	49	**53**	47	41	58
2	Freight	6	10	12	14	15	18	21	28	38	38	30	34	37	40	41	49	51	50	54	**55**	44	60
3	Passenger	6	10	12	13	14	13	9	19	24	29	41	46	47	52	54	**57**	54	55	53	51	44	63
4	Freight	5	-1	2	-8	0	-4	2	14	22	28	36	35	31	34	41	49	50	51	**51**	45	39	57
5	Passenger	14	22	14	20	19	17	14	12	15	21	23	39	40	41	48	**55**	53	53	50	50	43	60
6	Freight	15	9	3	-1	-3	0	2	13	25	29	41	35	33	37	42	48	54	53	**54**	45	40	59
7	Passenger	16	17	15	12	7	4	4	11	20	23	27	34	37	42	49	52	**53**	52	52	49	45	59
8	Passenger	13	14	14	13	14	13	9	10	8	16	22	30	38	37	41	**52**	51	47	48	50	43	57
9	Passenger	10	13	15	16	17	16	12	14	13	18	25	33	39	35	43	50	**53**	49	50	48	43	58
10	Passenger	8	11	13	13	14	14	13	8	8	16	17	30	32	40	45	49	49	49	**51**	50	42	57
11	Freight	14	14	13	12	12	12	14	27	33	29	36	35	36	35	40	47	50	49	**55**	51	44	58
12	Freight	7	11	13	14	14	13	13	14	24	29	41	39	38	35	44	48	52	54	**55**	47	40	60
13	Freight	9	13	15	17	18	17	20	37	30	35	33	37	36	35	39	45	**49**	45	47	48	40	55
14	Freight	-2	1	4	8	11	14	18	36	25	35	39	33	41	40	41	49	**54**	51	52	53	47	60
15	Freight	2	5	9	12	13	16	14	15	21	25	36	35	34	36	49	53	**57**	55	51	44	41	61

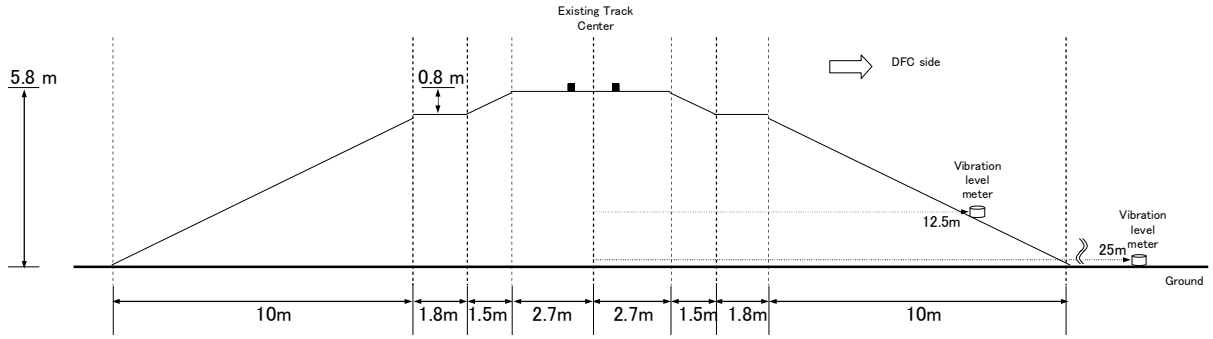
Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

(2) Sidhpur

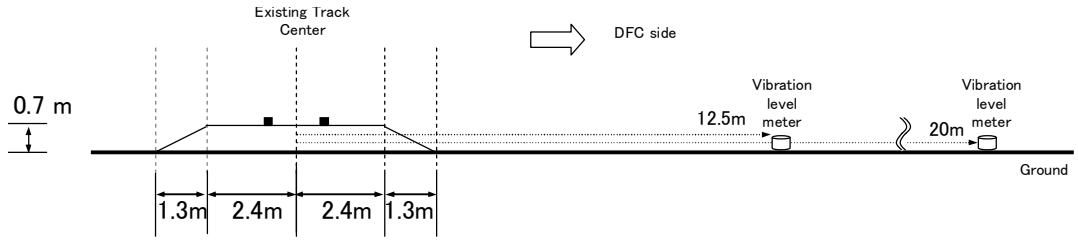
1) Cross-section View

Cross-section views of measurement site in Sidhpur are given in Figure 6b-2.



Source : NKC

Figure 6b-2(1) Cross-section View of Measurement Site in Sidhpur No.1



Source : NKC

Figure 6b-2(2) Cross-section View of Measurement Site in Sidhpur No.2

2) Result of Background Vibration

Results of background vibration measurement in Sidhpur are given in Table 6b-6.

Table 6b-6 Results of Background Vibration Measurement in Sidhpur

Station	date	No.	Background Vibration Level Lp [dB]														
			10:00～12:00			12:00～14:00			14:00～16:00			16:00～18:00			Overall 10:00～18:00		
			X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Sidhpur	3-Sep	1	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25
	2-Sep	2	<30	<30	35	38	35	41	32	36	36	<30	32	36	38	36	41

Note: Measurement lower limits of vibration level meter are 30dB for X and Y-direction and 25dB for Z-direction, therefore, measurement value under these limits indicate with [<]

Source: NKC

3) Result of Railway Vibration

Results of railway vibration measurement in Sidhpur are given in Tables 6b-7 and 6b-8.

Table 6b-7 Results of Railway Vibration Measurement in Sidhpur No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	25.0m	12.5m	25.0m	12.5m	25.0m
1	3-Sep	9:37	Passenger	50	22	31	312	Down	55.9	47.7	58.7	48.3	63.7	57.2
2	3-Sep	10:13	Passenger	60	31	41	512	Down	58.0	50.2	60.2	51.6	68.5	57.9
3	3-Sep	10:31	Passenger	39	45	53	490	Down	55.3	46.8	58.9	48.4	64.0	56.4
4	3-Sep	11:14	Passenger	74	21	26	423	Up	59.3	52.2	60.6	52.5	68.0	61.0
5	3-Sep	11:19	Freight	38	23	35	243	Down	54.5	46.3	57.3	48.3	64.5	57.0
6	3-Sep	11:41	Freight	29	68	68	542	Down	56.1	47.0	57.6	47.9	63.8	56.6
7	3-Sep	12:29	Passenger	50	35	46	490	Up	54.8	45.3	57.3	46.7	64.3	55.4
8	3-Sep	12:38	Passenger	50	29	41	401	Up	58.5	48.8	59.5	49.6	70.3	57.9
9	3-Sep	13:10	Passenger	41	43	52	490	Down	55.4	47.2	57.6	47.1	65.9	57.2
10	3-Sep	13:42	Passenger	40	36	38	401	Down	55.0	45.8	58.3	47.4	66.2	56.1
11	3-Sep	13:53	Passenger	58	31	42	490	Up	58.3	50.9	60.4	50.6	68.1	59.0
12	3-Sep	14:12	Freight	25	93	97	646	Up	55.0	47.8	56.6	49.0	63.5	56.5
13	3-Sep	14:45	Freight	46	52	68	657	Down	59.6	50.9	60.8	51.4	67.7	61.3
14	3-Sep	16:12	Freight	56	42	45	657	Up	62.6	53.1	63.6	54.9	71.9	62.8
15	3-Sep	18:00	Passenger	50	18	24	245	Down	55.4	45.7	56.5	46.1	63.2	53.6
16	3-Sep	18:32	Passenger	52	21	30	312	Up	56.9	47.5	59.3	49.2	68.1	57.7
17	3-Sep	18:38	Passenger	34	44	52	423	Down	52.7	45.0	56.2	45.9	63.1	54.7
18	3-Sep	19:00	Passenger	52	39	52	557	Up	58.1	47.9	58.7	50.3	64.6	58.0
Average		Passenger(P)		46	29	41	378	Up	57.7	48.8	59.3	49.8	67.2	58.2
				42	37	44	423	Down	55.4	46.9	58.1	47.8	64.9	56.2
		Freight(F)		50	40	47	467	Up	58.8	50.5	60.1	52.0	67.7	59.7
				47	55	61	605	Down	56.7	48.1	58.6	49.2	65.3	58.3

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
Source: NKC

Table 6b-8 Results of Railway Vibration Measurement in Sidhpur No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	20.0m	12.5m	20.0m	12.5m	20.0m
1	3-Sep	9:35	Passenger	29	38	45	312	Down	58.4	49.9	62.1	54.9	72.6	62.1
2	3-Sep	9:56	Passenger	34	55	68	512	Down	58.4	51.3	63.9	54.9	69.5	65.0
3	3-Sep	10:20	Freight	29	58	75	471	Up	56.5	57.9	57.4	51.2	67.4	61.0
4	3-Sep	11:47	Freight	34	68	80	643	Down	60.9	52.4	66.3	59.6	70.3	67.2
5	3-Sep	12:17	Passenger	67	26	35	490	Up	62.2	56.0	68.3	61.0	74.6	70.2
6	3-Sep	12:39	Passenger	28	62	73	490	Down	58.8	51.0	62.4	55.1	72.7	68.4
7	3-Sep	12:43	Freight	21	79	102	471	Up	56.2	48.5	59.2	50.7	68.6	60.2
8	3-Sep	12:55	Passenger	33	46	56	423	Up	55.5	54.1	58.8	52.5	67.0	61.0
9	3-Sep	13:40	Passenger	25	59	72	401	Down	57.1	47.8	60.8	52.8	71.3	61.5
10	3-Sep	13:49	Passenger	28	60	61	468	Up	55.0	52.3	58.6	51.6	66.0	62.0
11	3-Sep	14:38	Freight	21	81	155	471	Up	56.7	55.0	59.1	53.2	67.8	61.8
12	3-Sep	15:25	Freight	27	51	80	379	Up	57.8	54.6	60.2	53.8	69.2	63.5
13	3-Sep	18:00	Passenger	32	25	33	223	Down	53.9	47.7	56.0	49.1	65.5	58.0
14	3-Sep	18:09	Passenger	23	49	57	312	Down	55.5	50.4	60.7	50.2	65.8	63.3
15	3-Sep	18:15	Freight	23	101	101	657	Up	59.1	51.9	56.4	50.0	66.5	60.8
16	3-Sep	18:42	Freight	28	59	87	450	Down	60.0	56.9	62.3	55.6	71.2	64.1
Average		Passenger(P)		43	44	51	460	Up	57.6	54.1	61.9	55.0	69.2	64.4
				28	48	58	375	Down	57.0	49.7	61.0	52.8	69.6	63.1
		Freight(F)		24	80	108	518	Up	57.1	53.3	58.0	51.3	67.6	61.0
				31	63	84	547	Down	60.5	54.7	64.3	57.6	70.8	65.7

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6b-9 and 6b-10. In Sidhpur No.1, in consideration of all results roughly, frequency of the range from 20 to

31.5 Hz at X-axis excelled, range from 25 to 40 Hz at Y-axis excelled, range from 25 to 31.5 Hz at Z-axis excelled. In Sidhpur No.2, in consideration of all results roughly, frequency of the range from 40 to 50 Hz at X-axis excelled, range from 25 to 40 Hz at Y-axis excelled, range from 31.5 to 50 Hz at Z-axis excelled. In Japan, in the example[1] of bullet train, existing train and subway, 20 Hz, 10 and 40 Hz and 60 Hz of predominant frequency at Z-axis have been confirmed respectively. Although result in this survey differs from such example, this reason might be due to difference situation between Japan and India. On the other hand, it is said to vary predominant frequency by type of train, structure of rail, and ground which vibration diffuses, and such a difference might have been confirmed.

Table 6b-9 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Sidhpur No.1

Vibration Level of X-direction [dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	3	7	11	15	16	17	17	16	22	32	31	42	41	41	50	50	53	51	51	45	43	59
2	Passenger	1	4	7	10	10	11	11	15	20	33	37	36	45	45	50	59	57	51	52	50	49	63
3	Passenger	3	6	9	9	12	11	12	10	16	15	28	25	26	34	41	40	39	41	38	30	30	47
4	Passenger	3	6	8	10	10	11	11	7	16	27	37	44	40	48	46	46	46	47	47	47	38	56
5	Freight	5	8	9	11	10	12	13	14	16	24	28	34	34	40	44	44	41	41	40	34	32	50
6	Freight	14	13	3	9	4	5	7	22	32	31	37	41	41	44	41	45	48	42	39	40	33	53
7	Passenger	6	9	11	12	12	13	11	11	11	22	23	28	36	40	42	41	39	37	39	32	26	48
8	Passenger	5	8	10	11	11	11	14	8	13	16	22	28	31	35	39	41	43	42	36	33	28	48
9	Passenger	5	8	10	13	15	16	17	16	19	23	27	28	34	36	42	41	42	39	40	37	34	49
10	Passenger	8	11	13	14	14	12	8	13	16	21	25	26	32	34	41	40	36	39	39	33	30	47
11	Passenger	6	10	11	12	12	9	12	7	11	16	20	26	32	38	40	41	39	38	38	32	27	47
12	Freight	11	13	13	7	4	5	8	22	31	29	34	42	36	39	39	42	41	42	42	37	33	50
13	Freight	13	12	6	7	8	5	15	29	40	41	42	37	35	37	45	45	45	45	40	38	33	53
14	Freight	5	10	12	13	14	14	17	19	26	36	44	41	35	43	43	49	51	49	45	44	34	56
15	Passenger	4	7	9	9	10	9	9	13	16	15	27	33	38	38	43	42	42	42	36	35	29	50
16	Passenger	4	8	11	11	7	9	7	6	10	17	25	26	33	38	40	40	40	38	38	32	27	47
17	Passenger	3	6	10	13	11	11	7	14	15	17	28	30	31	38	42	43	40	38	40	31	27	48
18	Passenger	2	6	8	9	10	7	7	6	7	19	22	26	28	36	41	41	40	38	37	32	27	47

Vibration Level of Y-direction[dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	2	5	6	6	8	9	8	13	25	34	29	40	37	37	45	43	40	46	39	36	33	51
2	Passenger	4	9	14	15	16	17	18	20	28	33	38	38	39	37	44	50	45	46	43	43	40	54
3	Passenger	6	9	11	12	13	12	10	11	15	21	28	23	33	41	42	47	43	41	42	34	33	51
4	Passenger	7	11	13	13	15	16	13	16	25	38	45	47	38	44	40	45	48	50	50	48	40	57
5	Freight	7	11	12	14	17	13	14	18	22	36	31	45	40	43	45	45	46	46	43	36	34	54
6	Freight	16	11	7	15	3	5	12	17	34	34	34	38	38	40	46	48	50	47	42	40	37	55
7	Passenger	7	10	12	14	15	14	11	8	15	23	21	30	36	41	46	43	41	40	39	32	30	50
8	Passenger	7	11	13	14	16	14	12	11	14	24	24	29	34	39	45	45	44	44	43	33	30	52
9	Passenger	6	10	12	14	16	13	15	12	19	27	24	29	35	39	43	43	41	45	41	39	36	51
10	Passenger	8	12	14	16	16	14	10	12	17	20	24	28	33	38	42	44	43	43	44	35	33	51
11	Passenger	7	10	13	14	14	14	8	11	16	19	28	29	35	37	41	43	42	45	41	33	32	50
12	Freight	13	13	11	16	9	7	18	28	32	28	37	35	43	41	41	46	42	44	41	39	36	52
13	Freight	10	10	12	12	20	10	16	30	33	39	42	36	38	39	44	46	47	48	42	41	35	54
14	Freight	8	13	15	17	18	21	27	31	41	47	40	44	43	40	42	52	54	52	47	47	37	59
15	Passenger	6	9	12	12	13	11	12	11	22	25	31	38	37	37	45	48	47	47	38	34	33	53
16	Passenger	6	10	12	12	12	11	10	7	12	21	30	29	31	41	40	42	42	41	38	32	32	49
17	Passenger	5	7	10	13	12	15	12	14	15	23	31	31	39	47	45	46	42	41	43	34	32	53
18	Passenger	5	8	11	13	11	13	10	12	15	17	26	30	31	38	41	42	42	39	37	33	31	49

Vibration Level Z-direction[dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	-1	1	4	6	8	6	7	7	17	21	26	31	29	35	39	40	39	39	36	37	30	47
2	Passenger	5	9	12	14	14	12	8	15	21	28	33	32	36	39	44	47	45	43	41	42	38	52
3	Passenger	5	8	10	13	14	14	14	11	13	20	28	32	34	48	46	51	50	48	51	42	40	57
4	Passenger	6	9	11	13	13	13	12	13	26	32	36	46	43	52	50	56	57	56	60	57	50	65
5	Freight	7	10	12	13	13	10	9	11	20	27	28	40	43	42	49	50	57	51	55	46	43	61
6	Freight	11	8	2	3	0	4	18	30	39	38	39	41	43	44	49	54	58	50	51	48	44	62
7	Passenger	8	11	13	16	16	16	15	15	16	19	24	31	38	47	45	51	50	48	47	40	38	56
8	Passenger	7	11	13	14	16	15	14	13	16	20	29	32	36	42	46	51	51	52	50	42	39	58
9	Passenger	6	9	11	13	13	11	13	10	19	22	32	37	38	42	47	49	53	49	50	47	45	58
10	Passenger	7	11	13	14	17	16	15	13	21	19	26	33	35	46	46	49	51	50	50	42	43	57
11	Passenger	7	10	12	14	14	13	15	11	13	21	30	31	43	46	45	50	49	50	52	43	40	57
12	Freight	13	13	12	7	6	7	21	30	44	36	41	48	52	42	45	50	50	45	52	47	45	59
13	Freight	11	8	5	3	9	6	15	27	41	42	43	45	47	43	50	55	57	54	51	48	43	62
14	Freight	10	13	16	20	20	22	22	26	32	44	47	46	47	50	49	58	63	58	56	56	44	66
15	Passenger	6	9	12	13	14	12	12	11	19	20	28	39	45	44	49	52	54	51	48	47	41	59
16	Passenger	5	9	11	11	11	13	11	8	9	23	31	34	38	48	45	47	50	47	49	40	36	56
17	Passenger	5	8	10	12	11	10	8	10	13	19	27	33	42	51	49	54	52	50	48	43	39	59
18	Passenger	7	9	12	15	15	17	16	15	16	21	27	34	35	46	46	48	51	49	50	41	38	57

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

Table 6b-10 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Sidhpur No.2

Vibration Level of X-direction [dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	-3	2	6	9	12	12	7	9	13	15	23	31	36	40	40	41	40	42	40	40	36	49
2	Passenger	6	8	7	4	10	9	7	6	7	16	22	30	39	40	38	40	42	43	42	41	37	50
3	Freight	6	9	11	12	10	14	16	22	26	29	27	32	36	43	43	43	45	44	50	49	43	55
4	Freight	11	13	16	15	16	16	16	22	30	30	32	38	39	45	42	43	43	46	47	46	39	54
5	Passenger	11	13	14	13	11	9	11	14	20	28	30	33	42	44	45	48	49	48	51	50	43	57
6	Passenger	12	12	11	11	13	11	9	9	14	24	31	32	37	39	39	39	40	41	41	39	35	49
7	Freight	13	13	11	11	14	13	17	25	28	27	33	39	41	42	42	45	44	43	48	47	42	54
8	Passenger	14	14	12	12	10	8	9	5	11	16	25	32	34	43	44	46	44	42	42	41	37	52
9	Passenger	12	14	11	10	9	9	8	6	11	17	25	30	31	37	41	41	42	39	37	36	31	48
10	Passenger	7	10	12	14	14	14	12	8	10	16	24	30	33	39	42	42	41	42	40	40	37	50
11	Freight	12	10	9	6	8	7	7	15	29	27	30	35	32	31	33	36	36	35	36	36	29	45
12	Freight	11	12	10	12	13	12	12	15	20	28	33	34	36	45	41	45	44	44	45	42	38	53
13	Passenger	6	8	9	12	11	13	7	6	7	13	22	23	32	38	40	42	42	40	43	41	33	50
14	Passenger	10	13	13	13	10	11	10	8	8	18	26	28	34	37	40	39	41	41	38	38	32	48
15	Freight	11	14	14	7	0	1	7	18	24	31	35	33	41	44	38	42	45	46	44	43	36	53
16	Freight	9	2	4	7	2	7	20	24	27	24	32	34	43	40	42	42	43	43	47	48	43	54

Vibration Level of Y-direction[dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	0	6	8	11	13	8	10	11	15	21	26	35	38	38	40	45	45	43	42	36	38	51
2	Passenger	8	12	10	7	10	11	9	8	12	21	30	36	42	45	45	41	43	46	43	37	38	53
3	Freight	8	11	13	8	16	21	20	26	27	28	33	34	38	44	46	45	47	46	46	45	44	55
4	Freight	13	13	11	15	13	13	13	24	29	32	32	38	38	43	47	46	46	51	49	42	38	56
5	Passenger	14	15	13	17	14	13	11	12	20	24	31	42	51	48	49	52	50	48	49	47	44	59
6	Passenger	14	15	14	14	14	13	12	11	13	22	29	37	43	37	42	44	46	45	41	38	36	52
7	Freight	12	14	11	15	12	15	19	23	24	26	32	34	39	43	47	51	48	46	47	43	40	56
8	Passenger	14	13	14	17	14	13	12	7	15	22	29	39	37	42	46	49	46	44	42	37	37	54
9	Passenger	14	14	12	13	12	10	9	11	13	22	29	34	39	41	40	43	42	42	40	34	30	50
10	Passenger	9	13	14	15	14	15	12	9	12	16	25	38	44	38	45	48	45	44	41	39	38	53
11	Freight	11	11	9	10	12	9	10	18	26	27	25	30	32	31	34	41	40	36	35	34	29	46
12	Freight	14	15	12	15	15	15	17	16	22	23	31	37	35	44	45	46	45	46	47	41	37	54
13	Passenger	8	11	13	13	15	16	14	14	16	17	23	32	41	40	40	44	43	44	43	38	32	51
14	Passenger	11	13	14	13	13	14	10	11	13	24	27	35	38	37	40	45	44	44	42	36	31	51
15	Freight	13	16	14	13	9	12	14	14	26	25	32	32	39	43	42	48	48	49	44	41	36	55
16	Freight	16	5	6	9	10	17	19	22	27	25	33	36	38	44	42	46	46	47	46	46	38	54

Vibration Level Z-direction[dB], Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	2	5	8	12	12	10	13	13	18	21	25	33	39	45	43	51	56	51	51	50	49	60
2	Passenger	13	16	17	18	19	20	20	19	21	21	30	32	42	46	48	49	55	52	53	52	50	60
3	Freight	8	12	15	16	19	19	19	35	36	34	35	40	44	51	52	53	57	54	60	59	56	65
4	Freight	13	14	14	15	14	14	17	27	38	37	37	45	44	49	50	52	57	58	59	58	52	65
5	Passenger	14	14	13	14	14	11	11	13	23	26	33	40	51	51	55	58	63	61	62	62	57	69
6	Passenger	13	14	14	12	11	10	9	9	18	25	36	39	42	45	49	49	57	54	52	52	48	62
7	Freight	16	18	17	18	19	21	23	34	30	31	40	41	45	47	51	56	59	56	60	57	54	66
8	Passenger	14	14	15	16	15	14	14	12	17	21	28	36	42	45	53	53	56	54	52	53	50	62
9	Passenger	14	13	12	12	11	11	10	10	11	22	28	34	40	44	49	52	55	52	51	47	45	60
10	Passenger	9	12	14	15	17	17	17	14	14	19	23	34	44	43	52	52	56	58	53	54	51	63
11	Freight	12	13	13	13	13	15	16	23	32	31	31	36	38	37	42	47	50	45	49	47	42	56
12	Freight	14	13	12	13	13	14	14	24	33	31	37	38	40	49	56	52	59	59	58	56	52	65
13	Passenger	7	10	12	14	14	13	12	10	15	22	30	35	37	46	48	48	56	52	54	51	46	61
14	Passenger	12	12	11	14	12	11	11	10	12	21	29	32	37	41	49	51	56	52	52	48	46	60
15	Freight	13	14	14	8	8	7	20	21	32	34	38	39	46	46	52	55	59	60	57	53	48	65
16	Freight	12	8	2	8	6	6	27	29	34	32	41	40	44	48	50	54	56	53	60	58	55	65

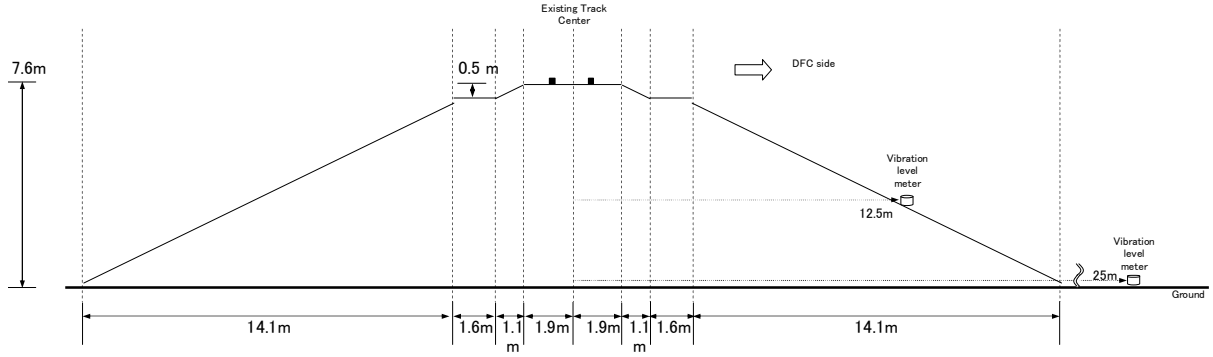
Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

(3) Mehsana

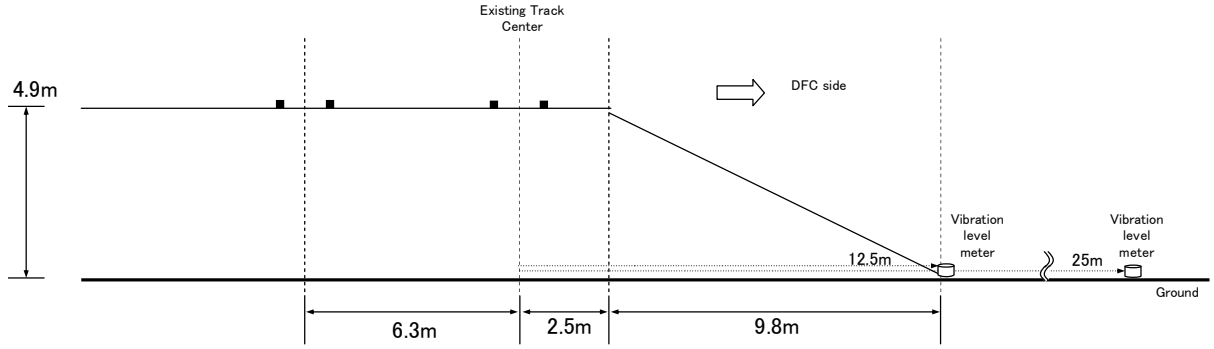
1) Cross-section View

Cross-section views of measurement site in Mehsana are given in Figure 6b-3.



Source : NKC

Figure 6b-3(1) Cross-section View of Measurement Site in Mehsana No.1



Source : NKC

Figure 6b-3(2) Cross-section View of Measurement Site in Mehsana No.2

2) Result of Background Vibration

Results of background vibration measurement in Mehsana are given in Table 6b-11.

Table 6b-11 Results of background Vibration Measurement in Mehsana

Station	date	No.	Background Vibration Level Lp [dB]														
			10:00～12:00			12:00～14:00			14:00～16:00			16:00～18:00			Overall 10:00～18:00		
			X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Mehsana	5-Sep	1	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25
	6-Sep	2	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25	<30	<30	<25

Note: Measurement lower limits of vibration level meter are 30dB for X and Y-direction and 25dB for Z-direction, therefore, measurement value under these limits indicate with [<]

Source: NKC

3) Result of Railway Noise

Results of railway vibration measurement in Mehsana are given in Tables 6b-12 and 6b-13.

Table 6b-12 Results of Railway Vibration Measurement in Mehsana No.1

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	25.0m	12.5m	25.0m	12.5m	25.0m
1	5-Sep	10:00	Passanger	58	25	33	401	Down	56.3	43.2	56.3	45.8	63.1	53.5
2	5-Sep	11:10	Freight	44	53	65	657	Up	59.4	49.1	59.3	49.9	65.5	56.1
3	5-Sep	11:34	Passanger	84	18	23	423	Up	61.3	50.9	63.0	52.9	68.0	60.4
4	5-Sep	12:23	Passanger	49	35	42	468	Down	56.8	45.9	60.1	48.3	65.3	54.1
5	5-Sep	12:56	Passanger	68	26	30	490	Up	57.7	46.8	61.3	49.4	66.6	57.0
6	5-Sep	13:03	Passanger	46	31	39	401	Down	54.3	43.8	58.9	46.2	63.2	52.2
7	5-Sep	13:39	Passanger	93	16	27	423	Up	57.9	49.2	62.0	51.4	67.7	59.0
8	5-Sep	14:18	Freight	35	46	65	450	Up	58.1	48.3	61.7	50.2	65.2	56.4
9	5-Sep	14:30	Passanger	90	20	31	490	Up	62.1	51.4	64.2	53.2	67.7	61.2
10	5-Sep	16:13	Freight	77	31	60	657	Up	59.0	49.9	61.3	48.1	65.0	54.2
11	5-Sep	17:18	Passanger	52	16	19	223	Down	54.0	45.1	56.6	46.0	61.9	51.3
12	5-Sep	18:08	Passanger	55	28	34	423	Down	58.4	47.6	58.3	48.6	66.2	55.1
13	5-Sep	18:23	Freight	41	58	97	657	Up	55.2	46.1	59.1	47.2	64.9	53.5
14	5-Sep	19:00	Passanger	65	20	27	356	Down	58.1	47.2	59.6	51.1	68.4	56.6
Average		Passenger(P)		84	20	28	456	Up	59.8	49.6	62.6	51.7	67.5	59.4
				54	26	32	378	Down	56.3	45.5	58.3	47.7	64.7	53.8
		Freight(F)		52	43	63	588	Up	58.8	49.1	60.8	49.4	65.2	55.6
				-	-	-	-	Down	-	-	-	-	-	-

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
Source: NKC

Table 6b-13 Results of Railway Vibration Measurement in Mehsana No.2

No.	Date	Time	Train type	Train speed [km/h]	Train passage time [s]	Measurement time [s]	Train length [m]	Train direction	Railway Vibration Level [dB]					
									Lpx		Lpy		Lpz	
									12.5m	25.0m	12.5m	25.0m	12.5m	25.0m
1	6-Sep	9:45	Passenger	52	34	34	490	Down	60.9	55.4	61.9	54.0	70.4	62.9
2	6-Sep	12:00	Passenger	28	64	110	490	Down	60.3	49.6	60.5	51.7	68.4	60.5
3	6-Sep	12:41	Passenger	38	40	62	423	Down	61.4	52.4	60.4	53.4	69.4	61.4
4	6-Sep	13:05	Passenger	22	22	32	133	Down	55.9	44.2	55.8	46.1	63.0	55.3
5	6-Sep	13:11	Passenger	43	33	39	401	Up	60.6	49.9	60.5	51.6	67.8	58.4
6	6-Sep	13:55	Passenger	26	58	62	423	Up	60.6	49.7	59.4	51.6	67.5	58.1
7	6-Sep	15:15	Passenger	19	25	35	133	Up	57.6	45.7	57.0	47.0	63.8	56.1
8	6-Sep	17:14	Passenger	31	26	44	223	Down	58.7	47.3	56.2	48.3	64.1	56.9
Average		Passenger(P)		30	39	45	319	Up	59.6	48.4	59.0	50.1	66.4	57.5
				34	37	56	352	Down	59.4	49.8	59.0	50.7	67.1	59.4
		Freight(F)		-	-	-	-	Up	-	-	-	-	-	-
				-	-	-	-	Down	-	-	-	-	-	-

Note: P : passenger train F : freight train Up : to Mumbai Down : to Delhi
Train passage time (s) : time until the back of the train passes after the head of the train passes at a certain point
Measurement time (s) : This indicates railway vibration measurement time for L_p in time that is 10dB or more higher than background noise.
Average : value calculated by the simple arithmetic average in each up side passenger train, down side passenger train, up side freight train, down side freight train
Source: NKC

4) Result of Frequency Analysis

Results of 1/3 octave band frequency analysis are given in Tables 6b-14 and 6b-15. In Mehsana No.1, in consideration of all results roughly, frequency of the range from 20 to 25 Hz at X-axis excelled, range from 25 to 40 Hz at Y-axis excelled, range from 25 to 31.5 Hz at Z-axis excelled. In Mehsana No.2, in consideration of all results roughly, frequency of 31.5 Hz at X-axis excelled, range from 25 to 31.5 Hz at Y-axis excelled, range from 20 to 31.5 Hz at Z-axis excelled. In Japan, in the example[1] of bullet train, existing train and subway, 20 Hz, 10 and 40 Hz and 60 Hz of predominant frequency at Z-axis have been confirmed respectively. Although result in this survey differs from such example, this reason might be due to difference situation between Japan and India. On the other hand, it is said to vary predominant frequency by type of train, structure of rail, and ground which vibration diffuses, and such a difference might have been confirmed.

Table 6b-14 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Mehsana No.1

Vibration Level of X-direction [dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passanger	-3	-1	-5	-1	3	7	12	11	20	23	23	34	39	44	42	46	46	40	43	39	35	52
2	Freight	9	4	9	9	10	13	15	21	34	37	39	36	42	41	42	45	47	49	47	38	32	54
3	Passanger	6	11	13	12	17	16	18	21	28	31	40	41	46	45	48	49	48	47	45	42	35	56
4	Passanger	4	7	10	12	12	10	14	10	20	23	22	32	33	36	40	38	39	42	43	34	29	49
5	Passanger	5	10	13	13	17	16	14	14	21	28	30	24	36	36	47	42	46	41	44	35	31	52
6	Passanger	9	10	12	11	11	8	9	10	17	21	25	30	37	37	41	39	38	39	41	34	29	48
7	Passanger	3	5	7	8	14	17	11	14	20	25	33	27	35	40	46	41	47	42	43	38	32	52
8	Freight	12	15	11	10	10	16	19	26	37	35	30	40	38	42	42	42	41	42	43	38	32	51
9	Passanger	4	9	13	13	14	12	16	19	23	31	33	38	37	47	50	42	45	44	42	38	32	54
10	Freight	15	17	15	16	7	5	10	26	32	42	37	33	40	38	44	42	44	46	46	36	29	53
11	Passanger	3	6	7	8	8	8	13	12	21	24	26	35	35	44	46	39	40	40	38	32	26	50
12	Passanger	2	4	6	10	6	7	3	13	13	21	25	35	38	43	43	46	44	44	43	38	31	52
13	Freight	8	5	0	4	4	6	5	10	18	32	38	39	38	35	44	46	44	42	38	28	16	52
14	Passanger	-4	0	1	4	10	11	4	12	18	24	25	31	38	43	39	42	40	39	38	33	28	49

Vibration Level of Y-direction[dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passanger	1	5	6	6	5	11	7	14	21	27	24	36	37	43	46	47	44	41	42	36	34	53
2	Freight	10	13	13	7	12	12	10	20	35	36	39	40	47	45	46	46	48	50	47	38	34	56
3	Passanger	7	9	13	14	16	20	18	19	28	33	40	41	47	48	44	55	51	50	47	43	39	59
4	Passanger	8	12	13	15	16	14	11	13	26	27	23	34	35	39	47	44	44	49	46	39	31	54
5	Passanger	8	12	13	14	6	11	12	17	21	31	38	35	36	42	43	46	48	49	44	43	36	55
6	Passanger	13	13	12	12	13	12	14	16	25	23	28	32	38	42	43	42	43	47	45	41	37	53
7	Passanger	8	10	13	15	11	16	15	16	20	30	38	38	37	46	45	48	48	50	45	41	38	56
8	Freight	14	15	19	14	10	12	22	29	29	31	32	34	35	46	44	43	45	50	51	50	39	57
9	Passanger	6	9	10	13	13	14	12	17	29	34	41	41	41	44	49	52	54	48	43	42	39	58
10	Freight	17	16	9	9	15	8	11	23	37	39	38	35	39	43	47	46	48	50	48	38	30	56
11	Passanger	7	10	13	15	18	17	18	19	22	25	30	37	37	44	46	47	46	40	38	35	30	53
12	Passanger	5	7	11	10	11	15	13	15	24	30	26	39	42	45	45	49	45	44	49	45	33	55
13	Freight	12	9	5	7	3	10	11	14	20	25	38	44	37	43	51	51	46	42	40	31	21	56
14	Passanger	1	4	9	13	13	13	11	15	19	28	30	35	44	42	46	47	45	37	34	33	29	52

Vibration Level Z-direction[dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passanger	5	7	10	14	16	16	16	18	21	32	30	34	41	46	51	52	49	49	46	48	43	58
2	Freight	11	13	15	16	17	18	18	24	37	46	45	41	50	48	53	57	56	51	48	44	41	62
3	Passanger	5	10	14	12	16	17	21	20	24	32	41	45	45	50	53	57	53	54	52	52	48	62
4	Passanger	7	11	13	14	14	12	10	15	20	25	21	32	38	44	49	49	48	45	44	44	41	56
5	Passanger	7	10	12	14	13	13	10	9	19	28	39	32	39	41	52	54	55	50	46	43	41	60
6	Passanger	11	12	11	12	11	9	8	12	21	27	31	36	42	44	45	51	49	48	47	44	44	57
7	Passanger	6	10	12	13	15	15	14	14	22	28	38	34	37	43	52	56	56	53	50	45	43	61
8	Freight	16	16	17	12	12	11	22	37	37	42	36	41	38	42	45	50	51	50	46	51	45	58
9	Passanger	7	11	13	14	16	18	18	19	22	31	37	44	36	46	54	52	54	52	50	47	45	60
10	Freight	18	20	19	17	14	10	15	23	37	47	43	39	42	44	49	55	53	52	49	43	39	60
11	Passanger	7	11	14	15	18	18	19	18	23	31	27	39	38	46	46	52	48	44	46	42	36	56
12	Passanger	5	9	10	11	12	10	9	14	23	31	28	35	44	46	50	55	56	49	50	52	41	61
13	Freight	12	11	10	8	5	1	9	16	25	35	47	41	41	39	49	58	55	48	43	36	29	61
14	Passanger	1	4	7	10	10	11	12	12	19	27	29	37	43	45	49	54	50	47	47	42	37	58

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

Table 6b-15 Results of 1/3 Octave Band Frequency Analysis of Railway Vibration in Mehsana No.2

Vibration Level of X-direction [dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	-3	5	2	1	4	5	7	13	28	31	28	29	41	45	50	54	55	50	48	45	37	59
2	Passenger	2	6	-5	7	2	-1	-2	1	9	12	17	27	24	32	36	41	44	40	35	32	23	48
3	Passenger	-2	2	3	0	9	5	11	10	18	19	24	21	32	36	41	46	47	45	42	35	27	52
4	Passenger	-4	0	2	6	3	2	12	13	15	17	23	28	30	34	39	43	46	45	41	36	28	51
5	Passenger	0	2	8	12	9	5	10	16	19	19	29	32	32	37	40	50	52	49	44	41	34	56
6	Passenger	2	1	3	-2	2	6	8	9	17	17	24	23	30	36	45	46	48	47	40	34	26	53
7	Passenger	1	5	6	5	9	10	9	13	14	18	25	23	26	36	42	43	44	43	40	31	24	50
8	Passenger	-5	0	3	4	7	5	6	13	12	13	25	32	27	35	38	43	47	43	38	32	24	50

Vibration Level of Y-direction[dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	7	3	8	13	6	13	9	19	29	31	41	39	48	47	50	52	54	51	46	38	32	59
2	Passenger	4	8	9	8	1	0	-5	9	11	15	21	31	30	35	38	43	43	39	34	28	21	48
3	Passenger	0	4	7	12	12	7	14	13	12	13	22	27	35	35	43	48	51	46	41	33	22	55
4	Passenger	1	5	7	10	13	12	21	19	21	25	31	37	43	42	46	46	45	43	38	32	24	53
5	Passenger	3	8	12	12	10	13	13	16	22	26	31	33	44	44	46	53	51	50	44	37	30	57
6	Passenger	6	6	8	8	11	6	10	7	13	26	30	36	41	38	42	48	49	46	39	31	21	54
7	Passenger	4	8	7	6	6	10	15	11	14	23	32	38	34	38	38	45	43	43	40	30	21	50
8	Passenger	1	5	7	8	9	10	10	11	15	17	28	36	31	38	38	44	46	41	36	28	19	50

Vibration Level Z-direction[dB] — Frequency [Hz]

№	train type	0.8	1	1.25	1.6	2	2.5	3.15	4	5	6.3	8	10	12.5	16	20	25	31.5	40	50	63	80	AP
1	Passenger	10	13	13	14	16	17	17	19	28	34	41	45	53	56	62	62	56	54	57	58	51	67
2	Passenger	6	5	7	4	-3	-1	-1	3	13	17	26	32	36	43	49	51	48	43	44	43	37	55
3	Passenger	-1	2	4	4	5	5	8	6	18	23	24	35	37	43	53	56	54	47	47	48	38	60
4	Passenger	0	3	5	5	4	2	14	15	20	26	35	41	47	47	48	50	53	50	46	47	39	58
5	Passenger	5	9	13	15	17	18	18	18	23	24	36	38	51	51	57	60	55	53	52	55	48	65
6	Passenger	6	5	6	6	5	5	6	12	19	24	32	32	44	49	54	53	52	49	48	48	39	60
7	Passenger	4	7	9	11	12	8	12	10	16	19	34	41	41	50	50	52	49	47	44	45	37	58
8	Passenger	4	8	11	13	14	15	13	15	16	24	32	35	40	46	51	50	46	47	45	44	37	56

Note: Each frequency indicates center frequency of 1/3 octave band.
Shaded sections indicate maximum one of each measurement.

Source: NKC

2. Impact Assessment

2-1 Time Table of Passenger Train

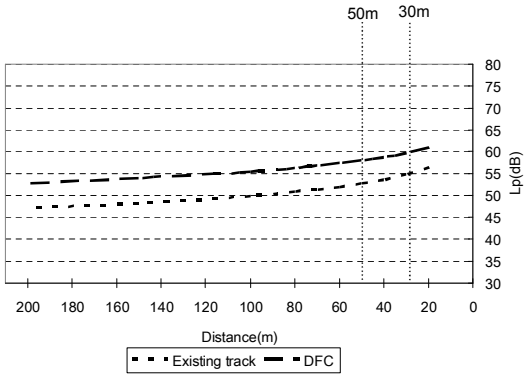
Refer to APPENDIX-6a NOISE SURVEY.

2-2 Results of Vibration Prediction

The results of vibration prediction are given below. Range of distance from near railway to 200 m is indicated on graphs. Distance 0m in each graph indicates center position of each existing track while the prediction points (30m and 50m) were put down with each graph.

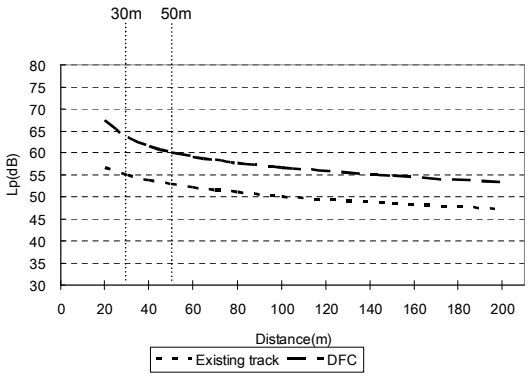
(1) Palanpur No.1

Results of vibration prediction for Palanpur No.1 are given from Figure 6b-4.



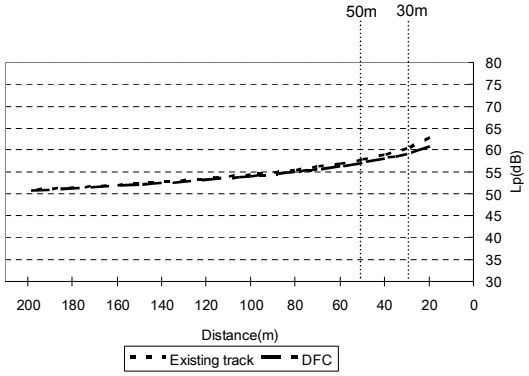
Source : NKC

Figure 6b-4(1) Result of Vibration Prediction at X-axis in Palanpur-1 (Existing track side)



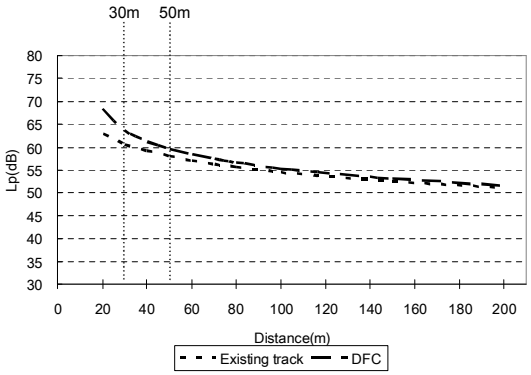
Source : NKC

Figure 6b-4(2) Result of Vibration Prediction at X-axis in Palanpur-1 (DFC track side)



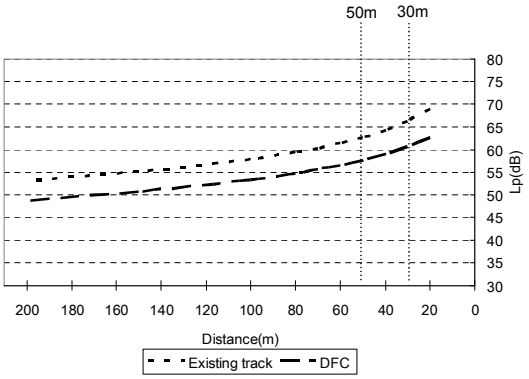
Source : NKC

Figure 6b-4(3) Result of Vibration Prediction at Y-axis in Palanpur-1 (Existing track side)



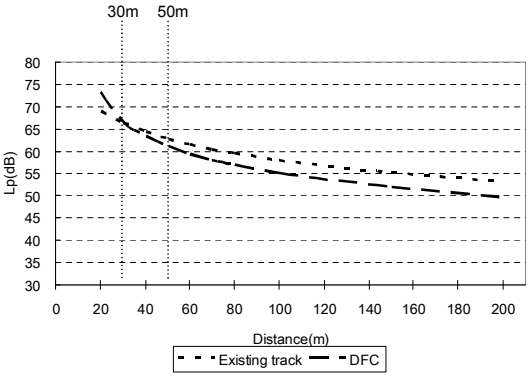
Source : NKC

Figure 6b-4(4) Result of Vibration Prediction at Y-axis in Palanpur-1 (DFC track side)



Source :NKC

Figure 6b-4(5) Result of Vibration Prediction at Z-axis in Palanpur-1 (Existing track side)

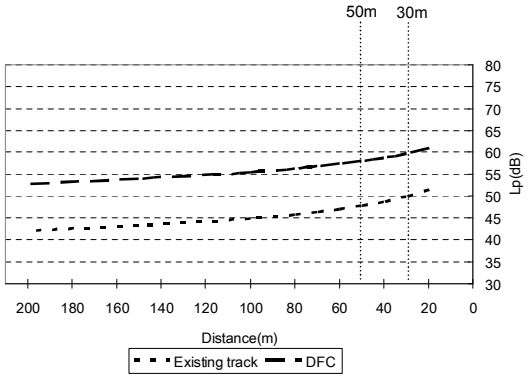


Source : NKC

Figure 6b-4(6) Result of Vibration Prediction at Z-axis in Palanpur-1 (DFC track side)

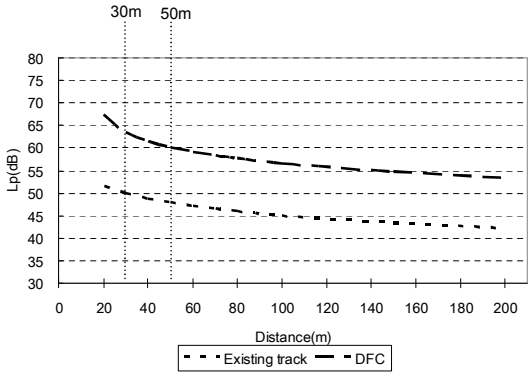
(2) Palanpur No.2

Results of vibration prediction for Palanpur No.2 are given from Figure 6b-5.



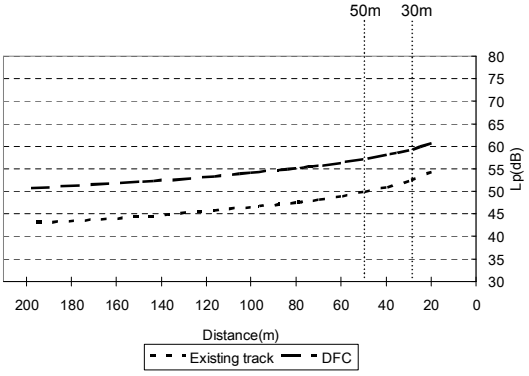
Source : NKC

Figure 6b-5(1) Result of Vibration Prediction at X-axis in Palanpur-2 (Existing track side)



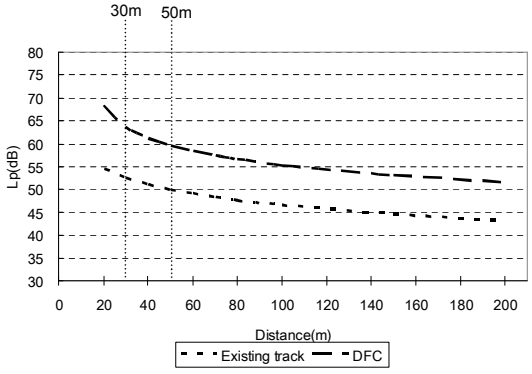
Source : NKC

Figure 6b-5(2) Result of Vibration Prediction at X-axis in Palanpur-2 (DFC track side)



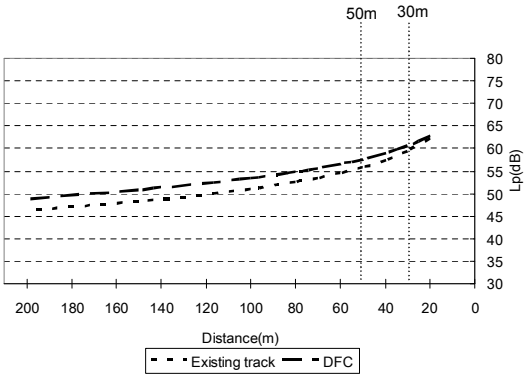
Source : NKC

Figure 6b-5(3) Result of Vibration Prediction at Y-axis in Palanpur-2 (Existing track side)



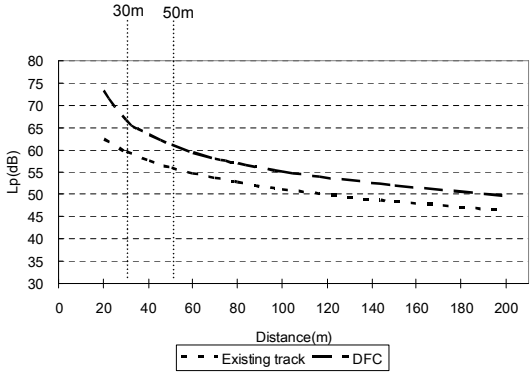
Source : NKC

Figure 6b-5(4) Result of Vibration Prediction at Y-axis in Palanpur-2 (DFC track side)



Source :NKC

Figure 6b-5(5) Result of Vibration Prediction at Z-axis in Palanpur-2 (Existing track side)

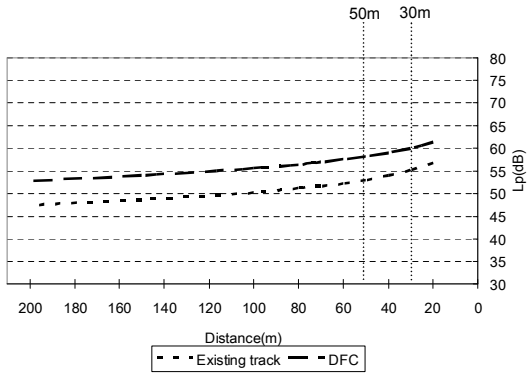


Source : NKC

Figure 6b-5(6) Result of Vibration Prediction at Z-axis in Palanpur-2 (DFC track side)

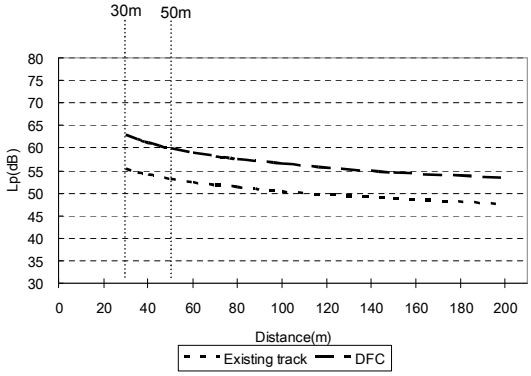
(3) Sidhpur No.1

Results of vibration prediction for Sidhpur No.1 are given from Figure 6b-6.



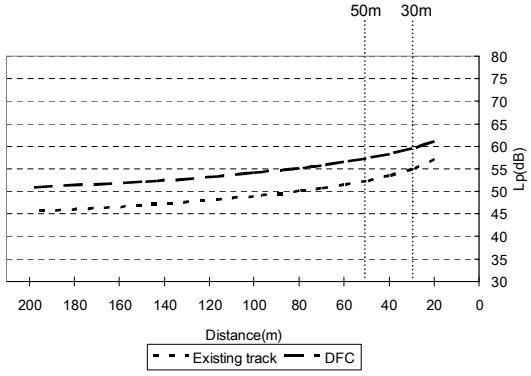
Source : NKC

Figure 6b-6(1) Result of Vibration Prediction at X-axis in Sidhpur-1 (Existing track side)



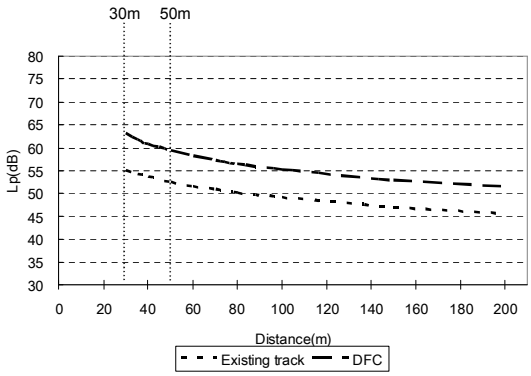
Source : NKC

Figure 6b-6(2) Result of Vibration Prediction at X-axis in Sidhpur-1 (DFC track side)



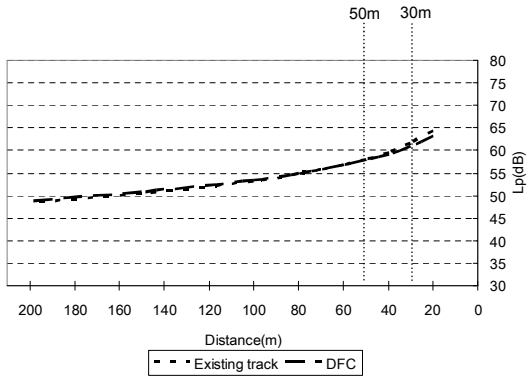
Source : NKC

Figure 6b-6(3) Result of Vibration Prediction at Y-axis in Sidhpur-1 (Existing track side)



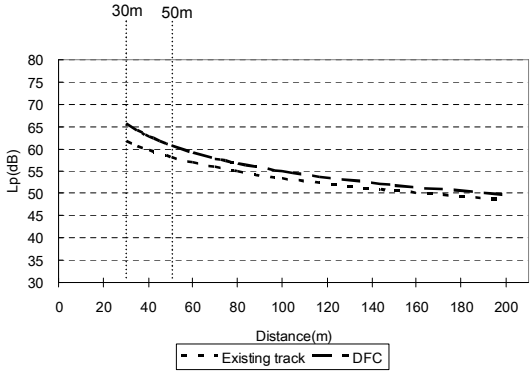
Source : NKC

Figure 6b-6(4) Result of Vibration Prediction at Y-axis in Sidhpur-1 (DFC track side)



Source :NKC

Figure 6b-6(5) Result of Vibration Prediction at Z-axis in Sidhpur-1 (Existing track side)

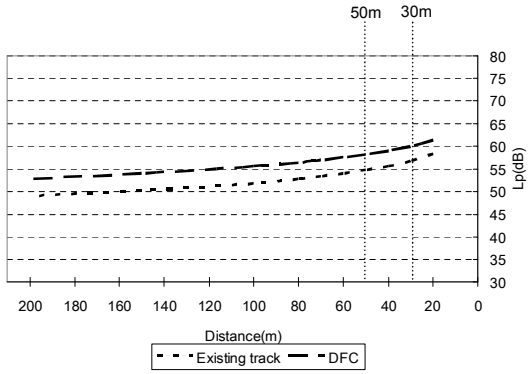


Source : NKC

Figure 6b-6(6) Result of Vibration Prediction at Z-axis in Sidhpur-1 (DFC track side)

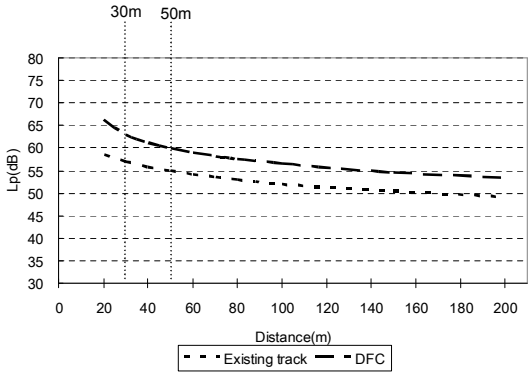
(4) Sidhpur No.2

Results of vibration prediction for Sidhpur No.2 are given from Figure 6b-7.



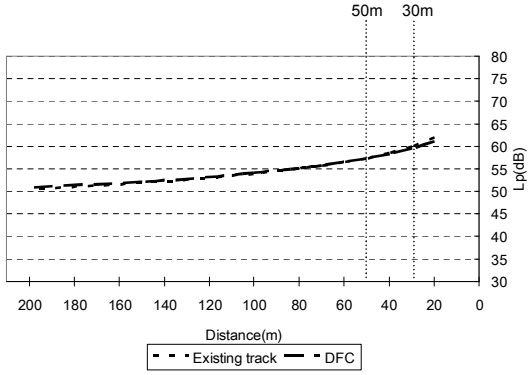
Source : NKC

Figure 6b-7(1) Result of Vibration Prediction at X-axis in Sidhpur-2 (Existing track side)



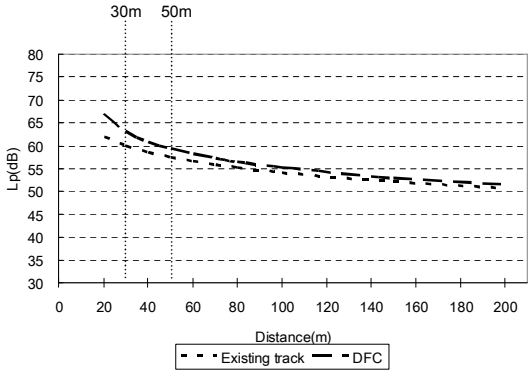
Source : NKC

Figure 6b-7(2) Result of Vibration Prediction at X-axis in Sidhpur-2 (DFC track side)



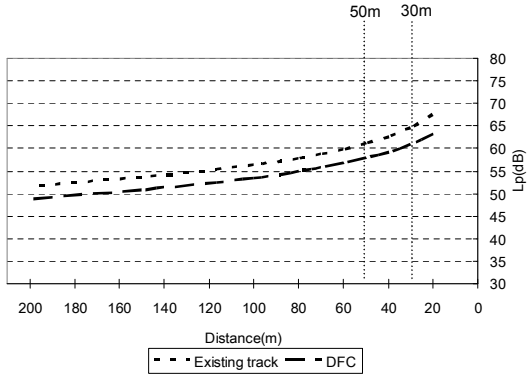
Source : NKC

Figure 6b-7(3) Result of Vibration Prediction at Y-axis in Sidhpur-2 (Existing track side)



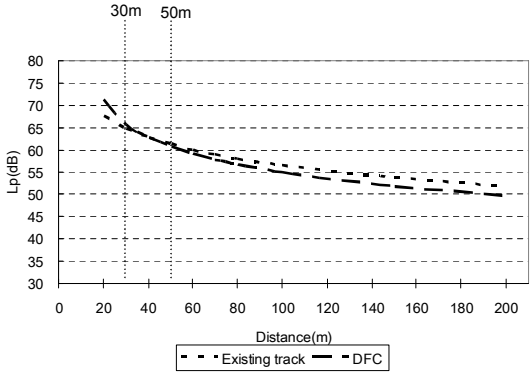
Source : NKC

Figure 6b-7(4) Result of Vibration Prediction at Y-axis in Sidhpur-2 (DFC track side)



Source :NKC

Figure 6b-7(5) Result of Vibration Prediction at Z-axis in Sidhpur-2 (Existing track side)

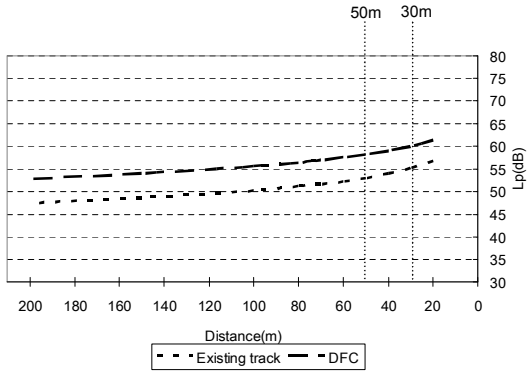


Source : NKC

Figure 6b-7(6) Result of Vibration Prediction at Z-axis in Sidhpur-2 (DFC track side)

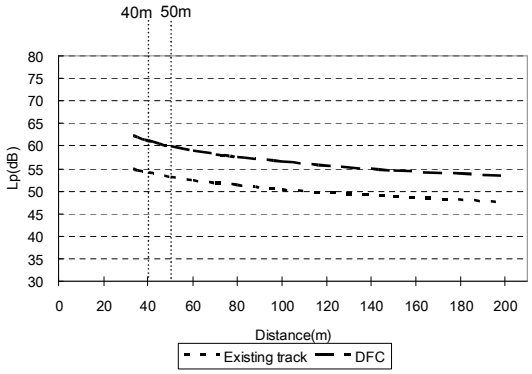
(5) Mehsana No.1

Results of vibration prediction for Mehsana No.1 are given from Figure 6b-8.



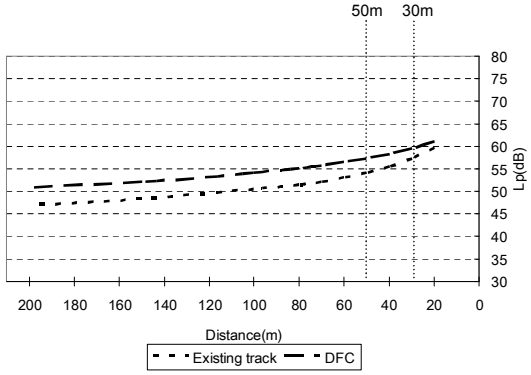
Source : NKC

Figure 6b-8(1) Result of Vibration Prediction at X-axis in Mehsana-1 (Existing track side)



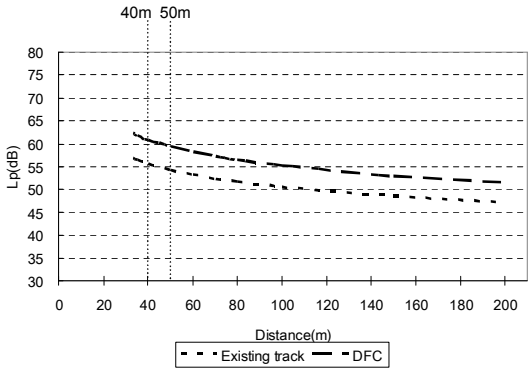
Source : NKC

Figure 6b-8(2) Result of Vibration Prediction at X-axis in Mehsana-1 (DFC track side)



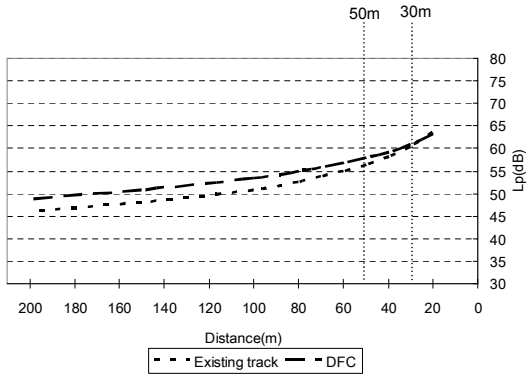
Source : NKC

Figure 6b-8(3) Result of Vibration Prediction at Y-axis in Mehsana-1 (Existing track side)



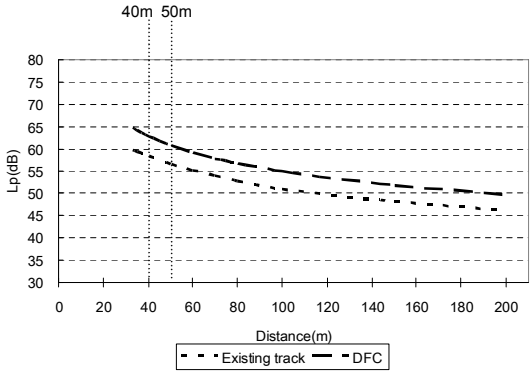
Source : NKC

Figure 6b-8(4) Result of Vibration Prediction at Y-axis in Mehsana-1 (DFC track side)



Source :NKC

Figure 6b-8(5) Result of Vibration Prediction at Z-axis in Mehsana-1 (Existing track side)

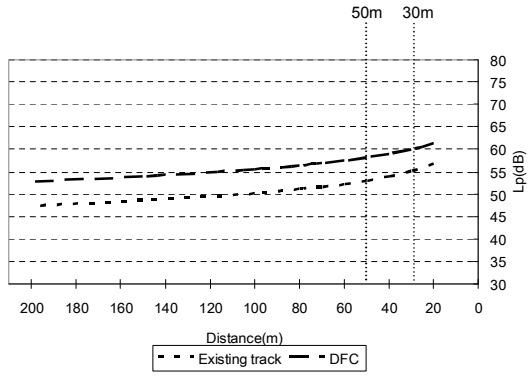


Source : NKC

Figure 6b-8(6) Result of Vibration Prediction at Z-axis in Mehsana-1 (DFC track side)

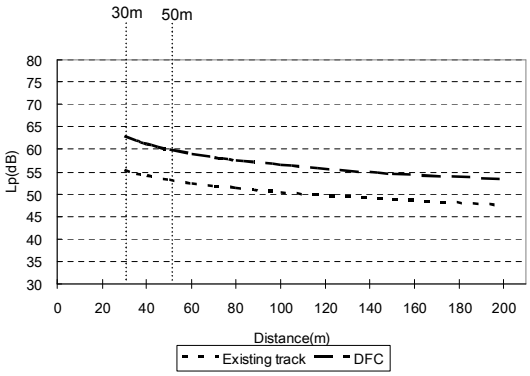
(6) Mehsana No.2

Results of vibration prediction for Mehsana No.2 are given from Figure 6b-9.



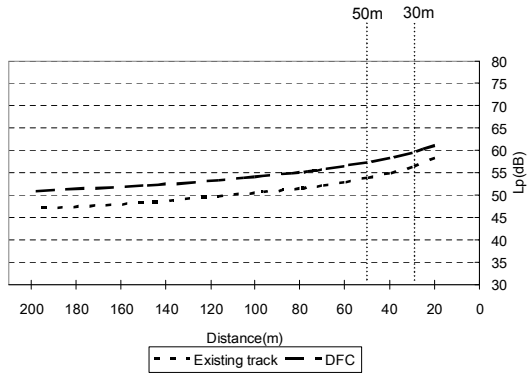
Source : NKC

Figure 6b-9(1) Result of Vibration Prediction at X-axis in Mehsana-2 (Existing track side)



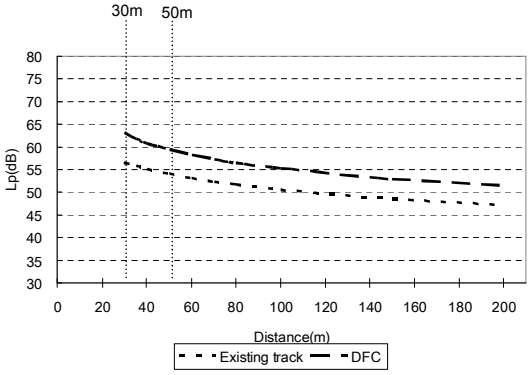
Source : NKC

Figure 6b-9(2) Result of Vibration Prediction at X-axis in Mehsana-2 (DFC track side)



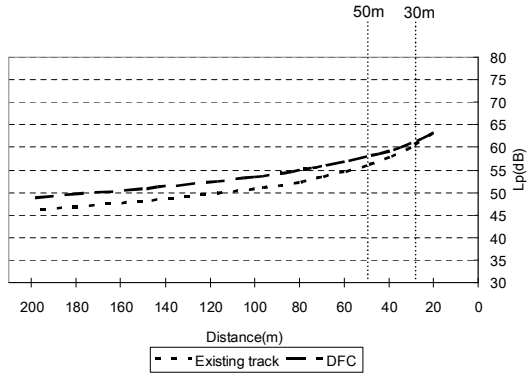
Source : NKC

Figure 6b-9(3) Result of Vibration Prediction at Y-axis In Mehsana-2 (Existing track side)



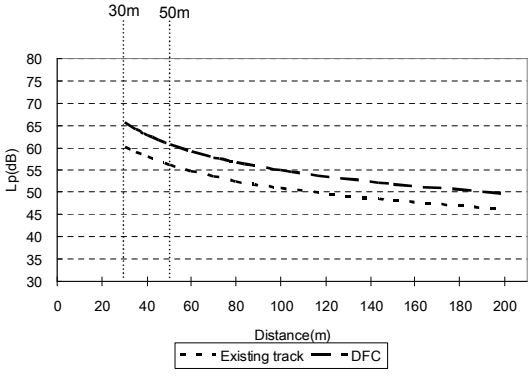
Source : NKC

Figure 6b-9(4) Result of Vibration Prediction at Y-axis in Mehsana-2 (DFC track side)



Source :NKC

Figure 6b-9(5) Result of Vibration Prediction at Z-axis in Mehsana-2 (Existing track side)



Source : NKC

Figure 6b-9(6) Result of Vibration Prediction at Z-axis in Mehsana-2 (DFC track side)

Appendix-6c
Water Quality Survey

1. Laboratory Test Report (Monsoon Season)

The laboratory test reports of the water quality analysis for monsoon season survey are shown in Figure 6c-1.

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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R. | REV.: 01 | Rev. Date: 01.12.2010

LABORATORY TEST REPORT

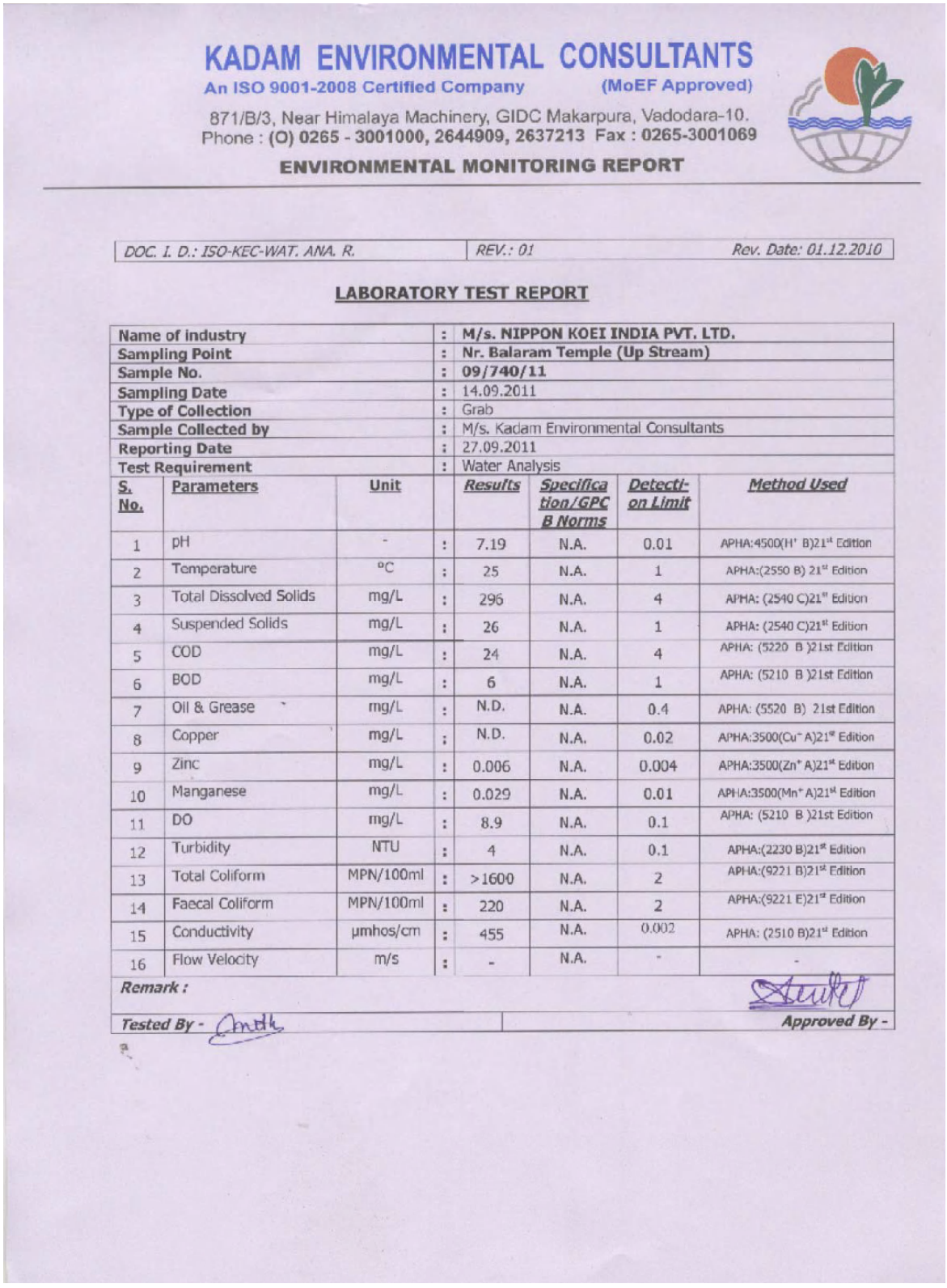
Name of industry	:	M/s. NIPPON KOEI INDIA PVT. LTD.
Sampling Point	:	Nr. Railway Bridge (Core Sample Stream)
Sample No.	:	09/739/11
Sampling Date	:	14.09.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	27.09.2011
Test Requirement	:	Water Analysis

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	7.26	N.A.	0.01	APHA:4500(H+ B)21st Edition
2	Temperature	°C	:	25	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	184	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	38	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	20	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	5	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	N.D.	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	0.01	N.A.	0.02	APHA:3500(Cu+ A)21st Edition
9	Zinc	mg/L	:	0.02	N.A.	0.004	APHA:3500(Zn+ A)21st Edition
10	Manganese	mg/L	:	N.D.	N.A.	0.01	APHA:3500(Mn+ A)21st Edition
11	DO	mg/L	:	7.7	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	10	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	>1600	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	220	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	285	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	-	N.A.	-	-

Remark :

Tested By - Approved By -

Figure 6c-1 (1) Laboratory Test Report (Monsoon Season: Core Sample Station)



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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R.	REV.: 01	Rev. Date: 01.12.2010

LABORATORY TEST REPORT

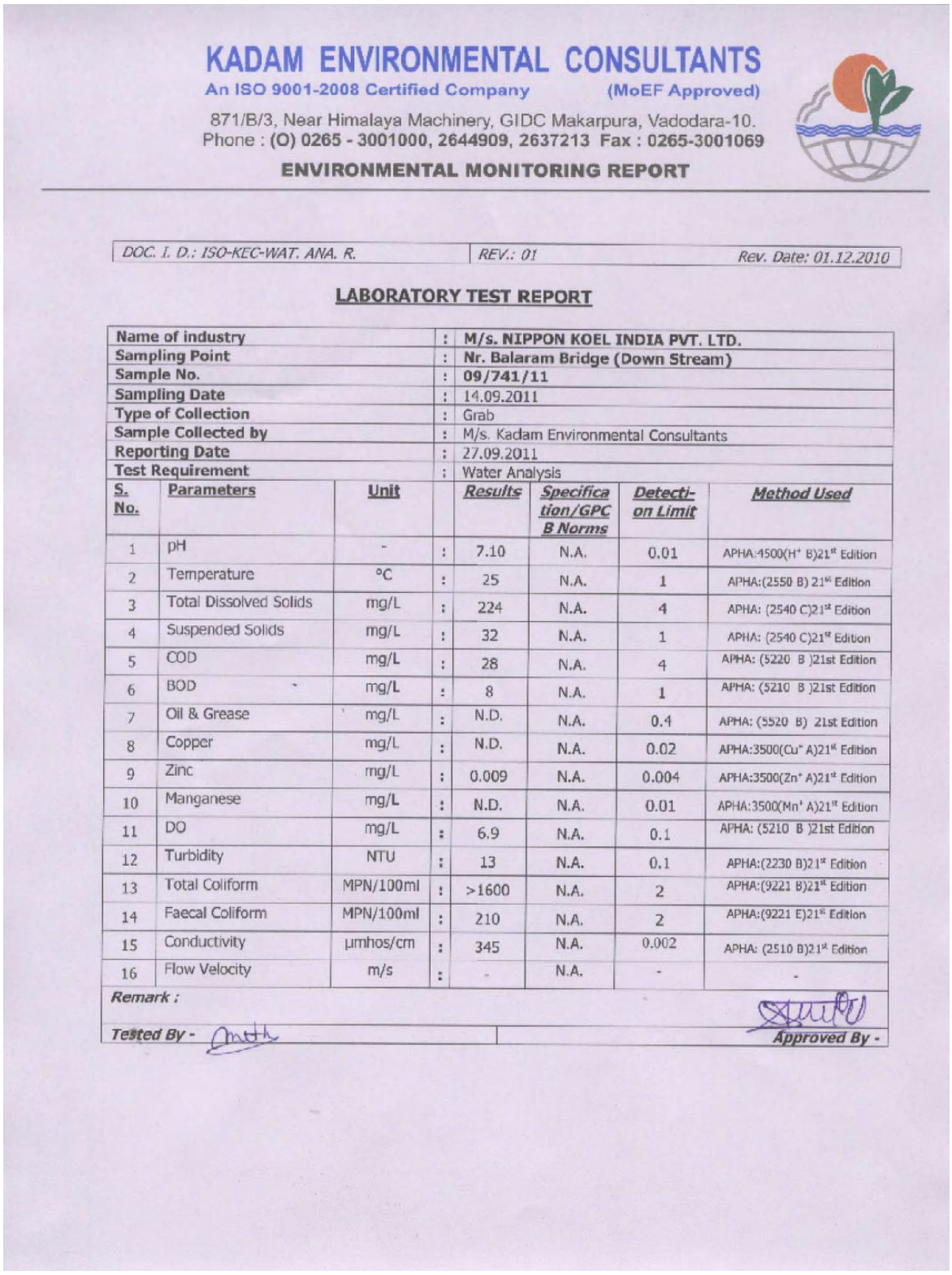
Name of industry	:	**M/s. NIPPON KOEI INDIA PVT. LTD.**
Sampling Point	:	**Nr. Balaram Temple (Up Stream)**
Sample No.	:	**09/740/11**
Sampling Date	:	14.09.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	27.09.2011
Test Requirement	:	Water Analysis

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	7.19	N.A.	0.01	APHA:4500(H+ B)21st Edition
2	Temperature	°C	:	25	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	296	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	26	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	24	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	6	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	N.D.	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	N.D.	N.A.	0.02	APHA:3500(Cu~ A)21st Edition
9	Zinc	mg/L	:	0.006	N.A.	0.004	APHA:3500(Zn+ A)21st Edition
10	Manganese	mg/L	:	0.029	N.A.	0.01	APHA:3500(Mn+ A)21st Edition
11	DO	mg/L	:	8.9	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	4	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	>1600	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	220	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	455	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	-	N.A.	-	-

Remark :

Tested By - ***Approved By -***

Figure 6c-1 (2) Laboratory Test Report (Monsoon Season: Upstream)



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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R. | REV.: 01 | Rev. Date: 01.12.2010

LABORATORY TEST REPORT

Name of industry	:	**M/s. NIPPON KOEL INDIA PVT. LTD.**
Sampling Point	:	**Nr. Balaram Bridge (Down Stream)**
Sample No.	:	**09/741/11**
Sampling Date	:	14.09.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	27.09.2011
Test Requirement	:	Water Analysis

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	7.10	N.A.	0.01	APHA:4500(H+ B)21st Edition
2	Temperature	°C	:	25	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	224	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	32	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	28	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	8	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	N.D.	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	N.D.	N.A.	0.02	APHA:3500(Cu+ A)21st Edition
9	Zinc	mg/L	:	0.009	N.A.	0.004	APHA:3500(Zn+ A)21st Edition
10	Manganese	mg/L	:	N.D.	N.A.	0.01	APHA:3500(Mn+ A)21st Edition
11	DO	mg/L	:	6.9	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	13	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	>1600	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	210	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	345	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	-	N.A.	-	-

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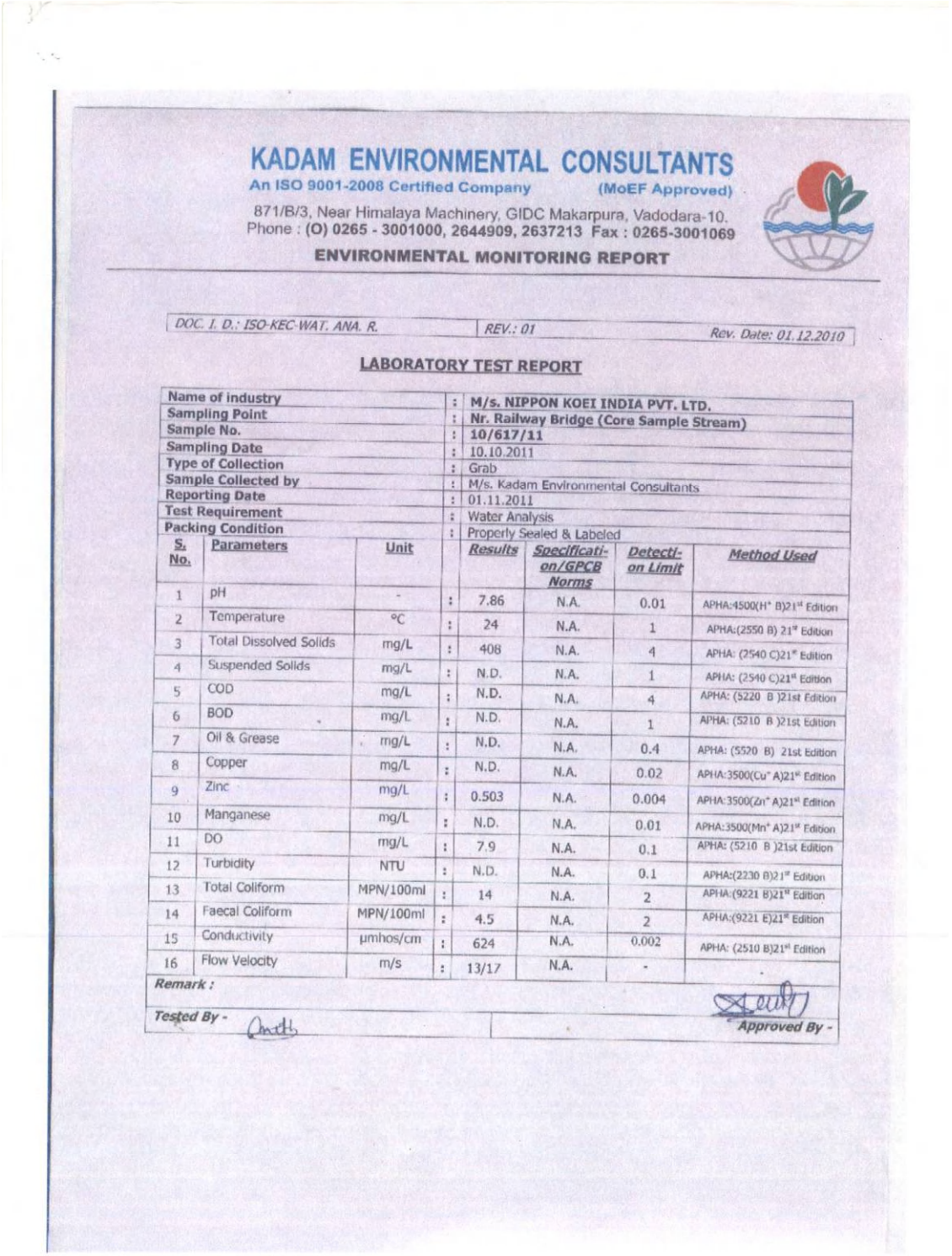
Figure 6c-1 (3) Laboratory Test Report (Monsoon Season: Downstream)

2. Laboratory Test Report (Post Monsoon Season)

The laboratory test reports of the water quality analysis for post-monsoon season survey are shown in Figure 6c-2.



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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R. | REV.: 01 | Rev. Date: 01.12.2010

LABORATORY TEST REPORT

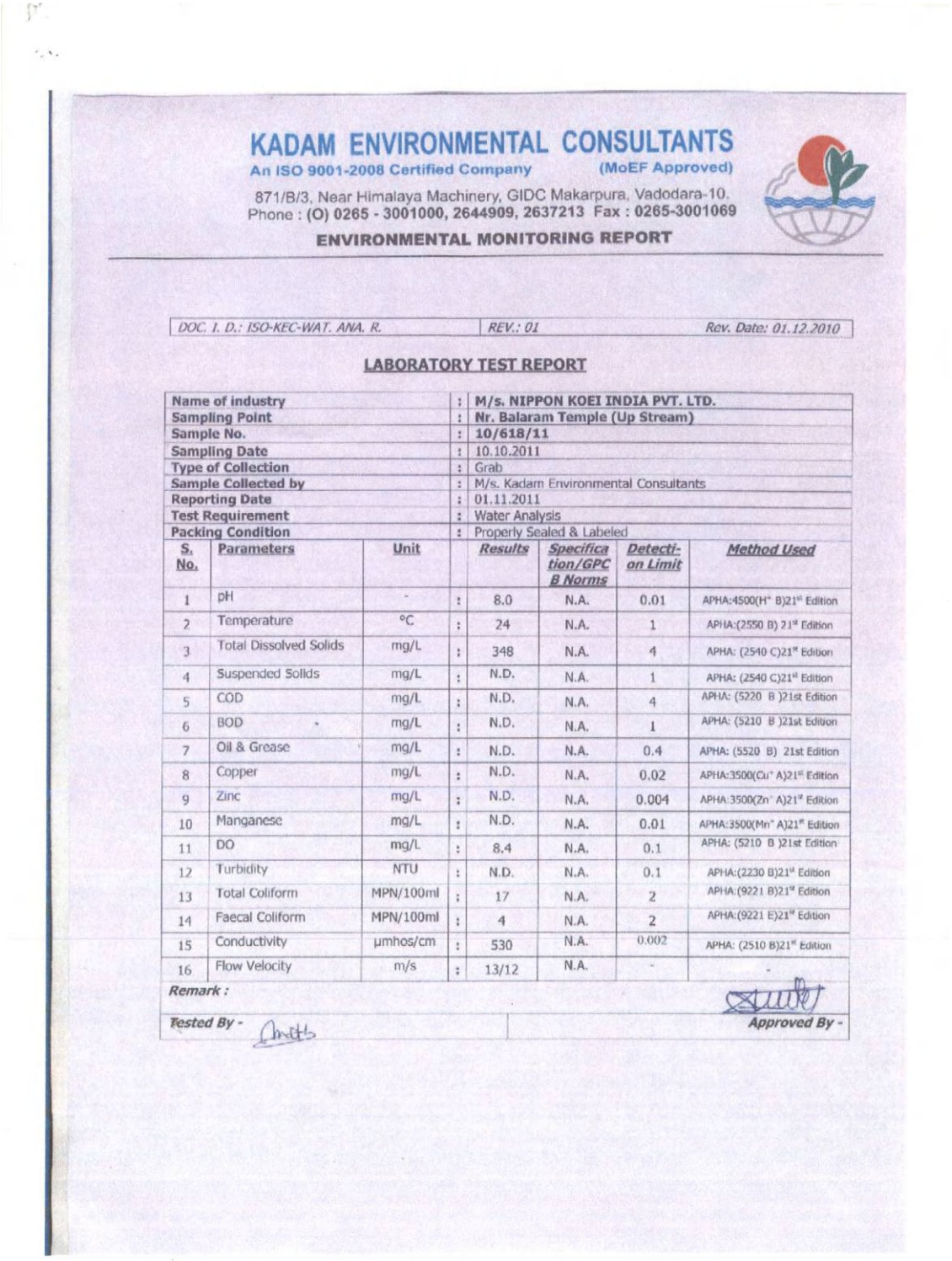
Name of industry	:	M/s. NIPPON KOEI INDIA PVT. LTD.
Sampling Point	:	Nr. Railway Bridge (Core Sample Stream)
Sample No.	:	10/617/11
Sampling Date	:	10.10.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	01.11.2011
Test Requirement	:	Water Analysis
Packing Condition	:	Properly Sealed & Labeled

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	7.86	N.A.	0.01	APHA:4500(H^+ B)21st Edition
2	Temperature	°C	:	24	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	408	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	N.D.	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	N.D.	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	N.D.	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	N.D.	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	N.D.	N.A.	0.02	APHA:3500(Cu^+ A)21st Edition
9	Zinc	mg/L	:	0.503	N.A.	0.004	APHA:3500(Zn^+ A)21st Edition
10	Manganese	mg/L	:	N.D.	N.A.	0.01	APHA:3500(Mn^+ A)21st Edition
11	DO	mg/L	:	7.9	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	N.D.	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	14	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	4.5	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	624	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	13/17	N.A.	-	

Remark :

Tested By - *Approved By -*

Figure 6c-2 (1) Laboratory Test Report (Post-Monsoon Season: Core Sample Station)



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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R. | REV.: 01 | Rev. Date: 01.12.2010

LABORATORY TEST REPORT

Name of industry	:	**M/s. NIPPON KOEI INDIA PVT. LTD.**
Sampling Point	:	**Nr. Balaram Temple (Up Stream)**
Sample No.	:	**10/618/11**
Sampling Date	:	10.10.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	01.11.2011
Test Requirement	:	Water Analysis
Packing Condition	:	Properly Sealed & Labeled

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	8.0	N.A.	0.01	APHA:4500(H^+ B)21st Edition
2	Temperature	°C	:	24	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	348	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	N.D.	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	N.D.	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	N.D.	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	N.D.	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	N.D.	N.A.	0.02	APHA:3500(Cu^+ A)21st Edition
9	Zinc	mg/L	:	N.D.	N.A.	0.004	APHA:3500(Zn^+ A)21st Edition
10	Manganese	mg/L	:	N.D.	N.A.	0.01	APHA:3500(Mn^+ A)21st Edition
11	DO	mg/L	:	8.4	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	N.D.	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	17	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	4	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	530	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	13/12	N.A.	-	-

Remark :

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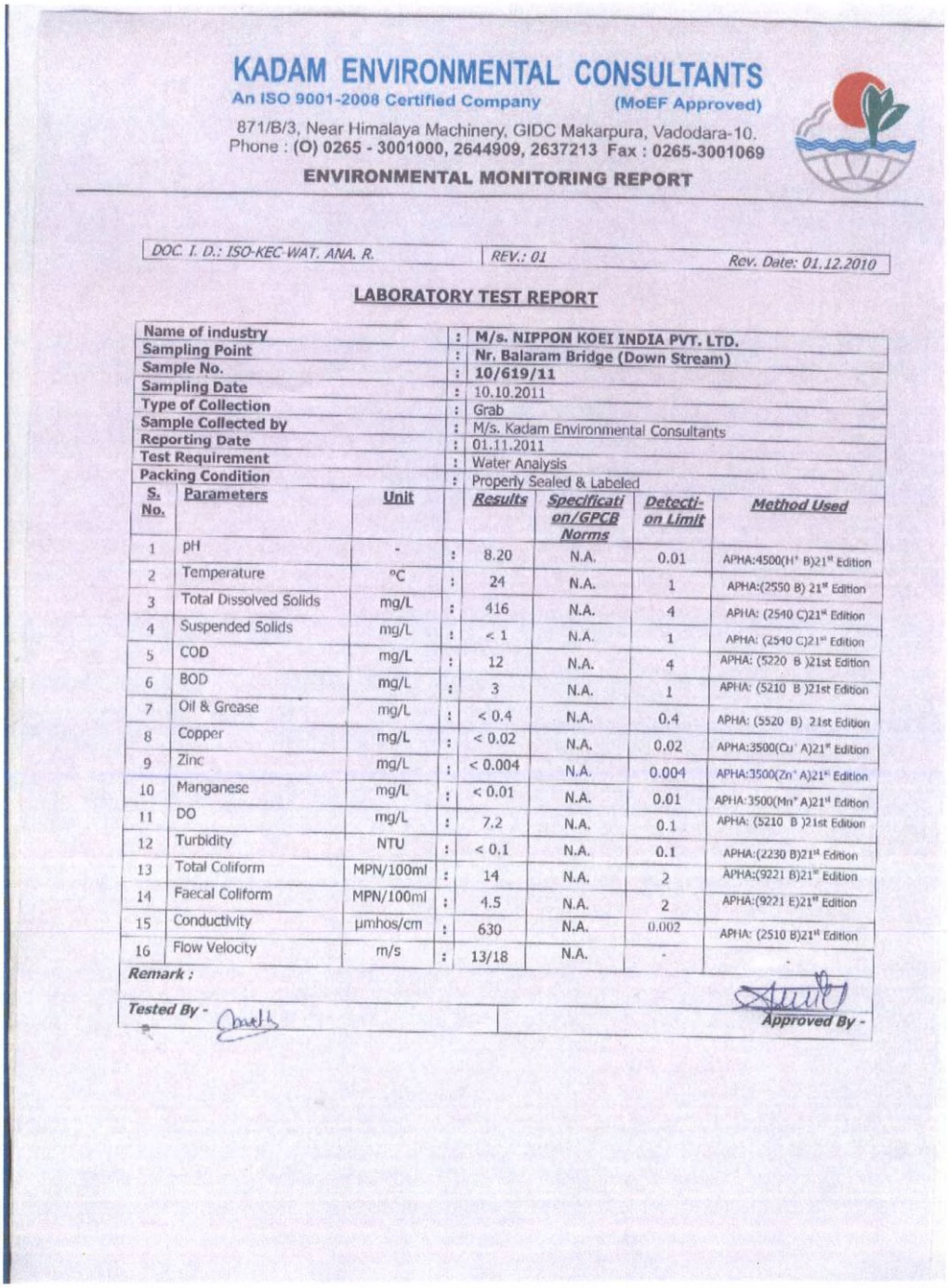
Figure 6c-2 (2) Laboratory Test Report (Post-Monsoon Season: Upstream)



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ENVIRONMENTAL MONITORING REPORT

DOC. I. D.: ISO-KEC-WAT. ANA. R. | REV.: 01 | Rev. Date: 01.12.2010

LABORATORY TEST REPORT

Name of industry	:	**M/s. NIPPON KOEI INDIA PVT. LTD.**
Sampling Point	:	**Nr. Balaram Bridge (Down Stream)**
Sample No.	:	**10/619/11**
Sampling Date	:	10.10.2011
Type of Collection	:	Grab
Sample Collected by	:	M/s. Kadam Environmental Consultants
Reporting Date	:	01.11.2011
Test Requirement	:	Water Analysis
Packing Condition	:	Properly Sealed & Labeled

S. No.	Parameters	Unit		Results	Specification/GPCB Norms	Detection Limit	Method Used
1	pH	-	:	8.20	N.A.	0.01	APHA:4500(H+ B)21st Edition
2	Temperature	°C	:	24	N.A.	1	APHA:(2550 B) 21st Edition
3	Total Dissolved Solids	mg/L	:	416	N.A.	4	APHA: (2540 C)21st Edition
4	Suspended Solids	mg/L	:	< 1	N.A.	1	APHA: (2540 C)21st Edition
5	COD	mg/L	:	12	N.A.	4	APHA: (5220 B)21st Edition
6	BOD	mg/L	:	3	N.A.	1	APHA: (5210 B)21st Edition
7	Oil & Grease	mg/L	:	< 0.4	N.A.	0.4	APHA: (5520 B) 21st Edition
8	Copper	mg/L	:	< 0.02	N.A.	0.02	APHA:3500(Cu+ A)21st Edition
9	Zinc	mg/L	:	< 0.004	N.A.	0.004	APHA:3500(Zn+ A)21st Edition
10	Manganese	mg/L	:	< 0.01	N.A.	0.01	APHA:3500(Mn+ A)21st Edition
11	DO	mg/L	:	7.2	N.A.	0.1	APHA: (5210 B)21st Edition
12	Turbidity	NTU	:	< 0.1	N.A.	0.1	APHA:(2230 B)21st Edition
13	Total Coliform	MPN/100ml	:	14	N.A.	2	APHA:(9221 B)21st Edition
14	Faecal Coliform	MPN/100ml	:	4.5	N.A.	2	APHA:(9221 E)21st Edition
15	Conductivity	µmhos/cm	:	630	N.A.	0.002	APHA: (2510 B)21st Edition
16	Flow Velocity	m/s	:	13/18	N.A.	-	-

Remark :

Tested By - *Approved By -*

Figure 6c-2 (3) Laboratory Test Report (Post-Monsoon Season: Downstream)

Appendix-7a
List of Reviewed Documents

1. Akhtar, S. A. 1998. Wintering Ecology of the Harriers of Velavadar National Park, Dt. Bhavnagar, Gujarat; Ph. D. Thesis. University of Bombay, Bombay.

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Appendix-7b
Record of Experts Interview

Mr. V. J. Rana, Director, Sakkar Baug Zoo, Junagadh, Gujarat

Q1. Mega infrastructure Projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: We must understand that development cannot be ignored, it is a priority. But this should be sustainable over the longterm. People's needs cannot be overlooked. If this is attempted, it will backfire at great cost to whatever is left of our natural resources, especially wildlife. In the light of the present circumstances more resources should be made available for in-situ conservation, which is a more effective approach to conservation.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: There are bound to be disturbances due to the frequent movement of freight trains, especially in terms of sound pollution and general vibrations in the vicinity of the trains.

This can be mitigated by devising sound barriers, in terms of thicker hedgerows (e.g. bamboo plantations) and other suitable species which will buffer the sound.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing railway RoW (a part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: Since the DFC will be utilizing an existing RoW, which was created much before the establishment of the PAs, the impacts will be limited to a very minor section (2.4km). Even here the habitat is dominated by an exotic, *Prosopis juliflora*. The primary habitat (core area) will not be affected as it is away from the RoW

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good population of Nilgai. Do you feel the DFC could have an impact on their population?

A: The DFC will not have a very great impact on the population of the nilgai and sloth bear, as these species are generally alert to any unusual activity in their surroundings and generally keep away from such sources of disturbance. Hence, it is unlikely that they will be run over by passing trains. My experiences as a PA manager in the Velavadar National Park has shown that animals like Blackbuck and Nilgai adjust to traffic movements in their area. A coastal highway passes along the periphery of the park with no obvious effect on the wildlife in the area. However, in case of the DFC speed restrictions should be strictly enforced. Blowing of horns should be allowed at a lower pitch. For the day to day management of freight trains moving through the section, a coordinating system should be

established between the railways and the PA managers in the area. This will help in monitoring day to day wildlife activities and their movements across the tracks. Perhaps the railway gangmen could be given an orientation to monitor and report such activities.

Q5. In the light of the above observations, would you suggest mitigation measures to address these concerns?

A: Raise the embankment through BAWS by a few feet and make it steeper, to discourage animals from crossing over. Have more underpasses in sync with the underpasses on the adjacent National Highway so as to facilitate easy movement of animals

Dr. S. P. Singh, Head, Dept. of Biosciences & Dr. Rahul Kundu, Associate Professor, Dept. of Biosciences, Saurashtra University, Rajkot, Gujarat

Q1. Mega infrastructure Projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: We should be realistic and practical in our approach. Urbanisation and industrialization can not be rolled back. Eco-sensitive zones should be clearly demarcated and their sanctity respected.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: Disturbances due to the frequent movement of freight trains, especially in terms of sound pollution and general vibrations in the vicinity of the trains, is bound to occur. However, this can be checked to a great extent by devising sound barriers, in terms of thick vegetation cover (e.g. bamboo plantations) and other local species which will buffer the sound. Experts in the particular problem (noise pollution) area can also be consulted further.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing railway RoW (a part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: The DFC will be utilizing an existing RoW, which was created much before the establishment of the PAs The impacts if any will be limited to a very minor section (2.4km). Moreover the habitat in this section is dominated by an exotic, *Prosopis juliflora.* However, the local biodiversity will be especially impacted during the construction phase, this can be curtailed to a great extent by minimizing disturbance during the construction phase. This can be achieved by appointing an ecologist in the environmental cell of the DFC, to monitor construction activities and coordinate with the stake holders.

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good

population of Nilgai. Do you feel the DFC could have an impact on their population?

A: The DFC will not have a very great impact on the population of the nilgai and sloth bear, as these species are generally alert to any unusual activity in their surroundings and generally keep away from such sources of disturbance. Hence, it is unlikely that they will be run over by passing trains or their population affected greatly.

Q5. In the light of the above observations, would you suggest mitigation measures to address these concerns?

A: Raising the DFC embankment through BAWS by a few feet and make it steeper, to discourage animals from crossing over. Have more underpasses in sync with the underpasses on the adjacent National Highway so as to facilitate easy movement of animal. Tracks around the underpasses should be fenced off so that the animals are funneled into the underpasses, as the NHAI authorities have done.

Mr. Bharat Pathak, Director, GEER Foundation, Gandhinagar, Gujarat

Q1. Mega infrastructure Projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: Industrialization and the consequent urbanisation is a fact of life. Eco-sensitive zones should be clearly demarcated and their sanctity respected. More monitoring centres at the State level should be set up to keep a track of environmental violations. Provisions should be made in such mega projects to fund the establishment of monitoring centres, which is the need of the hour.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: The freight track will give rise to rapid industrialization in the area. However, if the eco-sensitive zone is duly recognized as such and due efforts made to invest in its well being, then the impacts can be curtailed to a great extent.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing railway RoW (a part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: The local biodiversity will be impacted during the construction phase, this can be avoided to a great extent by making use of prefabricated elements, which can be manufactured offsite and assembled on site thus minimising disturbance.

The working period should be restricted to daylight hours, considering that the location is frequented by crepuscular species like the sloth bear, which also happens to be the flagship

species in the area.

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good population of Nilgai. Do you feel the DFC could have an impact on their population?

A: The DFC will not have a very great impact on the population of the nilgai and sloth bear, as these species are generally alert to any unusual activity in their surroundings and generally keep away from such sources of disturbance. Speed restrictions should be strictly enforced. Blowing of horns should be allowed at a lower pitch. In the light of the above observations, would you suggest mitigation measures to address these concerns?

Habitat improvement measures should be undertaken in the core areas of the PAs, by planting fruiting species (e.g. *Zizyphus sp. Salvadora sp., Ficus sp. Capparis sp.* etc,), which will attract the animals away from the tracks and minimize their movement around such conflict zones. Maintain a string of strategically placed water holes to draw wildlife away from the freight track.

Habitat improvement measures, including watershed management, should be carried out on a PPP (Public – Private – People) model. The resultant benefits - in terms of NTFP (Nontimber Forest Produce - viz. fodder, fruits, medicinal plants) and the resultant positive impact on the water table will encourage the locals to participate in conserving the eco-sensitive areas around the DFC alignment.

Mr. A. Kaboolchand, Principal CCF, Aranya Bhavan, Gandhinagar, Gujarat

Q1. Mega infrastructure Projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: All such initiatives should be planned properly, which should include habitat improvement schemes in the affected zones. Sufficient funds should be set aside to sustain eco-development projects.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: The eco-sensitive zone should be duly highlighted and recognized as such. Efforts should be made to maintain contiguity between the PAs especially by improving the fragmented habitat in the area.

The noise pollution can be checked to a great extent by devising sound barriers, in terms of thick vegetation cover (e.g. bamboo plantations) and other local species which will help filter out the sound.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing railway RoW (a

part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: The DFC will be utilizing an existing RoW, which was created much before the establishment of the PAs The impacts if any will be limited to a very minor section (2.4km). Moreover the habitat in this section is dominated by an exotic, *Prosopis juliflora.* The primary habitat will not be affected as it is away from the RoW.

The local biodiversity will be especially impacted during the construction phase, this can be curtailed to a great extent by making use of prefabricated elements, which can be manufactured offsite and assembled on site with the most minimum disturbance. Use of floodlights during the construction phase should be strictly regulated. A system to monitor construction activity should be put in place.

The working period should be restricted to daylight hours, considering that the location is frequented by crepuscular species like the sloth bear, which also happens to be the flagship species in the area.

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good population of Nilgai. Do you feel the DFC could have an impact on their population?

A: Speed restrictions (@40kms/hr) should be strictly enforced along a predetermined section. Blowing of horns should also be restricted and if necessary, allowed at a lower pitch.

The freight time table should be worked out in such a way that the peak movement of trains occurs during late morning and early afternoon hours. This will facilitate the movement of a crepuscular species like the sloth bear.

Q5. In the light of the above observations, would you suggest mitigation measures to address these concerns?

A: Perhaps we can raise the embankment through BAWS by a few feet and make it steeper, to discourage animals from crossing over.

Increase the number of underpasses. These should be coordinated with the underpasses on the adjacent National Highway so as to facilitate safe movement of animals' right across the railway track and the adjacent National Highway. Tracks around the underpasses should be fenced off so that the animals are funneled into the underpasses, as the NH authorities have done.

Mr. Vijay Kumar, Director, Gujarat Institute of Desert Ecology,Bhuj, Gujarat

Q1. Mega infrastructure Projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: The country's development needs will always remain a priority, however we must

enhance our efforts accordingly. Such mega projects can be made to set aside special funds to sponsor research and subsequent implementation of the findings.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: The disturbances due to the frequent movement of freight trains, especially in terms of sound pollution and general vibrations in the vicinity of the trains, cannot be ignored. However, the longer term impact will be from industrialization of the area. Until the area is clearly demarcated and officially recognized as an eco-sensitive zone and restrictions placed on further development in the zone, the impact will continue to multiply manifold.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing Railway RoW (a part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: The wildlife in the proposed alignment is used to passing trains. Moreover, the DFC will be utilizing an existing RoW, which was created much before the establishment of the PAs, hence the impacts will be limited to a very minor section (2.4km). Even here the habitat is dominated by an exotic, *Prosopis juliflora*, which is not of much importance to the wildlife in the area. The primary habitat will not be affected as it is away from the RoW. However, habitat improvement measures, in consultation with the Forest Department and by involving the locals, can be initiated to help improve biodiversity in the area.

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good population of Nilgai. Do you feel the DFC could have an impact on their population?

A: The Nilgai are generally known to keep to open areas like farmlands and are known to use underpasses wherever available. Hence, their chances of being run over are very slim. Similarly the Sloth bear keeps away from human activities and would generally avoid an active railway track. We have not come across casualties of these species on railway tracks.

Q5. In the light of the above observations, would you suggest mitigation measures to address these concerns?

A: Have more underpasses of appropriate dimensions in sync with the underpasses on the adjacent National Highway so as to facilitate easy movement of animals. These underpasses should be properly maintained on a continuing basis.

Habitat improvement measures undertaken in the core areas of the PAs, by planting fruiting species (e.g. *Zizyphus sp. Salvadora sp.*, *Ficus sp.* etc,), which will attract wildlife away from the tracks and hence minimize their movement around such areas. Provision of water holes will further enhance the habitat improvement measures.

Mr. R. B. Jhala, Conservator of Forests, Gujarat Forest Research Institute, Gandhinagar, Gujarat

Q1. Mega infrastructure projects like the DFC have become a necessity/priority in the context of the country's development needs. How should these development projects be balanced with an equally pressing need for conservation of natural resources?

A: Development is the need of the hour. Along with this realization, practical efforts should be put in place to save whatever natural resources are left.

Q2. The proposed DFC alignment (140 km), between Iqbalgarh and Wamaj, passes through an ecologically sensitive zone between two wildlife sanctuaries in the area (JSBS & BAWS) and also near to Thol Wildlife Sanctuary in Mehsana. Do you visualize impacts/threats to this zone because of the DFC project?

A: There are bound to be disturbances due to the frequent movement of freight trains, especially in terms of sound pollution. However, it is my observation that animals get used to such traffic. This I can say from my experiences as Park Manager in the sanctuary in the Little Rann, where a busy highway passes through a portion of the sanctuary.

Q3. What are the impacts/threats that you anticipate vis-à-vis the local biodiversity by the construction of the DFC? The corridor proposes the utilization of an existing railway RoW (a part - 2.4 km - of which passes through the western edge of BAWS). This RoW has been in use by the Railways for more than a century.

A: Since the DFC will be utilizing the existing RoW, which was created much before the establishment of the protected areas, the impacts will be limited to a very minor section (2.4km), which is dominated by an exotic, *Prosopis juliflora.* The primary habitat will not be affected as it is away from the RoW. However, a full fledged study should be initiated to understand and record the impacts both before and after the execution of the project.

Q4. The area, as is well known, is home to the Sloth Bear as well as a reasonably good population of Nilgai. Do you feel the DFC could have an impact on their population?

A: As I have mentioned earlier, from my experiences as a PA manager in the sanctuary, in the Little Rann, wildlife generally get used to traffic and learn to keep away from such areas.

Q5. In the light of the above observations, would you suggest mitigation measures to address these concerns?

A: Have more underpasses in synchronized with the underpasses on the adjacent National Highway so as to facilitate easy movement of animals. Introduce stilt construction instead of embankments to facilitate unrestricted movement of animals in the eco-sensitive zone.

Habitat improvement measures should be undertaken in the core areas of the PAs, by planting fruiting species. Since the area is water stressed, special efforts should be made to create permanent water holes in the area.

Appendix-7c
List of Species Recorded During the Field Survey at Balaram-Ambaji Wildlife Sanctuary (BAWS)

(1) Flora

No.	Name of Species			Total No. of Species Recorded		Conservation Status
	Scientific Name	Common Name	Local Name	Pre-monsoon	Monsoon	
Tree Species						
1	*Acacia nilotica*	Gum Arabic/Babul	Babool	45	95	Not threatened
2	*Acacia tortilis*	Israeli babool		1	8	Not threatened
3	*Azadirachta indica*		Neem	0	2	Not threatened
4	*Balanites aegyptica*		Aniyar	63	19	Not threatened
5	*Bombax ceiba*	Cotton tree	Samar	0	1	Not threatened
6	*Butea monosperma*	Flame of the forest	Palas	13	10	Not threatened
7	*Cassia fistula*	Golden shower tree	Amaltas	8	4	Not threatened
8	*Cordia mixa*		Gunda	0	1	Not threatened
9	*Crateva religiosa*			1	0	Not threatened
10	*Grewia flavescene*		Tambet	0	4	Not threatened
11	*Holoptelea integrifolia*	Indian Elm	Pipdi	4	5	Not threatened
12	*Peltophorum pterocarpum*		Tamrafal	0	2	Not threatened
13	*Prosopis cineraria*		Kando	1	3	Not threatened
14	*Prosopis juliflora*		Vilayati Babool	155	48	Not threatened
15	*Salvadora oliodes*			1	0	Not threatened
16	*Wrightia tinctoria*	Dyer's Oleander	Dudhi	0	1	Not threatened
Shrub Species						
1	*Akolia*			5	0	
2	*Calotropis procera*		Akda	3	3	
3	*Capparis aphylla*		Kerda	0	2	
4	*Capparis sepiearia*		Kanthar	0	6	
5	*Cassia auriculata*		Aval	8	13	
6	*Zizyphus mauritiana*		Ber	0	8	
7	*Zizyphus numularia*		Ber	1	0	
Climbers						
1	-		Bhinda vel	0	62	
2	*Dioscorea bulbifera*		Varahi Kund	0	1	
3	*Luffa acutangula*		Turiya	0	11	
4	*Momordica dioica*		Kankoda	0	11	
Grasses & Herb Species						
1	*Apluda aristada*		Bhantia grass	0	15	
2	*Achyranthus aspera*			1	920	
3	*Ageratum conezoides*			1	2	
4	*Argemone mexicana*			1	0	
5	*Boerhavia diffusa*			2	0	
6	*Boerhavia elegans*			0	88	
7	*Cassia tora*			0	22	
8	*Cenchrus setigerus*		Dhaman	0	93	
9	*Censia coromandelica*			1	0	
10	*Coculus hirsutus*			1	0	
11	*Commelina benghalensis*			0	263	

No.	Name of Species			Total No. of Species Recorded		Conservation Status
	Scientific Name	Common Name	Local Name	Pre-monsoon	Monsoon	
12	*Corchorus capsularis*			0	2	
13	*Crotolaria lutescens*			58	0	
14	*Cynodon dactylon*		Dharo grass	72	23	
15	*Cyperus tribus*			0	33	
16	*Cyperustribus*			0	17	
17	*Dactyloctenium aegypticum*		Makra	0	44	
18	*Digitaria adscendens*		Tarodi grass	0	407	
19	*Dinebra retroflexa*			1	0	
20	*Eragrostis tenella*		Chiar	0	118	
21	*Eragrostis viscosa*		Chikatu	0	11	
22	*Euphorbia hirta*			0	1	
23	*Impatiens balsamania*			0	1	
24	*Indigofera trifolia*			0	24	
25	*Justicia simplex*			0	8	
26	*Lepidagathis trimerus*			4	0	
27	*Martynia annua*			0	7	
29	*Mehrua oavlifolia*			4	0	
30	*Metanus emarginatus*			1	0	
31	*Mimosa hamata*			0	4	
32	*Neurocanthus sphaerostachys*			0	5	
33	*Peristrophe bicalyculata*			1	0	
34	*Sesbania sesban*			0	16	
35	*Sida cordifolia*			0	12	
36	*Solanum xanthocarpum*			1	1	
37	*Tephrosia purpurea*			645	142	
38	*Tridax procumbens*			0	12	
39	*Xanthium strumarium*			0	212	

Source: NKC field survey

(2) Mammals

No.	Common Name	Scientific Name	IUCN Category	WPA Schedule
1	Jackal	Canis aureus	Least Concern	Schedule II
2	Indian Fox	Vulpes bengalensis	Least concern	Schedule II
3	Nilgai	Boselaphus tragocamelus	Least Concern	Schedule III
4	Threestriped Palm Squirrel	Funambulus palmarum	Least Concern	
5	Common Langur	Presbytis entellus		Schedule II
6	Longeared Hedgehog	Hemiechinus auritus		Schedule IV
7	Wild Boar	Sus scrofa		Schedule III

Source: NKC field survey

(3) Avian Fauna

No.	English Name	Scientific Name	IUCN Category	Zological Society of India Category
1	Indian Peafowl	Pavo cristatus	Least Concern	Threatened
2	Red Spurfowl	Galloperdix spadicea	Endangered	N.A.
3	Grey Junglefowl	Gallus sonneratii	Near threatened	N.A.
4	White-bellied Minivet	Pericrocotus	Near threatened	N.A.

No.	English Name	Scientific Name	IUCN Category	Zological Society of India Category
		erythropygius		
5	Black Ibis	Pseudibis papillosa	Near threatened	N.A.
6	Painted Stork	Mycteria leucocephala	Vulnerable	N.A.
7	Indian White-backed Vulture	Gyps bengalensis	Vulnerable	N.A.
8	Long-billed Vulture	Gyps indicus	Vulnerable	N.A.
9	Drongo			
10	Indian Roller			
11	Small Bee-eater			

Source: NKC field survey

(4) Reptiles

No.	English Name	Scientific Names	IUCN Category	WPA Schedule
1	Indian Cobra	Naja naja	N.A.	Schedule II
2	Rat Snake	Ptyas mucous	N.A.	Schedule IV
3	Common Indian Monitor	Varanus bengalensis	Least concern	Schedule II
4	Indian Chameleon	Chamaeleon zeylanicus	N.A.	
5	Starred Tortoise	Geochelone elegans	Least Concern	Schedule IV

Source: NKC field survey

Appendix-7d
List of Tree Species Recorded During Tree Census Survey

(1) Girthwise Trees in Existing ROW of Segments from A to K

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
1	*Acacia nilotica*	**Desi Baval**	**Total**	**58**	**73**	**75**	**100**	**169**	**186**	**164**	**148.8**	**820.3**	**825**
			A	0	6	5	4	5	2	9	4.4	28.3	31
			B	0	0	1	1	0	1	1	0.3	6.9	4
			C	6	19	34	40	56	66	45	47.7	253.1	266
			D	0	3	5	5	12	17	10	8.5	52.9	52
			E	0	0	0	0	0	0	0	0	0	0
			F	49	29	12	9	11	20	52	20.1	151.0	182
			G	0	0	0	3	2	3	1	0	43.0	9
			H	0	0	2	5	3	3	6	2.2	20.3	19
			I	0	0	0	0	3	4	5	6.5	14.7	12
			J	3	16	16	33	77	70	35	59.1	250.1	250
			K	0	0	0	0	0	0	0	0	0	0
2	*Acacia lecophlea*	**Aniyar**	**Total**	**26**	**71**	**82**	**76**	**71**	**37**	**26**	**23.8**	**307.2**	**389**
			A	0	7	15	9	2	4	1	1.5	27.9	38
			B	0	0	1	1	0	1	0	0	7.9	3
			C	17	40	47	30	29	11	9	6.7	130.3	183
			D	0	16	14	15	12	6	4	4.1	53.8	67
			E	0	0	0	0	0	0	0	0	0	0
			F	7	4	0	2	2	2	2	1.3	13.6	19
			G	0	0	0	0	0	0	0	0	0	0
			H	1	0	1	10	2	2	2	0.7	15.8	18
			I	1	2	0	0	4	0	3	3.0	9.5	10
			J	0	2	4	9	20	11	5	6.5	48.4	51
			K	0	0	0	0	0	0	0	0	0	0
3	*Acacia tortolis*	**Israeri Baval**	**Total**	**99**	**281**	**390**	**371**	**341**	**228**	**126**	**110.7**	**1,490.1**	**1,836**
			A	3	122	169	112	66	42	20	21.6	395.6	534
			B	0	2	5	1	3	0	0	0	19.7	11
			C	55	100	168	137	149	83	21	37.4	540.9	713
			D	0	2	9	7	20	15	9	7.3	60.4	62
			E	0	0	0	0	0	0	0	0	0	0
			F	24	29	5	12	12	3	7	3.5	59.3	92
			G	0	0	0	0	3	3	0	0	22.0	6
			H	8	13	28	82	63	61	44	17.6	281.5	299
			I	5	9	3	13	22	16	24	21.6	90.1	92
			J	4	4	3	7	3	5	1	1.7	20.6	27
			K	0	0	0	0	0	0	0	0	0	0
5	*Ailanthus excelsa*	**Arduso**	**Total**	**10**	**17**	**40**	**32**	**20**	**8**	**19**	**12.4**	**152.0**	**146**
			A	0	12	31	24	10	2	10	4.5	69.3	89
			B	0	0	4	1	2	2	4	3.1	47.1	13
			C	1	1	0	1	1	0	0	0.1	2.7	4
			D	0	0	0	1	0	0	0	0	0.8	1
			E	0	0	0	0	0	0	0	0	0	0
			F	9	4	2	2	0	2	0	0.4	10.5	19
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	2	3	7	0	3	1.3	15.4	15
			I	0	0	1	0	0	0	1	2.0	2.5	2
			J	0	0	0	0	0	2	1	1.0	3.7	3
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
6	*Albizzia lebbec*	**Siras**	**Total**	**0**	**2**	**11**	**8**	**7**	**8**	**24**	**15.1**	**62.7**	**60**
			A	0	1	9	7	6	8	22	13.6	56.0	53
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	1	1	0	0	0	0	1.3	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	1	0	0	0	1	0.2	2.4	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	1	0	1	1.3	3.0	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
8	*Anona squamosa*	**Sitafal**	**Total**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.4**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	0	0	0	0	0	0	0.4	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
9	*Azadrakhta indica*	**Limdo/ Neem**	**Total**	**70**	**179**	**172**	**141**	**206**	**158**	**198**	**181.6**	**1,245.0**	**1,124**
			A	1	59	53	45	61	32	37	21.4	236.5	288
			B	0	5	18	20	27	26	21	11.2	334.9	117
			C	6	10	19	4	14	18	38	34.7	113.3	109
			D	0	11	7	6	8	4	10	8.5	45.7	46
			E	0	0	0	0	0	0	0	0	0	0
			F	49	54	30	23	14	12	16	8.0	131.9	198
			G	0	0	0	0	2	1	2	0	22.0	5
			H	3	5	14	24	32	24	36	31.1	145.6	138
			I	1	5	4	1	6	3	13	42.1	42.1	33
			J	10	30	27	18	44	39	27	24.6	173.0	195
			K	0	0	0	0	0	0	0	0	0	0
10	*Balanites roxburghii*	**Angora**	**Total**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1.4**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	1	2	0	0	0	0	0	0	1.4	3
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
15	*Bombex ceiba*	**Simado**	**Total**	**0**	**7**	**17**	**20**	**11**	**6**	**9**	**5.8**	**60.1**	**70**
			A	0	7	17	20	11	6	9	5.8	60.1	70
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
16	*Butea monosperma*	**Khakhara**	**Total**	**0**	**3**	**3**	**0**	**2**	**0**	**0**	**2.6**	**73.8**	**8**
			A	0	3	3	0	2	0	0	2.6	73.8	8
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
17	*Callistemon viminalis*	**Brush**	**Total**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0.7**	**1.4**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	1	0.7	1.4	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
18	*Cassia fistula*	**Garmalo**	**Total**	**0**	**1**	**1**	**2**	**1**	**0**	**2**	**1.1**	**6.9**	**7**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	1	0	0	0	0	0	0	0.6	1
			C	0	0	1	1	1	0	0	0	2.4	3
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	1	0.3	1.5	1
			I	0	0	0	0	0	0	1	0.8	1.5	1
			J	0	0	0	1	0	0	0	0	0.9	1
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
19	*Cassia siamia*	**Kasid**	**Total**	**0**	**3**	**6**	**3**	**0**	**0**	**0**	**86.0**	**952.5**	**12**
			A	0	3	2	2	0	0	0	86.0	947.9	7
			B	0	0	0	1	0	0	0	0	2.0	1
			C	0	0	2	0	0	0	0	0	1.3	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	2	0	0	0	0	0	1.3	2
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
20	*Casuarina equisitifolia*	**Saru**	**Total**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0.4**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	0	0	0	0	0	0	0.4	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
22	*Cordia dichotoma*	**Vadgundo**	**Total**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	0	0	0	0	0	0	0.5	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
23	*Cordia mixa*	**Gunda**	**Total**	**0**	**1**	**2**	**0**	**1**	**2**	**2**	**4.3**	**8.7**	**8**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	1	0	0	0	2	1	2.3	4.5	4
			D	0	0	2	0	1	0	0	0	2.3	3
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	1	2.0	1.9	1
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
25	*Dalbergia sissoo*	**Sissoo**	**Total**	**2**	**3**	**8**	**6**	**3**	**3**	**5**	**4.0**	**27.7**	**30**
			A	0	3	8	6	3	3	5	4.0	27.0	28
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	2	0	0	0	0	0	0	0	0.7	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
26	*Delonix regia*	**Gulmahor**	**Total**	**0**	**1**	**3**	**0**	**3**	**1**	**4**	**2.3**	**22.9**	**12**
			A	0	0	0	0	1	0	2	1.1	10.9	3
			B	0	0	1	0	1	0	0	0	4.8	2
			C	0	0	1	0	0	1	2	1.2	5.2	4
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	0	0	0	0	0	0	0.5	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	0	1	0	0	0	1.5	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
28	*Embellica officinalis*	**Amala**	**Total**	**6**	**32**	**31**	**11**	**11**	**4**	**1**	**0.7**	**136.3**	**96**
			A	0	0	0	0	0	0	0	0	0	0
			B	6	32	31	11	11	4	0	0	134.9	95
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	1	0.7	1.4	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
29	*Eucalyptus hybrid*	**Nilgiri**	**Total**	**1**	**6**	**11**	**4**	**6**	**1**	**0**	**0.6**	**20.5**	**29**
			A	0	5	11	4	5	1	0	0.6	18.7	26
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	1	0	0	1	0	0	0	1.8	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
30	*Ficus benghalensis*	**Vad**	**Total**	**0**	**0**	**1**	**0**	**0**	**1**	**6**	**51.2**	**22.1**	**8**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	2	3.1	5.3	2
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	1	0	0	0	0	0	0.7	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	1	0	0.1	1.1	1
			I	0	0	0	0	0	0	4	48.0	15.0	4
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
31	*Ficus racemosa*	**Umaro**	**Total**	**0**	**0**	**0**	**1**	**0**	**1**	**2**	**4.8**	**9.9**	**4**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	1	0	0	0	0	3.3	1
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	1	2	4.8	6.6	3
			K	0	0	0	0	0	0	0	0	0	0
32	*Ficus religiosa*	**Pipal**	**Total**	**1**	**5**	**4**	**6**	**9**	**6**	**28**	**42.2**	**85.0**	**59**
			A	0	1	1	4	5	1	10	4.7	22.8	22
			B	0	0	0	0	1	1	1	0	14.7	3
			C	0	2	0	0	1	1	6	20.1	17.6	10
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	1	2	1	0	0	0	3.6	5
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	1	4	1.8	8.2	5
			I	1	1	2	0	1	2	3	3.2	9.6	10
			J	0	0	0	0	0	0	4	12.4	8.5	4
			K	0	0	0	0	0	0	0	0	0	0
33	*Gmelina arborea*	**Sevan**	**Total**	**0**	**0**	**1**	**2**	**0**	**0**	**0**	**0**	**2.3**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	2	0	0	0	0	2.3	3
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
34	*Holoptelia integrifolia*	**Kanji**	**Total**	**4**	**22**	**27**	**29**	**37**	**30**	**28**	**19.9**	**219.2**	**177**
			A	0	9	8	1	5	3	6	2.6	26.1	32
			B	0	1	3	4	2	4	11	6.4	87.0	25
			C	3	1	6	4	3	0	1	0.6	12.6	18
			D	0	0	0	0	1	0	0	0	0.9	1
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	1	0	0	0	0	0	0.6	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	7	5	8	1	0.9	21.7	22
			I	1	0	1	0	1	0	3	2.7	6.4	6
			J	0	11	7	13	20	15	6	6.7	63.9	72
			K	0	0	0	0	0	0	0	0	0	0
35	*Leucaena lecocephala*	**Subaval**	**Total**	**1**	**3**	**1**	**2**	**2**	**0**	**0**	**0**	**6.0**	**9**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	2	1	0	0	0	0	0	2.3	4
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	2	0	0	0	1.6	2
			I	0	0	0	1	0	0	0	0	0.8	1
			J	0	1	0	1	0	0	0	0	1.3	2
			K	0	0	0	0	0	0	0	0	0	0
36	*Limonia acidissima*	**Kotha**	**Total**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0.8**	**2.9**	**2**
			A	0	0	0	0	0	0	1	0.4	1.3	1
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	1	0.4	1.6	1
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
37	*Madhuca latifolia*	**Mahudo**	**Total**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	1	0	0	0	0	0	0	0.5	1
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
38	*Mangifera indica*	**Ambo**	**Total**	**2**	**1**	**0**	**0**	**0**	**0**	**3**	**1.5**	**18.7**	**6**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	1	0	0	0	0	3	1.5	17.6	4
			C	0	0	0	0	0	0	0	0	0	0
			D	2	0	0	0	0	0	0	0	1.1	2
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
39	*Manilkara hexandra*	**Rayan**	**Total**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**9.5**	**6.7**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	1	8.0	4.1	1
			D	0	0	0	0	0	0	1	1.5	2.6	1
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
41	*Melia azadrakht*	**Bakam Limdo**	**Total**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0.7**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	1	0	0	0	0	0	0.7	1
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
42	*Moringa oleifera*	**Sargavo**	**Total**	**0**	**4**	**9**	**2**	**4**	**2**	**3**	**0.5**	**48.3**	**24**
			A	0	1	6	0	0	0	1	0.4	5.8	8
			B	0	0	0	1	4	1	2	0	37.1	8
			C	0	2	3	0	0	0	0	0	3.0	5
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	0	0	0	0	0	0	0.5	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	1	0	1	0	0.1	1.9	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
46	*Peltophorum pterocarpum*	**Peltoform**	**Total**	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**0.8**	**2.7**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	1	0	0	0	0	1	0.8	2.7	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
50	*Pongomia pinnata*	**Karanj**	**Total**	**0**	**8**	**9**	**2**	**7**	**2**	**11**	**5.7**	**34.5**	**39**
			A	0	6	8	2	6	1	10	5.2	29.3	33
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	2	1	0	1	1	1	0.5	5.2	6
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
51	*Prosopis cineraria*	**Khijado**	**Total**	**64**	**130**	**130**	**144**	**168**	**196**	**199**	**137.0**	**1,112.6**	**1,031**
			A	0	10	8	21	6	3	3	2.2	39.7	51
			B	0	1	5	8	10	13	13	0	208.0	50
			C	11	41	66	66	87	110	110	88.2	470.3	491
			D	1	21	25	17	34	50	54	34.6	205.3	202
			E	0	0	0	0	0	0	0	0	0	0
			F	52	55	18	15	3	5	6	2.8	86.3	154
			G	0	0	0	1	1	3	2	0	29.0	7
			H	0	1	4	8	11	7	5	2.4	35.3	36
			I	0	0	0	1	0	2	3	3.2	7.1	6
			J	0	1	4	7	16	3	3	3.6	31.6	34
			K	0	0	0	0	0	0	0	0	0	0
52	*Prosopis juliflora*	**Gando Baval**	**Total**	**58**	**56**	**28**	**5**	**12**	**7**	**10**	**5.3**	**116.2**	**176**
			A	0	6	1	0	1	0	0	0.2	4.6	8
			B	0	0	2	1	2	0	1	0	17.0	6
			C	24	25	17	2	5	4	0	1.3	42.8	77
			D	0	0	0	0	0	1	0	0.3	1.2	1
			E	0	0	0	0	0	0	0	0	0	0
			F	33	22	7	2	2	1	8	2.8	42.9	75
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	1	0.2	1.9	1
			I	1	1	0	0	2	1	0	0.5	4.0	5
			J	0	2	1	0	0	0	0	0	1.8	3
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
54	*Salvedora oleides*	**Pilu**	**Total**	**0**	**1**	**4**	**2**	**0**	**3**	**1**	**1.6**	**19.1**	**11**
			A	0	0	2	0	0	0	0	0.9	11.1	2
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	2	1	0	1	1	0.5	5.1	6
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	1	0	2	0	0.2	2.9	3
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
55	*Salvedora persica*	**Vakhado**	**Total**	**0**	**1**	**0**	**2**	**8**	**2**	**0**	**1.9**	**12.1**	**13**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	1	0	2	8	2	0	1.9	12.1	13
			K	0	0	0	0	0	0	0	0	0	0
57	*Seraca asoca*	**Ashoka**	**Total**	**7**	**18**	**2**	**5**	**0**	**0**	**2**	**2.5**	**58.3**	**34**
			A	0	1	1	0	0	0	0	1.2	36.9	2
			B	5	15	1	3	0	0	0	0	15.0	24
			C	1	0	0	1	0	0	1	0.6	2.8	3
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	2	0	1	0	0	0	0	2.2	4
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	1	0.7	1.4	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
58	*Syzigium cumunii*	**Jambu**	**Total**	**0**	**0**	**1**	**5**	**3**	**3**	**1**	**43.5**	**494.2**	**13**
			A	0	0	0	2	0	1	0	43.0	473.7	3
			B	0	0	1	2	1	2	1	0.3	17.8	7
			C	0	0	0	1	1	0	0	0	1.7	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	1	0	0	0.2	1.0	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
59	*Tamarindus indica*	**Amali**	**Total**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**8.5**	**10.4**	**4**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	1	0.5	4.5	1
			C	1	0	0	0	0	0	2	8.0	5.9	3
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
62	*Terminalia cattapa*	**Badam**	**Total**	**0**	**2**	**0**	**1**	**1**	**1**	**0**	**0**	**8.6**	**5**
			A	0	0	0	0	1	0	0	0	1.0	1
			B	0	0	0	1	0	1	0	0	6.6	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	2	0	0	0	0	0	0	1.0	2
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
63	*Terminalia tomentosa*	**Sadad**	**Total**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**1**
			A	0	1	0	0	0	0	0	0	0.5	1
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
65	*Zizyphus mauritiana*	**Bordi**	**Total**	**44**	**235**	**157**	**4**	**4**	**3**	**2**	**1.1**	**245.4**	**449**
			A	0	3	0	0	0	0	0	0	1.5	3
			B	0	1	1	0	0	0	0	0	1.7	2
			C	3	11	3	1	0	1	0	0.2	10.4	19
			D	0	1	0	0	0	0	0	0	0.4	1
			E	0	0	0	0	0	0	0	0	0	0
			F	2	2	1	0	0	1	1	0.5	4.7	7
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	3	1	0	0	0	3.2	4
			I	0	0	0	0	0	0	0	0	0	0
			J	39	217	152	0	3	1	1	0.4	223.5	413
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Tree
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
67	*UNK*	**Jeji**	**Total**	**0**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**3.0**	**5**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	2	2	0	0	0	0	0	2.2	4
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	1	0	0	0	0	0.8	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
Total			**Total**	**457**	**1175**	**1229**	**987**	**1109**	**900**	**887**	**938.8**	**7,930.7**	**6,744**
			A	4	266	358	263	196	109	146	229.4	2,606.3	**1,342**
			B	11	59	74	57	64	56	59	21.8	989.1	**380**
			C	129	257	371	289	347	297	238	257.5	1,632.1	**1,928**
			D	3	55	62	51	88	93	90	67.9	433.2	**442**
			E	0	0	0	0	0	0	0	0.0	0.0	**0**
			F	232	214	83	69	48	48	96	41.6	530.8	**790**
			G	0	0	0	4	8	10	5	0.0	116.0	**27**
			H	12	19	54	147	128	110	107	62.3	569.7	**577**
			I	10	20	13	16	39	28	60	133.6	205.6	**186**
			J	56	285	214	91	191	149	86	124.7	847.9	**1,072**
			K	0	0	0	0	0	0	0	0.0	0.0	**0**

Note: "*UKN"* stands for *"unknon"*.
* Nos. of trees correspond to Nos. in Table 7.1.14 (Chapter 7).
Source: NKC Field Survey

(2) Girthwise Trees in Proposed ROW Segments from A to K

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
1	*Acacia nilotica*	**Desi Baval**	**Total**	**56**	**221**	**193**	**160**	**207**	**163**	**175**	**89.3**	**1,016.0**	**1,175**
			A	1	31	23	11	18	2	8	6.4	37.6	94
			B	0	0	0	0	0	1	1	0.6	6.5	2
			C	0	2	5	5	0	4	4	5.2	20.7	20
			D	0	0	1	1	4	4	8	4.6	21.6	18
			E	9	11	6	14	13	7	7	1.6	157.5	67
			F	43	76	60	51	50	60	105	42.9	386.6	445
			G	0	0	0	0	1	4	6	2.3	14.2	11
			H	2	2	2	8	5	4	3	1.0	33.8	26
			I	0	0	0	0	1	0	0	0	0.9	1
			J	1	14	11	13	22	24	13	13.8	91.2	98
			K	0	85	85	57	93	53	20	10.9	245.4	393
2	*Acacia lecophlea*	**Aniyar**	**Total**	**1**	**21**	**14**	**22**	**23**	**13**	**6**	**10.3**	**73.9**	**100**
			A	0	12	7	7	7	0	2	1.4	14.0	35
			B	0	0	0	0	0	0	0	0	0	0
			C	0	2	1	1	3	0	0	0.3	5.4	7
			D	0	1	0	1	2	2	0	0.5	5.6	6
			E	0	0	1	1	1	0	0	0	6.0	3
			F	0	1	2	1	1	2	1	0.5	6.7	8
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	5	1	1	0	0.2	6.1	7
			I	0	0	0	0	0	1	1	2.6	2.2	2
			J	1	5	3	6	8	7	2	5.3	27.9	32
			K	0	0	0	0	0	0	0	0	0	0
3	*Acacia tortolis*	**Israeli Baval**	**Total**	**17**	**221**	**201**	**133**	**164**	**89**	**39**	**37.2**	**511.4**	**864**
			A	0	116	63	50	74	26	16	19.7	138.0	345
			B	0	0	0	0	1	0	0	0	4.2	1
			C	1	4	12	22	20	15	1	4.9	65.2	75
			D	0	0	0	3	6	9	7	4.7	27.8	25
			E	1	0	2	0	0	0	1	0	9.5	4
			F	15	30	15	9	9	10	7	3.8	63.7	95
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	5	17	14	8	1	3.5	46.4	45
			I	0	0	0	0	1	0	0	0	1.9	1
			J	0	4	6	6	9	3	0	0.6	24.4	28
			K	0	67	98	26	30	18	6	0	130.3	245
4	*Aegle marmelos*	**Bili**	**Total**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**0.2**	**2.8**	**4**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	1	0	0	0	0	0	1.3	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	1	0	0.2	1.1	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	0	0	0	0	0	0.4	1

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
5	*Ailanthus excelsa*	**Arduso**	**Total**	**26**	**64**	**84**	**125**	**104**	**50**	**59**	**39.1**	**599.2**	**512**
			A	0	4	10	3	1	0	1	0.8	7.6	19
			B	0	2	4	10	5	3	8	7.4	107.5	32
			C	4	4	3	1	2	2	0	0.5	8.2	16
			D	0	0	0	0	0	0	0	0	0	0
			E	0	3	5	8	7	5	14	1.1	140.5	42
			F	7	18	13	7	7	1	6	2.6	41.4	59
			G	7	7	3	8	9	10	3	1.5	36.8	47
			H	7	10	16	51	34	7	1	1.7	112.7	126
			I	1	14	24	29	32	12	15	16.5	107.6	127
			J	0	0	0	0	1	2	4	2.6	8.1	7
			K	0	2	6	8	6	8	7	4.4	28.8	37
6	*Albizzia lebbec*	**Siras**	**Total**	**1**	**8**	**12**	**12**	**15**	**6**	**13**	**10.1**	**51.9**	**67**
			A	0	4	7	8	9	5	7	4.5	16.0	40
			B	0	0	0	0	0	0	2	1.5	12.0	2
			C	0	2	0	0	0	0	0	0	1.0	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	2	1	0	1	0	0	0	6.0	4
			F	1	0	2	2	1	0	0	0.2	3.4	6
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	2	0	0	0	1.5	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	2	0	1	0	4	3.8	9.5	7
			K	0	0	0	2	1	1	0	0.1	2.5	4
7	*Alisonia scholaris*	**Saptparni**	**Total**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0.2**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	1	0	0	0	0	0.2	1
8	*Anona squamosa*	**Sitafal**	**Total**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0.1**	**1.4**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	0	0	0	1	0	0.1	1.4	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
9	*Azadrakhta indica*	**Limdo**	**Total**	**104**	**610**	**765**	**559**	**620**	**374**	**371**	**274.1**	**2,670.7**	**3,403**
			A	5	102	172	176	185	46	64	68.6	300.0	750
			B	0	2	9	6	11	4	20	8.8	183.2	52
			C	2	5	22	15	21	24	36	49.0	135.6	125
			D	0	0	1	0	0	0	1	1.3	3.2	2
			E	34	86	71	47	23	10	15	2.2	443.0	286
			F	46	113	53	35	29	30	25	14.4	221.3	331
			G	0	0	2	10	15	24	47	16.1	116.4	98
			H	1	1	14	50	67	49	21	12.0	162.3	203
			I	4	15	28	19	18	18	13	28.0	97.4	115
			J	10	34	39	30	69	49	43	30.3	247.4	274
			K	2	252	354	171	182	120	86	43.4	760.9	1,167
10	*Balanites roxburghii*	**Angora**	**Total**	**1**	**5**	**1**	**1**	**0**	**0**	**0**	**0**	**3.0**	**8**
			A	0	4	0	0	0	0	0	0	1.6	4
			B	0	0	0	0	0	0	0	0	0	0
			C	0	1	1	0	0	0	0	0	0.6	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	1	0	0	1	0	0	0	0	0.8	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
11	*Bambusa arundinacia*	**Vans**	**Total**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.3**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	1	0	0	0	0	0	0	0	0.3	1
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
12	*Bauhinia racemosa*	**Aasitro**	**Total**	**0**	**1**	**1**	**2**	**5**	**0**	**1**	**0**	**5.6**	**10**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	1	1	2	5	0	1	0	5.6	10

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
13	*Bauhinia tomentosa*	**Champo**	**Total**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1.1**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	1	0	0	0	0	0	1.1	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
14	*Belanites aegyptica*	**Ingoriya**	**Total**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0.4**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	1	1	0	0	0	0.4	2
15	*Bombax ceiba*	**Simado**	**Total**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**4.5**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	1	0	0	4.0	1
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	2	0	0	0	0	0	0	0.5	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
16	*Butea monosperma*	**Khakhara**	**Total**	**0**	**4**	**3**	**4**	**6**	**4**	**3**	**1.0**	**13.6**	**24**
			A	0	4	0	0	2	1	0	1.0	2.8	7
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	2	0	0	0	0	0	4.0	2
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	4	4	3	3	0	6.8	15

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
17	*Callistemon vimanalis*	**Brush**	**Total**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1.3**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	2	0	0	0	0	0	0	1.3	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
18	*Cassia fistula*	**Garmalo**	**Total**	**1**	**0**	**0**	**1**	**0**	**1**	**0**	**0.1**	**2.4**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	1	0	0	0	0	0	0	0	0.4	1
			F	0	0	0	1	0	0	0	0	0.8	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	1	0	0.1	1.2	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
19	*Cassia siamia*	**Kasid**	**Total**	**1**	**1**	**4**	**16**	**17**	**9**	**4**	**7.3**	**28.6**	**52**
			A	0	1	1	16	15	8	4	7.2	18.0	45
			B	0	0	0	0	2	0	0	0	7.5	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	2	0	0	1	0	0.1	2.6	4
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	0	0	0	0	0	0.5	1
20	*Casuarina equisitifolia*	**Saru**	**Total**	**0**	**7**	**17**	**17**	**20**	**15**	**4**	**6.6**	**34.1**	**80**
			A	0	7	17	17	19	13	4	6.2	30.8	77
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	1	0	0	0	1.0	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	2	0	0.4	2.3	2
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
21	*Citrus limon*	**Nimbu**	**Total**	**24**	**104**	**222**	**1**	**0**	**0**	**1**	**2.1**	**200.7**	**352**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	24	1	0	0	0	0	0	0	8.8	25
			H	0	0	0	0	0	0	0	0	0	0
			I	0	88	214	1	0	0	1	2.1	180.2	304
			J	0	15	8	0	0	0	0	0	11.7	23
			K	0	0	0	0	0	0	0	0	0	0
22	*Cordia dichotoma*	**Vadgundo**	**Total**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0.2**	**1.6**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	0	0	0	0	1	0.2	1.6	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
24	*Cordia gharaf*	**Gundi**	**Total**	**1**	**3**	**1**	**3**	**1**	**0**	**0**	**0**	**5.7**	**9**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	1	0	1	1	0	0	0	0	4.0	3
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	3	0	2	1	0	0	0	1.7	6
26	*Delonix regia*	**Gulmahor**	**Total**	**7**	**13**	**4**	**2**	**3**	**0**	**3**	**0.9**	**25.8**	**32**
			A	0	0	0	1	0	0	0	0	0.4	1
			B	0	1	1	0	0	0	0	0	1.7	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	2	8	3	1	0	0	0	0	12.8	14
			F	5	4	0	0	2	0	3	0.9	9.9	14
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	1	0	0	0	1.0	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
27	*Diaspyros cordifolia*	**Makrodi**	**Total**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2.1**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	1	0	0	0	0	2.1	1
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
28	*Embelica officinalis*	**Amala**	**Total**	**0**	**6**	**6**	**2**	**0**	**0**	**1**	**0.1**	**5.7**	**15**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	1	0	0	0	0	0	0.7	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	2	2	0	0	1	0.1	3.0	5
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	6	3	0	0	0	0	0	2.0	9
29	*Eucalyptus hybrid*	**Nilgiri**	**Total**	**0**	**3**	**5**	**8**	**6**	**4**	**4**	**2.6**	**18.3**	**30**
			A	0	1	5	5	5	1	0	0.7	6.8	17
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	1	0	1	0.5	2.3	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	1	0	2	0	1	1	0.2	4.7	5
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	1	0	1	0	2	2	1.2	4.5	6
30	*Ficus benghalensis*	**Vad**	**Total**	**0**	**0**	**1**	**0**	**2**	**0**	**6**	**11.3**	**16.8**	**9**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	1	0	1	4.5	4.5	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	1	0	0	0	2	0.5	3.8	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	3	6.3	7.7	3
			K	0	0	0	0	1	0	0	0	0.8	1

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
31	*Ficus racemosa*	**Umaro**	**Total**	**0**	**0**	**0**	**3**	**1**	**3**	**5**	**1.7**	**21.3**	**12**
			A	0	0	0	2	1	2	1	1.1	2.4	6
			B	0	0	0	0	0	0	2	0	11.0	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	1	1	0.6	1.5	2
			K	0	0	0	1	0	0	1	0	6.4	2
32	*Ficus religiosa*	**Pipal**	**Total**	**1**	**4**	**5**	**6**	**7**	**9**	**25**	**13.6**	**194.3**	**57**
			A	0	0	0	1	0	1	4	2.4	2.4	6
			B	0	0	1	3	3	6	12	1.0	150.2	25
			C	0	1	2	0	2	1	4	5.8	12.2	10
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	1	0	13.0	1
			F	1	3	1	1	1	0	2	0.9	9.2	9
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	0	1	0	0	0	1.5	2
			I	0	0	0	0	0	0	1	0.6	1.4	1
			J	0	0	0	0	0	1	1	2.9	4.2	2
			K	0	0	0	1	0	0	0	0	0.2	1
33	*Gmelina arborea*	**Sevan**	**Total**	**0**	**2**	**0**	**2**	**1**	**0**	**0**	**0**	**3.0**	**5**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	2	0	0	0	0	0	0	1.0	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	2	1	0	0	0	2.0	3
34	*Holoptelia integrifolia*	**Kanji**	**Total**	**11**	**69**	**65**	**58**	**68**	**48**	**33**	**27.1**	**373.9**	**352**
			A	0	7	4	6	4	0	3	0.8	36.5	24
			B	0	4	2	2	1	3	8	5.5	72.2	20
			C	0	1	3	0	1	1	0	1.5	9.2	6
			D	0	0	0	0	0	0	0	0	0	0
			E	1	5	4	1	1	1	0	0	20.5	13
			F	1	1	0	1	0	0	0	0	1.6	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	1	3	13	9	11	0	2.3	42.0	37
			I	1	2	1	2	1	3	3	3.8	13.9	13
			J	6	11	14	6	31	17	6	8.5	80.2	91
			K	2	37	34	27	20	12	13	4.7	97.8	145

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
35	*Leucaena leucocephala*	**Subaval**	**Total**	**1**	**10**	**7**	**6**	**2**	**0**	**2**	**0.8**	**21.3**	**28**
			A	0	2	2	1	0	0	0	0	2.0	5
			B	0	3	0	2	0	0	0	0	5.5	5
			C	0	0	2	0	0	0	0	0	1.1	2
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	5	1	2	2	0	2	0.8	10.6	13
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	1	0	0	0	0	1.5	2
			I	0	0	1	0	0	0	0	0	0.6	1
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
37	*Madhuca latifolia*	**Mahudo**	**Total**	**0**	**0**	**3**	**1**	**0**	**0**	**1**	**0.7**	**4.2**	**5**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	2	1	0	0	0	0	1.5	3
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	0	0	0	1	0.7	2.7	2
38	*Mangifera Indica*	**Ambo**	**Total**	**0**	**1**	**0**	**0**	**3**	**3**	**11**	**9.8**	**42.5**	**18**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	1	3	3.5	27.0	4
			C	0	0	0	0	2	0	0	0	1.8	2
			D	0	0	0	0	0	0	2	2.9	5.0	2
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	1	0	0	1	1	0	1.8	2.3	3
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	1	6	1.6	10.4	7
39	*Manilkara hexandra*	**Rayan**	**Total**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**11.2**	**3**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	1	0	10.0	1
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	2	0	0	0	0	1.2	2

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
40	*Manikara zapota*	**Chiku**	**Total**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0.2**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	0	0	0	0	0	0.2	1
41	*Melia azadarakht*	**Bakam Limdo**	**Total**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**1.8**	**4**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	2	1	0	0	0	0	0	1.6	3
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	1	0	0	0	0	0	0.2	0
42	*Moringa oleifera*	**Sargavo**	**Total**	**1**	**13**	**14**	**18**	**22**	**19**	**14**	**2.7**	**162.5**	**101**
			A	0	5	3	1	0	0	0	0	3.6	9
			B	0	2	3	4	5	8	6	0.2	111.2	28
			C	0	5	6	5	3	1	2	1.4	16.8	22
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	0	0	0	0	4	1.0	6.2	5
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	8	11	1	0	0.1	18.2	21
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	1	1	0	3	9	2	0	6.45	16
43	*Morus australis*	**Setur**	**Total**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.5**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	1	0	0	0	0	0	0	0	0.5	1
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
44	*Nerium indicum*	**Karan**	**Total**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0.1**	**1.8**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	1	0	0	1	0	0.1	1.8	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
45	*Parkinsonia aculeata*	**Rambaval**	**Total**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1.3**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	2	0	0	0	0	0	1.3	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
46	*Peltophorum pterocarpum*	**Peltoform**	**Total**	**1**	**0**	**1**	**1**	**1**	**2**	**2**	**1.6**	**12.3**	**8**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	1	1	0	0	0	5.3	2
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	1	0	0	1	1	0.6	4.1	4
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	1	1	1.0	2.9	2
			K	0	0	0	0	0	0	0	0	0	0
47	*Phoenix sylvestris*	**Khajuri**	**Total**	**0**	**1**	**1**	**2**	**1**	**0**	**0**	**0**	**3.7**	**5**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	1	1	2	1	0	0	0	3.7	5
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
48	*Pithecellobum duice*	**Goras ambali**	**Total**	**0**	**11**	**9**	**6**	**3**	**2**	**2**	**2.2**	**17.7**	**33**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	1	0	2	0	0	2	2.0	5.3	5
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	2	0	1	0	0	0	0	2.0	3
			G	0	0	0	0	0	0	0	0	0	0
			H	0	1	0	3	0	1	0	0.2	4.0	5
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	7	9	0	3	1	0	0	6.4	20
49	*Polyalthia longifolia*	**Asopalav**	**Total**	**6**	**30**	**20**	**40**	**8**	**6**	**17**	**5.0**	**95.1**	**127**
			A	0	5	0	1	0	0	0	0	2.4	6
			B	0	8	0	0	0	0	2	0	12.5	10
			C	0	3	7	3	0	1	7	0.4	7.5	21
			D	0	0	0	0	0	0	0	0	0	0
			E	0	1	0	0	0	0	0	0	0.8	1
			F	6	5	3	0	0	0	4	1.6	13.6	18
			G	0	0	0	0	0	0	0	0	0	0
			H	0	8	10	36	8	5	4	3.0	58.3	71
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
50	*Pongomia pinnata*	**Karanj**	**Total**	**1**	**6**	**3**	**3**	**1**	**4**	**2**	**1.5**	**20.6**	**20**
			A	0	1	0	1	0	1	0	0.3	1.2	3
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	4	3	2	1	3	1	0.9	17.9	15
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	1	0	0	0	0	1	0.3	1.5	2
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
51	*Prosopis cineraria*	**Khijado**	**Total**	**38**	**132**	**140**	**142**	**170**	**250**	**143**	**165.3**	**1,203.6**	**1,015**
			A	0	9	4	4	4	4	0	1.8	10.0	25
			B	0	0	0	0	0	0	1	0	13.0	1
			C	3	8	35	46	94	144	68	126.4	409.6	398
			D	0	4	5	15	14	27	24	15.9	94.6	89
			E	18	44	37	33	18	17	25	1.4	442.3	192
			F	16	23	16	15	8	22	6	5.7	80.6	106
			G	0	0	0	2	2	5	6	2.5	16.0	15
			H	0	0	0	4	2	8	3	1.5	25.8	17
			I	0	0	0	0	0	0	0	0	0	0
			J	0	10	8	8	13	13	7	7.6	52.4	59
			K	1	34	35	15	15	10	3	2.5	59.3	113

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
52	*Prosopis juliflora*	**Gando Baval**	**Total**	**18**	**99**	**60**	**30**	**14**	**18**	**23**	**10.2**	**150.3**	**262**
			A	1	47	17	4	5	2	0	1.2	30.4	76
			B	0	0	0	1	1	0	0	0	6.3	2
			C	2	7	8	7	0	1	0	0.3	17.1	25
			D	0	0	0	0	0	0	1	0.4	1.4	1
			E	2	2	3	2	0	0	0	0	9.3	9
			F	13	24	4	10	3	7	17	4.4	55.5	78
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	1	1	1.2	3.2	2
			I	0	0	0	0	0	1	0	0.3	1.1	1
			J	0	3	2	0	0	0	0	0	1.7	5
			K	0	16	26	6	5	6	4	2.4	24.3	63
53	*Psidium guajava*	**Jamfal**	**Total**	**1**	**0**	**9**	**0**	**0**	**1**	**0**	**0.3**	**16.8**	**11**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	1	0	0	0	0	1	0	0.3	13.4	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	9	0	0	0	0	0	3.4	9
54	*Salvedora oleides*	**Pilu**	**Total**	**7**	**26**	**42**	**38**	**81**	**78**	**138**	**1.3**	**269.4**	**410**
			A	0	1	1	1	1	0	0	0.2	1.6	4
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	1	0.3	1.2	1
			D	0	0	0	0	0	0	0	0	0	0
			E	4	6	11	2	2	3	1	0	53.3	29
			F	1	0	0	0	0	0	0	0	0.8	1
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	3	0	0	1	0.4	3.4	5
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	2	19	29	32	78	75	135	0.4	209.1	370
55	*Salvedora persica*	**Vakhado**	**Total**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1.8**	**2**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	1	1	0	0	0	1.8	2
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
56	*Sapindus emerginatus*	**Aritha**	**Total**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**7.0**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	1	0	7.0	1
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
58	*Syzigium cuminii*	**Jambu**	**Total**	**2**	**4**	**10**	**3**	**8**	**2**	**6**	**3.7**	**44.0**	**35**
			A	0	1	0	0	0	0	0	0	0.4	1
			B	0	1	1	0	1	0	1	0.7	13.7	4
			C	0	0	2	1	3	2	1	1.5	8.6	9
			D	0	0	0	0	0	0	0	0	0	0
			E	1	1	3	0	0	0	0	0	6.0	5
			F	1	1	3	1	4	0	0	0.2	6.2	10
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	1	0	0	1	0.4	4.1	3
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	3	0.9	5.0	3
59	*Tamarindus indica*	**Amali**	**Total**	**1**	**2**	**2**	**1**	**0**	**0**	**3**	**6.9**	**12.6**	**9**
			A	0	1	2	0	0	0	0	0	1.2	3
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	1	6.0	3.7	1
			D	0	0	0	0	0	0	1	0.5	1.6	1
			E	1	0	0	0	0	0	0	0	0.5	1
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	1	0	0	1	0.4	5.1	2
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	1	0	0	0	0	0	0	0.5	1
60	*Techomella undulata*	**Roydo**	**Total**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0.4**	**1**
			A	0	0	0	1	0	0	0	0	0.4	1
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
61	*Tectona grandis*	**Sag**	**Total**	**0**	**9**	**0**	**3**	**1**	**0**	**0**	**0**	**6.7**	**13**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	9	0	3	1	0	0	0	6.7	13
62	*Terminalia cattapa*	**Badam**	**Total**	**0**	**3**	**3**	**0**	**1**	**1**	**1**	**0.4**	**6.2**	**9**
			A	0	1	2	0	0	0	0	0	1.2	3
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	2	1	0	1	1	1	0.4	5.0	6
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
63	*Terminelia tomentosa*	**Sadad**	**Total**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0.4**	**1**
			A	0	0	1	0	0	0	0	0	0.4	1
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
64	*Thespesia populnea*	**Paras Piplo**	**Total**	**0**	**0**	**0**	**2**	**0**	**0**	**6**	**0**	**54.1**	**8**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	6	0	52.5	6
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	2	0	0	0	0	1.6	2
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0

No.*	Tree species	Vernacular name	Segment	Trees							Timber	Firewood	Total Trees
				21-30	31-45	46-60	61-75	76-90	91-110	111<			
65	*Zyzyphus mauritiana*	**Bordi**	**Total**	**3**	**22**	**20**	**11**	**23**	**5**	**0**	**1.2**	**46.8**	**84**
			A	0	3	0	0	0	0	0	0	1.2	3
			B	0	0	1	0	1	1	0	0	10.0	3
			C	0	1	1	0	0	0	0	0	1.6	2
			D	0	0	0	0	0	0	0	0	0	0
			E	1	2	1	1	0	0	0	0	5.5	5
			F	2	1	0	0	2	0	0	1.1	3.1	5
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	2	3	0	0	0.1	4.4	5
			I	0	0	0	0	0	0	0	0	0	0
			J	0	2	0	0	0	0	0	0	1.1	2
			K	0	13	17	8	17	4	0	0	19.9	59
66	*Zyzyphus xylopyra*	**Ghatbor**	**Total**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0.2**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	0	0	0	0	0	0	0	0
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	1	0	0	0	0	0.2	1
68	*UNK*	**Tagadi**	**Total**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0.7**	**1**
			A	0	0	0	0	0	0	0	0	0	0
			B	0	0	0	0	0	0	0	0	0	0
			C	0	0	0	0	0	0	0	0	0	0
			D	0	0	0	0	0	0	0	0	0	0
			E	0	0	0	0	0	0	0	0	0	0
			F	0	0	0	0	0	0	0	0	0	0
			G	0	0	0	0	0	0	0	0	0	0
			H	0	0	1	0	0	0	0	0	0.7	1
			I	0	0	0	0	0	0	0	0	0	0
			J	0	0	0	0	0	0	0	0	0	0
			K	0	0	0	0	0	0	0	0	0	0
Total			**Total**	**336**	**1744**	**1959**	**1452**	**1611**	**1183**	**1127**	**749.2**	**8,109.3**	**9,412**
			A	7	369	341	317	350	112	114	124.3	670.9	**1,610**
			B	0	17	23	30	32	28	80	29.2	833.1	**210**
			C	13	57	110	108	152	195	122	210.0	738.8	**757**
			D	0	5	7	20	26	42	44	30.8	155.8	**144**
			E	77	171	151	111	66	44	64	6.3	1,340.4	**684**
			F	166	316	188	143	124	141	189	84.7	987.8	**1,267**
			G	31	8	5	20	27	43	62	22.4	192.2	**196**
			H	11	29	60	209	159	100	39	30.4	552.4	**607**
			I	6	120	268	51	53	35	35	54.2	408.7	**568**
			J	18	98	93	70	155	120	85	83.7	576.0	**639**
			K	7	554	713	373	467	323	293	73.2	1,653.2	**2,730**

Note: "*UKN"* stands for *"unknon"*.

* Nos. of trees correspond to Nos. in Table 7.1.14 (Chapter 7).

Source: NKC Field Survey

Appendix-9a
Materials Used for PCMs for Environmental Scoping

(1) **Invitation Letters and Public Notice (English and Gujarati)**

【Invitation Letter in English】

DFCC
डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

To
District Collector
Gandhinagar.

Date 15/9/2011

Sub: Public Consultation Meeting (PCM) for Social and Environmental Scope for Development of Dedicated Freight Corridor Project – Phase -1 (Package-3: Wamaj – Ikbalgarh)

Dear Sir/Madam:

The Ministry of Railways (MOR), Government of India has given top priority to strengthen rail infrastructure in the country for faster and safer transportation of bulk goods for economic advancement and in line with the same, development of Dedicated Freight Corridor Project has been conceived to facilitate faster and safer transportation of goods in bulk which will help in faster distribution of goods and services. The project aims to create tremendous high quality job opportunities, higher profits and growth of household income and will serve in the interests of the public at large. The project is currently in the planning stage.

Your district is among one of the 4 districts through which the proposed railway corridor of Phase 1 Package 3 will pass. In order to disseminate information about the project to the general public and other stakeholders and to seek their opinion and suggestions on expected environmental and social impact of the project, DFCCIL is organizing a Public Consultation Meeting in the district. The second stage Public Consultation Meetings will be held some times in November to inform the public on the outcome of environmental and social study on the project and to take valuable opinion in the final planning stage.

In this context, we would like to sincerely request you to attend the meeting and share your opinion and suggestions for planning of the project at the date, time and venue given below:

If you ~~were~~ are not available, attendance of your representatives would be highly appreciated.

Date of Meeting: Hotel Amrit, Kalol-Ahmedabad Hiway, Kalol
Time of Meeting: - 26/9/2011
Venue: - 4:PM

24/9/11

Looking forward to your participation.

Thanking you.

Yours faithfully,

Authorized Signatory
(DFCCIL)

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhavan, New Delhi-110 001. Web : www.dfcc.in

【Invitation Letter in Gujarati】

DFCC
ડેડીકેટેડ ફ્રેટ કોરીડોર કૉર્પોરેશન

ડેડીકેટેડ फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

તા. ૨૪/૦૯/૨૦૧૨

પ્રતિ
સરપંચશ્રી
કુલાસણ ગ્રામ પંચાયત
તા. કલોલ, જિ. ગાંધીનગર

વિષય : ડેડીકેટેડ ફ્રાઈટ કોરીડોર પ્રોજેકટ - ભાગ-૧ (પેકેજ-૩ : વામજ - ઈકબાલગઢ)
માટેની કામગીરી માટે સામાજિક અને પર્યાવરણીય શકયતા ચકાસવા બાબત.

સાહેબશ્રી,
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL) દ્વારા ડેડીકેટેડ ફ્રાઈટ કોરીડોર (DFC) પ્રોજેકટ અમલીકરણ કરવામાં આવનાર છે. જેમાં કોમ્પ્યુટરાઈઝ્ડ કંટ્રોલથી ભારે માલગાડી માટેની રેલ્વે લાઈન પશ્ચીમ આદ્યોગિક કોરીડોર સાથે જોડાણ કરવામાં આવનાર છે. જે ઉત્તર પ્રદેશના-દાદરીથી જેએનપીટી-મહારાસ્ટ્ર સુધી બનનાર છે. જે હરીયાણા, રાજસ્થાન અને ગુજરાતમાંથી પસાર થનાર છે. સમગ્ર યોજનાનું અમલીકરણ લોકભાગીદારીના અભિગમથી લોકકેન્દ્રીત બની રહે તેવો રેલ્વે મંત્રાલયનો હેતુ છે.

આપની ગ્રામ પંચાયત ફ્રાઈટ કોરીડોરના ભાગ-૧ના પેકેજ-૩માં સમાવિષટ ૪ જિલ્લાઓ પૈકીની એક ગ્રામ પંચાયત છે, જેમાંથી સદર યોજનાની લાઈન પસાર થઈ રહી છે. આ યોજનાના અમલીકરણ દરમિયાન થનાર પર્યાવરણીય અને સામાજિક સંભવિત અસર માટે લોકોના સલાહ સુચન અને પ્રતિભાવો માટે એક બેઠકનું આયોજન કરવામાં આવેલ છે. ઉપરોકત હેતુને ધ્યાને રાખીને યોજનાના આયોજન અને અમલીકરણ માટે આપના સલાહ, સુચનો, પ્રતિભાવો આપવા માટે આપને આમંત્રીત કરવામાં આવે છે.

નીચે દર્શાવેલ વિગતે પ્રમાણે આપને આ જાહેર મીટીંગમાં હાજર રહેવા માટે વિનંતી કરવામાં આવે છે.

તારીખ : ૨૫/૦૯/૨૦૧૨ સમય : ૦૪.૦૦ વાગ્યે સાંજે
સ્થળ: હોટલ અમૃતા, કલોલ હાઈવે
કલોલ

આભાર સહ,

આપનો વિશ્વાસુ
(આશુતોષ રેકાવત)
મુખ્ય યોજના પ્રબંધક
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન
ઓફ ઈન્ડિયા લી.
અમદાવાદ

વધુ વિગત માટે સંપર્ક કરવો
૧) ૦૭૯-૨૨૧૭૫૧૦૭ ૨) ૯૪૨૭૩૧૭૬૩૪

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhavan, New Delhi-110 001. Web : www.dfcc.in

【Public Notice in Gujarati】

DFCC
डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम) ता. . . . .
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

જાહેર નોટીસ

તા-૨૪/૦૯/૨૦૧૨

પ્રતિ
તમામ ગ્રામ જનો

આથી આપને જણાવવામાં આવે છે કે ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL) દ્વારા ડેડીકેટેડ ફ્રાઈટ કોરીડોર (DFC) પ્રોજેક્ટ અમલીકરણ કરવામાં આવનાર છે. જેમાં કોમ્પ્યુટરાઈઙ કંટ્રોલથી મોટા ભારે માલગાડી માટેની રેલ્વે લાઈન પશ્ચીમ આદ્યોગિક કોરીડોર સાથે જોડાણ કરવામાં આવનાર છે. જે ઉત્તર પ્રદેશના-દાદરીથી જેએનપીટી-મહારાસ્ટ્ર સુધી બનનાર છે. જે હરીયાણા, રાજસ્થાન અને ગુજરાતમાંથી પસાર થનાર છે. સમગ્ર યોજનાનું અમલીકરણ લોકભાગીદારીના અભિગમથી લોકકેન્દ્રીત બની રહે તેવો રેલ્વે મંત્રાલયનો હેતુ છે.

આપની ગ્રામ પંચાયત સૂચિત ફ્રાઈટ કોરીડોર યોજનાના જિલ્લાઓ પૈકીની એક ગ્રામ પંચાયત છે, જેમાંથી સદર યોજનાની લાઈન પસાર થઈ રહી છે. આ યોજનાના અમલીકરણ દરમિયાન થનાર પર્યાવરણીય અને સામાજિક સંભવિત અસર માટે લોકોના સલાહ સુચન અને પ્રતિભાવો માટે એક બેઠકનું આયોજન કરવામાં આવેલ છે. ઉપરોક્ત હેતુને ધ્યાને રાખીને યોજનાના આયોજન અને અમલીકરણ માટે આપના સલાહ, સુચનો, પ્રતિભાવો આપવા માટે આપને આમંત્રીત કરવામાં આવે છે.

નીચે દર્શાવેલ વિગતે પ્રમાણે આપ ગ્રામજનોને હાજર રહેવા માટે વિનંતી કરવામાં આવે છે.

તારીખ : ૨૬/૦૯/૨૦૧૨ સમય : ૦૪.૦૦ વાગે સાંજે
સ્થળ: હોટલ અમૃત, કલોલ હાઇવે
કલોલ

આભાર સહ,

આપનો વિશ્વાસુ,
(signature)
(આશુતોષ સૂંકાવત)
મુખ્ય યોજના પ્રબંધક
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન
ઓફ ઈન્ડિયા લી.
અમદાવાદ

વધુ વિગત માટે સંપર્ક કરવો
૧) 079-22175107 ૨) 9427317634

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
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(2) **Handouts (English and Gujarati)**

【English】

Major Potential Environmental and Social Impacts Identified at Scoping

What is Scoping?

Scoping is the stage to identify potential environmental and social impacts from secondary data analysis and findings at site reconnaissance. Based on the scoping results, detailed environmental and social study will be conducted to the assessed major impacts.

Major potential impacts for Phase 1 (Wamaj to Iqbalgarh) identified at scoping is outlined below.

[Natural Environment]

- A part of the proposed alignment will pass the Balaram Ambaji Wildlife Sanctuary. In addition, tree cutting along the proposed alignment might be required for the project implementation. Further study to assess the impact on species habitation in the wildlife sanctuary and tree census will be conducted for examination of mitigation measures.

[Pollution Control]

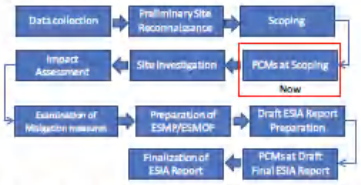
- Some sensitive receptors and residential area close to the proposed alignment might be impacted by noise & vibration during construction and operation phases. Site measurement of noise & vibration will be conducted in order to evaluate impacts caused by the project implementation and examine mitigation measures.

[Social Environment]

- The Project is expected to improve cargo transportation in a region as well as to increase job opportunities. Meanwhile, some impacts related to land acquisition might be caused. Potential impacts will be studied further by conducting the baseline survey and census and land use survey, etc. to examine mitigation measures.

Study Steps of ESIA

ESIA study takes several steps, and the following figure shows the outline of the study flow.



By reflecting comments and feed-back obtained at PCM for scoping phase, ESIA Study will be conducted accordingly.

For any further information please contact;

DFCCIL Headquarters
Add: 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi –110001
Tel: (0)11-2345890, Fax: (0)11-23454701

Chief Project Manager, Ahmedabad
Add: 1st Floor, Old DRM Office Building, Kalupur, Ahmedabad-380002
Tel: (0)79-22175107, Fax: (0)79-22163101

Chief Project Manager, Ajmer
Add: 42A/3, Civil Lines, Ajmer-305001
Tel: (0)145-2625548, Fax: (0)145-2630360

PUBLIC CONSULTATION MEETING FOR DEVELOPMENT OF DEDICATED FREIGHT CORRIDOR (DFC) PROJECT PHASE-1 (Wamaj to Iqbalgarh)

MINISTRY OF RAILWAYS
GOVERNMENT OF INDIA
AND
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (DFCCIL)

DFCC

PUBLIC CONSULTATION MEETING ON ESIA SCOPING FOR THE DEVELOPMENT OF DEDICATED FREIGHT CORRIDOR (DFC) PROJECT PHASE-1 (Wamaj – Iqbalgarh Section)

September, 2011

Dedicated Freight Corridor Corporation of India (DFCCIL) is a Special Purpose Vehicle set up under the administrative control of Ministry of Railways.

Objective of Public Consultation Meeting:

The general objectives of this public consultation meeting for the Environment and Social Impact Assessment (ESIA) study of Phase 1 (Wamaj – Iqbalgarh Section) in the DFC Project (the Project) are outlined below:

- Incorporating public views and opinion to ESIA study
- Holding opinion exchanging in the process of ESIA study by sharing potential positive/negative environmental and social impacts

Natural environmental survey

Noise & vibration measurement survey

General Features:

The Project stretches approximately 140km between Wamaj and Iqbalgarh in Gujarat involving 68 villages in total at Gandhinagar, Mehsana, Patan and Banaskantha districts.

Project Location Map

Objective of Environment and Social Impact Assessment (ESIA) Study:

According to the Indian law, railway and bridge construction projects do not require conducting Environmental Impact Assessment (EIA) study. However, considering the scale, nature and extent of activities envisaged as part of the DFC Project, a detailed ESIA, including preparation of an Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP), is conducted in order to mitigate potential negative environmental and social impacts by the Phase-1 (Wamaj – Iqbalgarh Section).

The specific objectives of the ESIA study are to:

- Identify and assess potential environmental and social impacts due to implementation of the Project, and recommend specific mitigation, management, and monitoring measures to avoid, offset or minimize the impacts,
- Formulate an implementable ESMP and ESMoP integrating the technically and economically feasible measures to avoid the identified impacts and an appropriate monitoring and supervision mechanism to ensure its implementation, and
- Recommend suitable institutional mechanisms to monitor and supervise effective implementation of ESMP and ESMoP.

The ESIA study consists of a pollution control study, natural environmental study, social study, public consultation, impact identification and assessment, preparation of mitigation measures, preparation of ESMP and ESMoP.

【Gujarati】

અભ્યાસના પગથીયા

અભ્યાસ હાથ ધરવા માટેના લીધેલા પગલા અને તેની મુખ્ય સમાવિષ્ટ મુદ્દા

૧. માહિતીનું એકત્રિકરણ
૨. કાર્ય વિસ્તારની જગ્યાની તપાસ
૩. શક્યતાઓ - કાર્યક્ષેત્ર
૪. સાર્વજનિક પરામર્શક બેઠકનું આયોજન
૫. સ્થળ ચકાસણી
૬. અસરની આકારણી
૭. અસરો ઘટાડવા માટેનો અભ્યાસ
૮. પર્યાવરણીય અને સામાજિક વ્યવસ્થાપન પ્લાન અને પર્યાવરણ અને સામાજિક મુલ્યાંકન પ્લાનની તૈયારી.
૯. પર્યાવરણીય અને સામાજિક અસરની આકારણીના અભ્યાસના અહેવાલનો મુસદ્દો તૈયાર કરવો
૧૦. સાર્વજનિક પરામર્શક બેઠકનો અહેવાલનો મુસદ્દો અને પર્યાવરણીય અને સામાજિક અસરની આકારણીનો અહેવાલ તૈયાર કરવો

સાર્વાજનિક પરામર્શક બેઠકના સુચનો અને પ્રતિભાવોને મેળવીને ESIAનો અભ્યાસ કરવામાં આવશે.

આગળની કોઈપણ જાતની માહિતી માટે સંપર્ક સરનામું

DFCCIL મુખ્ય મથક
પાંચમો માળ, પ્રગતી મેદાન, મેટ્રો સ્ટેશન બિલ્ડીંગ કોમ્પ્લેક્ષ,
નવી દિલ્હી -૧૧૦૦૦૧,
ફોન:(ઓ)૧૧-૨૩૪૫૪૮૦૦, ફેક્ષ (ઓ)૧૧-૨૩૪૫૪૭૦૧

મુખ્ય યોજના પ્રબંધક, અમદાવાદ
પ્રથમ માળ, જુની ડીઆરએમ ઓફીસ બિલ્ડીંગ, કાલુપુર,
અમદાવાદ - ૩૮૦ ૦૦૨.
ફોન:(ઓ)૭૯-૨૨૧૭૪૧૦૭, ફેક્ષ (ઓ)૭૯-૨૨૧૬૩૧૦૧

મુખ્ય યોજના પ્રબંધક, અજમેર
૪૨એ/૩, સીવીલ લાઈન, અજમેર - ૩૦૫૦૦૧.
ફોન:(ઓ)[redacted])૧૪૫-૨૬૩૦૩૬૦

સાર્વજનિક પરામર્શક બેઠક

ડેડીકેટેડ ફ્રેટ કોરીડોર પ્રોજેક્ટ- ભાગ-૧નો વિકાસ
(વામજ થી ઈકબાલગઢ વિભાગ)

રેલ્વે મંત્રાલય, ભારત સરકાર
અને
ડેડીકેટેડ ફ્રેટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી.
(DFCCIL)

ડેડીકેટેડ ફ્રેટ કોરીડોર પ્રોજેક્ટ- ભાગ-૧નો વિકાસ (વામજ થી ઈકબાલગઢ વિભાગ) પર્યાવરણીય અને સામાજિક અસરની આકારણીની શક્યતાદર્શી આકારવા માટે સાર્વજનિક પરામર્શક બેઠક - સપ્ટેમ્બર ૨૦૧૧

ડેડીકેટેડ ફ્રેટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા એ ભારત સરકારના રેલ્વે મંત્રાલયના વહિવટી નિયંત્રણ હેઠળ ખાસ હેતુસરના વાહનોના સેટઅપ માટે કામ કરતું એકમ છે.

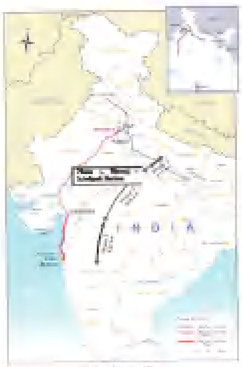
સાર્વજનિક પરામર્શક બેઠકનો હેતું :
પીએમસીનો સામાન્ય હેતું ડીએફસી પ્રોજેક્ટના પ્રથમ તબક્કામાં (વામજથી ઈકબાલગઢ) પર્યાવરણીય અને સામાજિક અસરની આકારણીનો અભ્યાસ (ESIA) કરવો, જેની રૂપરેખા નીચે મુજબ છે

- લોકોના અભિપ્રાયો અને સુચનોનો ESIA અભ્યાસમાં સમાવેશ કરવા.
- ESIA અભ્યાસ દરમિયાન જમીન મહિતી સાથે સંબંધિત પર્યાવરણીય અને સામાજિક અસરોના હકારાત્મક અને નકારાત્મક પાસાઓ અંગે ચર્ચા કરવી.

પાણી અને હવાની ગુણવત્તા માટેનો અભ્યાસ

પ્રકૃતિક પર્યાવરણ માટેનો અભ્યાસ

સામાન્ય લાક્ષણિકતા :
વામજથી ઈકબાલગઢ સુધીના ૧૭૦ કી.મી.માં ગુજરાતના ગાંધીનગર, મહેસાણા, બનાસકાંઠા અને પાટણ જિલ્લાના કુલ ૬૮ ગામોનો સમાવેશ થાય છે.



પર્યાવરણીય અને સામાજિક અસરની આકારણીના અભ્યાસનો હેતુ

ભારતીય કાયદા અનુસાર રેલ્વે અને પુલના બાંધકામ પ્રોજેક્ટના પર્યાવરણ અસરની આકારણી (EIA) અભ્યાસની જરૂરિયાત હોતી નથી. તેમ છતાં પ્રોજેક્ટના ભાગ-૧ (વામજ થી ઈકબાલગઢ)નો વ્યાપ, પ્રકાર અને કામગીરીના વ્યાપની કલ્પના કરતા ડીએફસી પ્રોજેક્ટના ભાગરૂપે વિગતે પર્યાવરણીય અને સામાજિક અસરની આકારણી કરવામાં આવી રહી છે. જેમાં પર્યાવરણીય અને સામાજિક વ્યવસ્થાપન પ્લાન (ESMP) પર્યાવરણીય અને સામાજિક મુલ્યાંકન પ્લાન (ESMoP) તૈયાર કરી પ્રોજેક્ટની સામાજિક અને પર્યાવરણની નકારાત્મક અસરને ઘટાડવાની છે.

ESIAના ખાસ હેતુઓ નીચે પ્રમાણે છે :
- પ્રોજેક્ટના અમલિકરણના કારણે સંભવિત પર્યાવરણ અને સામાજિક અસરોની ઓળખ અને આકારણી કરવી તેને ટાળવા કે ઓછી કરવા માટે ખાસ પ્રકારના વ્યવસ્થાપન અને મુલ્યાંકન કરવાની ભલામણ કરવી.
- સુવ્યવસ્થીત અમલીકરણ થઈ શકે તે રીતે પર્યાવરણીય અને સામાજિક વ્યવસ્થાપન પ્લાન (ESMP) અને ESMoPના નામથી આયોજન તૈયાર કરવું અને સોંપવામાં આવેલ જરૂરી કામગીરી કરવી.
- ESMP અને ESMoP અસરકારક મોનીટરીંગ અને સુવ્યવસ્થાપન કરી શકે તેવી સંસ્થાકીય વ્યવસ્થાપનની ભલામણ કરવી
- ESIA અભ્યાસમાં પ્રદૂષણ નિયંત્રણ અભ્યાસ, કુદરતી વાતાવરણનો અભ્યાસ, સામાજિક અભ્યાસ, સાર્વજનિક પરામર્શક બેઠક, અસરોની ઓળખ અને આકારણી, અસરો ટાળવામાટેની સુચના અને ESMP અને ESMoP ની સુચના.

પર્યાવરણીય અને સામાજિક અસરોની ઓળખ

શક્યતા
સામાજિક અને પર્યાવરણની અસરોના પ્રાથમિક આંકડાઓના પૃથ્થકરણ અને તારણોને કાર્યક્ષેત્ર પર તપાસવા અને તેના આધારે વિગતે પર્યાવરણીય અને સામાજિક અભ્યાસ હાથ ધરી તેની મુખ્ય અસરોની આકારણી કરવી.

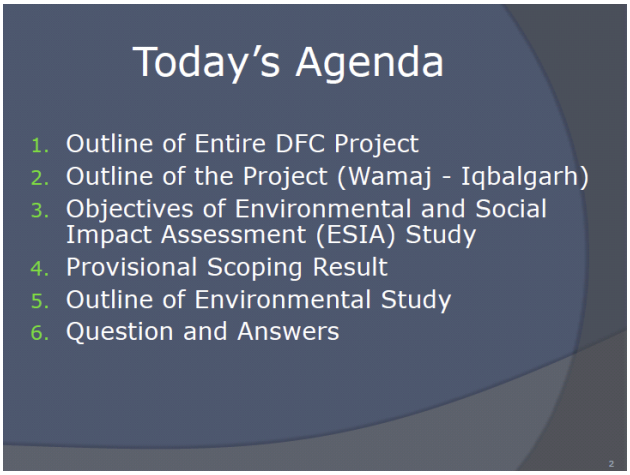
પ્રાકૃતિક પર્યાવરણ
યોજનાના આયોજન પ્રમાણે બાલારામ-અંબાજી વન્ય જીવ અભ્યારણમાંથી લાઈન પસાર થાય છે. જેમાં આયોજન પ્રમાણે વૃક્ષોને કાપવાની જરૂરીયાત પ્રોજેક્ટના અમલીકરણમાં ઉભી થઈ શકે છે. જેથી આગળનો અભ્યાસ કરી વન્યજીવ અભ્યારણમાં પ્રાણીઓની જાતી, રહેઠાણ અને વૃક્ષોની ગણતરી કરીને તેનો ઘટાડો ના થાય તે પ્રકારે ઝીણવટભરી તપાસ કરી અમલીકરણ કરવું.

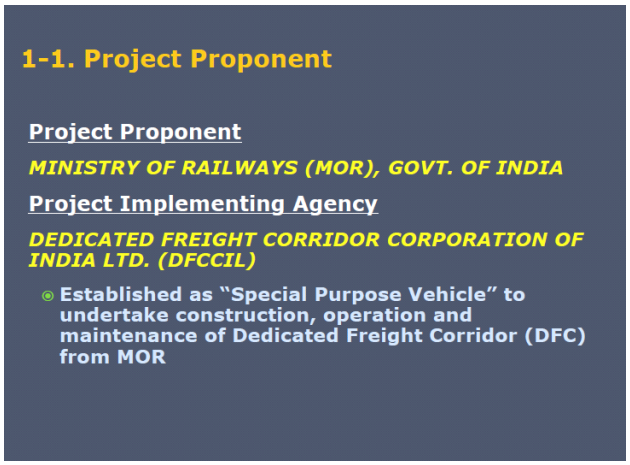
પ્રદૂષણ નિયંત્રણ
બાંધકામ દરમિયાન સંવેદનશીલ વિસ્તાર અને રહેણાંક વિસ્તારની નજીકના વિસ્તારમાં અવાજ અને ધ્રુજારીના અસર થઈ શકે છે. કાર્ય વિસ્તારમાં અવાજ અને ધ્રુજારીનું માપન કરીને તેનું મુલ્યાંકન કરવું અને પ્રોજેક્ટના અમલીકરણમાં તેનો ઘટાડો કરવો.

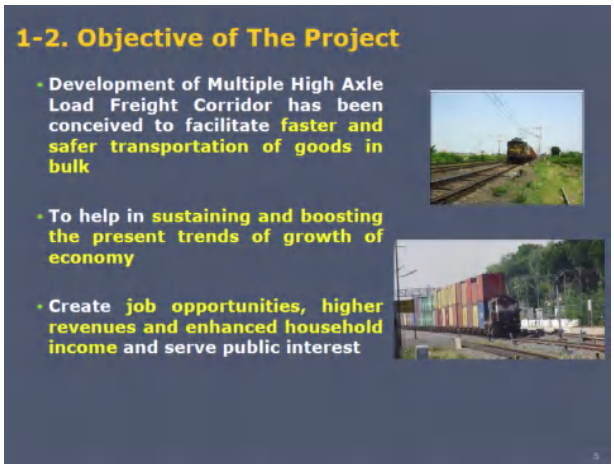
સામાજિક પર્યાવરણ
પ્રોજેક્ટના અમલીકરણ દ્વારા ગ્રામ્ય વિસ્તારમાં આવકારક વાહન વ્યવહારોનો વિકાસ કરવો અને નોકરીની તકોમાં વધારો કરવો. અમલીકરણ દરમિયાન જમીન સંપાદનને લગતી અસરો થઈ શકે છે. સંભવિત અસરોનો અભ્યાસ જેમાં બેઝલાઈન સર્વે, ગણતરી અને જમીનની ઉપયોગની ક્ષમતા વગેરે દ્વારા તેની અસરોને ઘટાડવા માટેના પગલાની સલાહ.

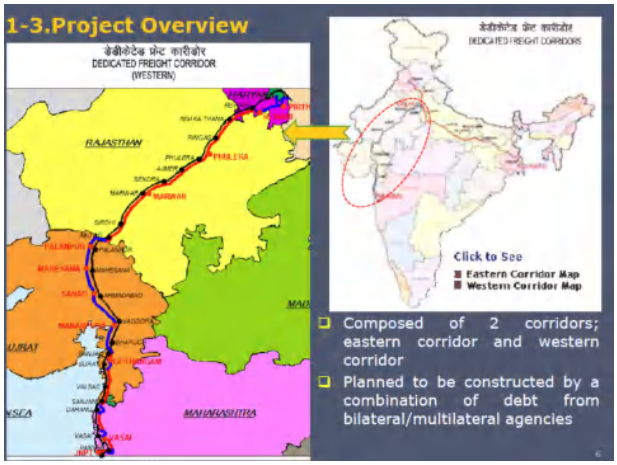
(3) Presentation Materials (English and Gujarati)

【English】

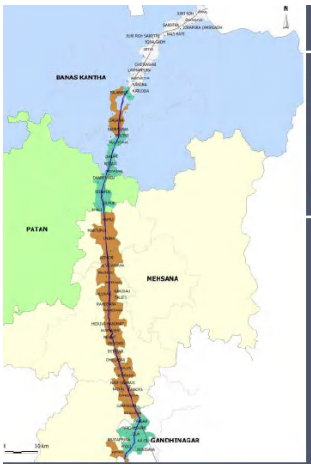








2. Outline of the Project (Wamaj – Iqbalgarh Section)

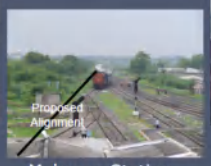


2-1. Project Area

- Gandhinagar – Approx.14 Km
- Mehsana – Approx. 64 Km
- Patan – Approx.12 Km
- Banaskantha – Approx.47 Km
- **Total – Approx. 140 Km**

2-2.Overview of Project Area (Phase 1 Wamaj - Iqbalgah Section)

Pansar Station



Mehsana Station

Palanpur Station

Balaram River

3. Objective of Environmental and Social Impact Assessment Study

3-1.Objective of The ESIA Study & Other Related Activities

[ESIA]

- To collect environmental & social baseline information in order to identify and assess potential impacts on social/ natural environment caused by the Project.
- To prepare the mitigation measures, namely the Environmental & Social Management Plan (ESMP), Environmental & Social Monitoring Plan (ESMoP) for necessary actions to address the potential environmental and social impacts.

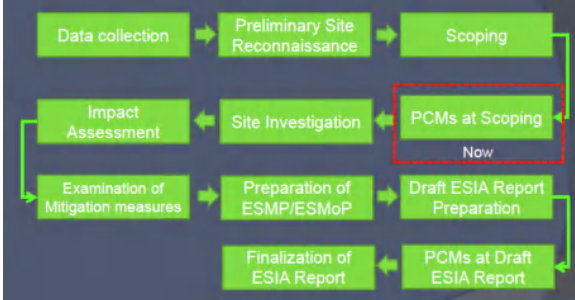
[Other Related Activities: RRP]

- To be studied land acquisition, resettlement & rehabilitation in the course of Resettlement & Rehabilitation Plan (RRP) preparation separately.
  (PCMs for RRP will be held on November, 2011)

3-2. Objectives of The Public Consultation Meetings

1. Incorporating public views and opinion to ESIA study
2. Holding opinion exchanging in the process of ESIA study by sharing potential positive/negative environmental and social impacts

3-3. ESIA Study Flow



4. Provisional Scoping Results

4-1. Major Result of Provisional Scoping

Items	Possible impacts to be studied further
Involuntary resettlement	- Possibility of involuntary resettlement due to construction of proposed DFC alignment
Daily life of people in surrounding areas	- Possibility of impact for land dependent people due to land acquisition - Possibility of positive impact during operation phase due to smooth cargo operation among industrial area
Social institutions (including regional severance)	- Possibility of temporal disturbance during construction phase - Possibility of inconvenience due to construction of embankment/cutting
Existing social infrastructures and services	- Possibility of restriction of access to the social infrastructures such as temple during construction and after operation
Historical and cultural heritage (including religious matters)	- Possibility of land acquisition from religious place - Possibility of noise & vibration impact during operation phase for religious place close to the alignment

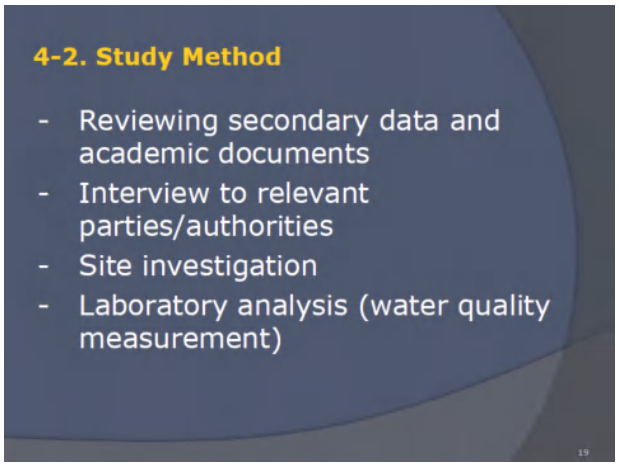
4-2. Major Result of Provisional Scoping

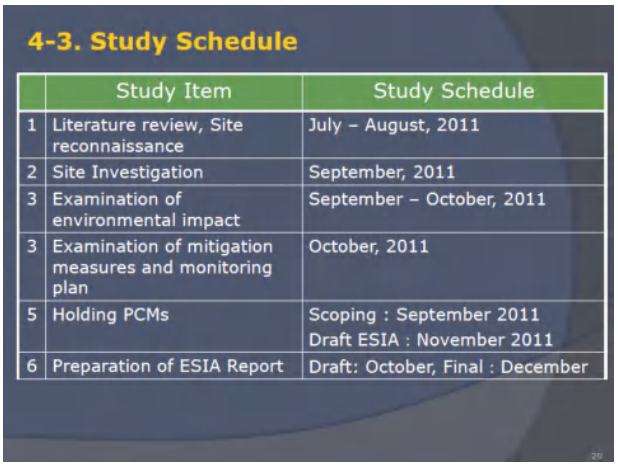
Items	Possible impacts to be studied further
Fauna & Flora	- Possibility of removing existing trees and plants in the alignment and work sites temporally or permanently due to construction works
Air pollution	- Possibility to increase exhaust gas and dust from construction vehicle and machines during construction phase - Possibility to improve regional air pollution due to modal shift
Water pollution	- Possibility of temporal water degradation during construction phase
Noise & Vibration	- Possibility to generate noise & vibration during construction (i.e. construction machine and vehicle) and operation phase

4. Outline of Environmental & Social Impact Assessment (ESIA) Study

4-1. Study Items

Social Environment	Natural Environment
- Socio-economic aspects (population, land use, education etc) - Cultural aspects (cultural assets, religion, etc)	- Flora, fauna, biodiversity ✓Endangered species ✓Tree census - Water quality measurement - Noise and vibration measurement





	Study Item	Study Schedule
1	Literature review, Site reconnaissance	July – August, 2011
2	Site Investigation	September, 2011
3	Examination of environmental impact	September – October, 2011
3	Examination of mitigation measures and monitoring plan	October, 2011
5	Holding PCMs	Scoping : September 2011 Draft ESIA : November 2011
6	Preparation of ESIA Report	Draft: October, Final : December

【Gujarati】

ડેડીકેટેડ ફ્રેટ કોરીડોર યોજનાનો વિકાસ
(પ્રથમ તબક્કો- વામજ થી ઈકબાલગઢ ભાગ)
પર્યાવરણીય અને સામાજિક અસરની
આકારણીનો અભ્યાસ
સાર્વજનિક પરામર્શક બેઠક (PCM)

એજન્ડા

- સમગ્ર DFC યોજનાની રૂપરેખા
- વામજ - ઈકબાલગઢ યોજનાની રૂપરેખા
- પર્યાવરણીય અને સામાજિક અસરની આકારણીનો અભ્યાસ
- લક્ષ્યબિંદુ કામચલાઉ પરિણામ
- પર્યાવરણીય અભ્યાસની રૂપરેખા
- પ્રશ્નો અને જવાબ

૧ ડીએફસી યોજનાની રૂપરેખા

૧-૧. યોજના

યોજનાની દરખાસ્ત કરનાર
રેલ્વે મંત્રાલય, ભારત સરકાર

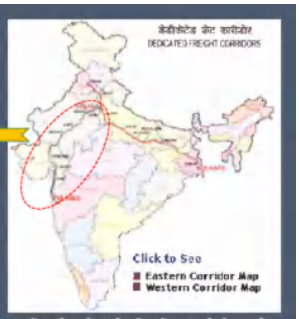
યોજના અમલીકરણ સંસ્થા
ડેડીકેટેડ ફ્રેટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL)

ભારત સરકારના રેલ્વે મંત્રાલયના ઉપક્રમે ડીએફસી પ્રોજેક્ટ ખાસ હેતુ સરના વાહનો માટેની બાંધકામ, સંચાલન અને મરામત માટે ઉભુ કરેલ સંસ્થા છે.

૧-૨. યોજનાનો હેતુ

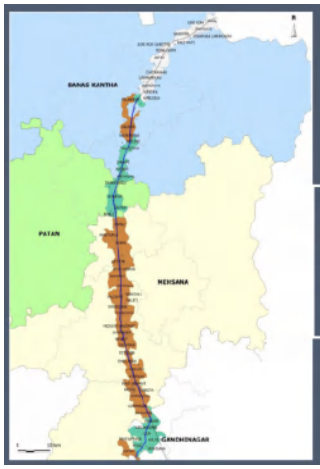
- મોટા જથ્થામાં માલનો ઝડપી અને સુરક્ષીત રીતે લઈ જવા માટે બહુવિધ ઉચી ધરીપટ માલવાહન યંત્રના રસ્તાઓનો વિકાસ કરવા
- આર્થિક વિકાસદરની હાલની દિશાને સમગતિશીલ વિકાસમાં મદદરૂપ બનવું
- નોકરીની તકો, આવકમાં વધારો, કુટુંબદિઠ આવક અને લોકોની રૂચીમાં ઉપયોગી થવા માટે નિમાર્ણ કરવું

૧-૩. યોજનાનું સામાન્ય નિરિક્ષણ



- વ્યક્તિઓ સાથે ચર્ચા કરી બન્ને રસ્તાઓ જેના પૂર્વ અને પશ્ચીમનો સમાવેશ થાય
- બે કોરીડોર બનાવવા જેમાં પૂર્વ અને પશ્ચિમ કોરીડોર
- નદિપશ્ચિમ અને બહુ પશ્ચિમ સંસ્થઓ સાથે વાદ વિવાદ અને ચર્ચાઓથી આયોજન બનાવવું

૨. યોજનાની રૂપરેખા (વામજ થી ઈકબાલગઢ વિભાગ)



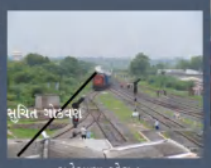
૨-૧. યોજનાનો વિસ્તાર

- ગાંધીનગર - અંદાજિત ૧૪ કિ.મી.
- મહેસાણા - અંદાજિત ૬૪ કિ.મી.
- પાટણ - અંદાજિત ૧૨ કિ.મી.
- બનાસકાંઠા - અંદાજિત ૪૭ કિ.મી.

કુલ - અંદાજિત ૧૪૦ કિ.મી.

૨-૨. યોજના વિસ્તારની દૃષ્ટિબીંદુ (વામજ થી ઈકબાલગઢ વિભાગ)

પાનસર સેકશન



મહેસાણા સ્ટેશન

પાલનપુર સ્ટેશન

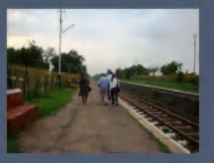
બાલારામ

૩. પર્યાવરણીય અને સામાજીક અસર આકારણીના અભ્યાસનો હેતું

૩-૧. ઈએસઆઈએ અભ્યાસનો હેતુ અને અન્ય સંલંગ્ન પ્રવૃત્તિ

ઈએસઆઈએ

- પર્યાવરણીય અને સામાજિક આધારભુત માહિતી એકત્ર કરવી અને સંભવિત અસરોની ઓળખ અને માપણી કરવી.
- સંભવિત પર્યાવરણીય અને સામાજિક અસરના ઘટાડવા માટે પર્યાવરણ અને સામાજિક વ્યવસ્થાપન (ઈએસએમપી) આયોજન અને પર્યાવરણીય અને સામાજિક મૂલ્યાંકન આયોજન (ઈએસએમઓપી) નામથી આયોજન તૈયાર કરવું અને સુચવવામાં આવેલ જરૂરી કામગીરી કરવી.



અન્ય સલગ્ન કામગીરી

- જમીન સંપાદન, પુનઃવસવાટ અને પુનઃવસન માટે પુનઃવસવાટ અને પુનઃવસન પ્લાન અમલઓ તૈયાર કરવા (પીસીએમ નવેમ્બર ૨૦૧૧)

૩-૨. સાર્વજનિક પરામર્શક બેઠકનો હેતુ

૧. લોકોના અભિપ્રાયો અને સુચનોનો ESIA અભ્યાસમાં સમાવેશ કરવા.

૨. ESIA અભ્યાસ દરમિયાન જમીન માલિકો સાથે સંભવિત પર્યાવરણીય અને સામાજિક અસરોના હકારાત્મક અને નકારાત્મક પાસાઓ અંગે ચર્ચા કરવી.

૩-૩. અભ્યાસના પગથીયા

૧. અભ્યાસ ધરવા માટેના લીધેલા પગલા અને તેની મુખ્ય સમાવિષ્ટ મુદ્દા
૨. માહિતીનું એકત્રિકરણ
૩. કાર્ય વિસ્તારની જગ્યાની તપાસ
૪. શકયતાઓ - કાર્યક્ષેત્ર
૫. સાર્વજનિક પરામર્શક બેઠકનું આયોજન
૬. સ્થળ ચકાસણી
૭. અસરની આકારણી
૮. અસરો ઘટાડવા માટેનો અભ્યાસ
૯. પર્યાવરણીય અને સામાજિક વ્યવસ્થાપન પ્લાન અને પર્યાવરણ અને સામાજિક મુલ્યાંકન પ્લાનની તૈયારી.
૧૦. પર્યાવરણીય અને સામાજિક અસરની આકારણીના અભ્યાસના અહેવાલનો મુસદ્દો તૈયાર કરવો
૧૧. સાર્વજનિક પરામર્શક બેઠકનો અહેવાલનો મુસદ્દો અને પર્યાવરણીય અને સામાજિક અસરની આકારણીનો અહેવાલ તૈયાર કરવો
૧૨. પર્યાવરણીય અને સામાજિક અસરની આકારણીનો અંતિમ અહેવાલ

૪ હંગામી કાર્યક્ષેત્રના પરિણામો

૪-૧. હંગામી કાર્ગક્ષેત્રના મહત્વના પરિણામો

વિગત	થનાર અભ્યાસની સંભાવિત અસરો
અસ્વૈચ્છિક પુનઃવસાહન	- સુચિત ડીએફસી લાઈનનાં બાંધકામને કારણે અસ્વૈચ્છિક પુનઃવસાહનની સંભાવના
આસપાસનાં વિસ્તારોનાં સમુદાયોની રોજની જીવન શૈલી	- જમીનના આધારિત ગુજરાન ચલાવતા લોકો સામે જમીન વિહોણા બનવાની સંભાવનાઓ ઉભી અતી અસરો કે પડકારો
સામાજિક સંસ્થાઓ (શૈક્ષિણ વિભાગોના સમાવેશ સાથે)	- બાંધકામનાં સમય દરમિયાન ઉભી અતી અવ્યવસ્થાની સંભાવના બાંધકામ દરમિયાન ઉભી થતી અગવડતાની સંભાવના જેવી કે : રસ્તા તૂટવા / જમીનનો કેટલોક ભાગ કપાવવો કે ઓછો થવો
હયાત સામાજિક બાંધકામો અને સેવાઓ	- સામાજિક બંધારણો જેવા કે મંદિર વગેરે પર - બાંધકામનાં કાર્ય દરમિયાન અને કાર્ય થયા બાદ અંકુશ કે પ્રતિબંધ મૂકાવવાની સંભાવના
એતિહાસિક અને સાંસ્કૃતિક વારસો (ધાર્મિક બાબતોનાં સમાવેશ સાથે)	- ધાર્મિક સ્થળો પાસેથી જમીન લેવાની સંભાવના લાઈનની નજિકનાં ધાર્મિક સ્થળો પર બાંધકામ કાર્ય દરમિયાન ઘોંઘાટ અને સ્પંદનોની ઉભી થતી અસરોની સંભાવના

૪-૨. હંગામી કાર્ગક્ષેત્રના મહત્વના પરિણામો

વિગત	થનાર અભ્યાસની સંભાવિત અસરો
પ્રાણિસૃષ્ટિ અને વનસ્પતિ સૃષ્ટિની વાદી	- બાંધકામના કાર્યને કારણે તે સ્થળ પરની હયાત છોડ અને વનસ્પતિઓ હંગામી અથવા કાયમી સમય માટેની નાશ થવાની સંભાવના
હવા પ્રદૂષણ	- બાંધકામના સમય દરમિયાન બાંધકામ માટે ઉપયોગમાં લેવાતા વાહનો અને યંત્રો દ્વારા નીકળતા ધુમાળા અને ધૂળના રજકણોનો હવામા વધુ પ્રમાણમાં ફેલાવાની સંભાવના વિસ્તારીક બાહ્યરૂપમાં થતા પરિવર્તનને કારણે જેતે વિસ્તારના હવા પ્રદૂષણમાં વધારો થવાની સંભાવના
પાણીનું પ્રદૂષણ	- બાંધકામ સમય દરમિયાન પાણીના ગુણધર્મો બદલાવાની સંભાવના
ઘોંઘાટ અને સ્પંદનો	- બાંધકામ અને કાર્યસમય દરમિયાન ઘોંઘાટ અને સ્પંદનો પેદા થવાની સંભાવના (બાંધકામ ના ઉપયોગમાં લેવાતા યંત્રો અને વાહનો ને કારણે)

૪ પર્યાવરણીય અને સામાજિક અસરોની ચકાસણી કરવા માટેનાં અભ્યાસ સંબંધિત રૂપરેખા તૈયાર કરવી

૪.૧ અભ્યાસની વિગતો

સામાજિક પરિસ્થીતી	કુદરતિ પરિસ્થિતિ
◉સામાજિક - આર્થિક સ્થિતિ (વસ્તિ, શિક્ષણ, સ્થાવર મિલકતનો વપરાશ) ◉સાંસ્કૃતિક સ્થિતિ (સાંસ્કૃત વારસો કે મિલકત ધર્મ વગેરે)	◉વનસ્પિતિ, પ્રાણીઓ વગેરેનો જૈવ વૈવિધિક અભ્યાસ ▪ભયગ્રસ્ત જાતીઓ ▪વૃક્ષોની ગણતરી ◉પાણીના ગુણોનું માપન ◉ઘોંઘાટ અને સ્પંદનો કે તરંગોનું માપણ

૪.૨ અભ્યાસની પધ્ધતિ

- સહાયક માહિતી અને તાત્વિક દસ્તાવેજોની સમિક્ષા કરવી
- સંલગ્ન પડકારો / સત્તાધારીઓ સાથે મૌખિક ચર્ચા કરવી
- સ્થળ ચકાસણી
- પ્રયોગશાળા દ્વારા પ્રાયોગિક પૃથ્થકરણ (પાણીનાં ગુણો કે ગુણધર્મોનું માપન)

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૪.૩ અભ્યાસ અંગેની કાર્યસૂચિ

	અભ્યાસની વિગત	અભ્યાસની કાર્યસૂચિ
૧	સાહિત્ય સમિક્ષા, સ્થળ પસંદગી	જુલાઈ-ઓગસ્ટ ૨૦૧૧
૨	સ્થળ નિરક્ષણ અને ચકાસણી	સપ્ટેમ્બર - ૨૦૧૧
૩	પર્યાવરણીય અસરોનું પરિક્ષણ	સપ્ટેમ્બર-ઓકટોબર ૨૦૧૧
૩	ઉપશમન અંગેના પગલાઓ અને તેના નિયંત્રણ અંગેના આયોજનનું પરિક્ષણ	ઓકટોબર-૨૦૧૧
૫	સાર્વજનિક પરામર્શ બેઠકનું નિયમન	અંદાજિત સપ્ટેમ્બર-૨૦૧૧ પ્રારૂપ ઈએસઆઈએ : નવેમ્બર-૨૦૧૧
૬	ઈએસઆઈએ અહેવાલ તૈયાર કરવો	પ્રારૂપ ઓકટોબર, અંતિમ : ડિસેમ્બર

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જરૂરી પૂછપરછ અને માહિતી માટે, સંપર્ક કરવો

DFCCIL (ડીએફસીસીઆઈએલ) મુખ્ય કચેરી

સરનામું :
પાંચમો માળ, પ્રગતી મેદાન, મેટ્રો સ્ટેશન બિલ્ડીંગ કોમ્પલેક્ષ,
નવી દિલ્હી -૧૧૦૦૦૧.
ફોનઃ(ઓ)૦૧૧-૨૩૪૫૪૮૯૦, ફેક્ષ (ઓ)૦૧૧-૨૩૪૫૪૭૦૧

મુખ્ય યોજના પ્રબંધક, અમદાવાદ

સરનામું :
પ્રથમ માળ, જૂની ડીઆરએમ ઓફીસ બિલ્ડીંગ, કાલુપુર,
અમદાવાદ - ૩૮૦ ૦૦૨.
ફોનઃ(ઓ)૦૭૯-૨૨૧૭૫૧૦૭, ફેક્ષ (ઓ)૦૭૯-૨૨૧૬૩૧૦૧

મુખ્ય યોજના પ્રબંધક, અજમેર

સરનામું :
૪૨એ/૩, સીવીલ લાઈન્સ, અજમેર - ૩૦૫૦૦૧.
ફોનઃ(ઓ) ૦૧૪૫-૨૬૩૦૩૬૦

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આભાર

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Appendix-9b
Results of PCMs for Environmental Scoping

Summary of PCM

No	Sub-District	Venue	Date	Language	Number of Participant
CPM Ahmedabad Jurisdiction					
1	Palanpur	Ajamata Temple Hall	Sep. 20, 2011	Gujarati	165
2	Sidhpur	Hotel Siddharth, Tavadiya	Sep. 21, 2011	Gujarati	325
3	Mehsana	Science Collage, Hagalpur	Sep. 22, 2011	Gujarati	200
4	Mehsana	Oxford School of Management	Sep. 23, 2011	Gujarati	160
5	Kalol	Hotel Amrit	Sep. 26, 2011	Gujarati	55
6	Mehsana	Cooperative Hall	Oct. 12, 2011	Gujarati	43
Total					**948**
CPM Ajmer Jurisdiction					
1	Palanpur	Agrawal Hall	Sep. 27, 2011	Gujarati	167
Grand Total					**1,115**

Source: NKC

Details of the PCM (Under CPM Ahmedabad Jurisdiction)

1. PCM in Palanpur

District: Banaskantha
Sub-district/Taluka: Palanpur
Venue: Ajamata Temple Hall, Sedarasan Village, Palanpur
Date: 20 September 2011
Villages covered: Jagana, Sedarsana, Majadhar, Jasleni, Kamalpur, and Malosana

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]
- The participants required explanation of the reasons of change of the alignment.
- The participants required compensating their land loss by land.
- The participants requested to explain compensation packages for affected structures.
- The participants requested to explain necessary area for land acquisition.
- The participants requested for the construction of ROB or RUB at Umardasi Railway Station.
- The participants request for the explanation on water boring coming on other side of the plot/alignment.
- The participants requested for the current market rate as compensation, criteria for calculation of compensation amount. They informed that with proposed compensation rate the PAPs will not be able to purchase land nearby.
- The participants enquired about the DFCCIL provision for rehabilitation and resettlement including provision for remaining land left after land acquisition.
- The participants enquired about disbursement of compensation amount in case one plot have several owners.
- The participants enquired about the issues related to accessibility, construction of rods for reaching their field and other villages.
- The participants requested to provide a job in railways to one person from each affected family as per his/her qualification.

[Environmental Issues]
- Enquiry on the dispose and use of soil during and after construction.
- Enquiry on noise pollution due to the DFC.

(2) Participants
- Number of the participants: 165 (there were no female participants).

(3) Photographs

Source: NKC
Photo 1.1 PCM in Palanpur

Source: NKC
Photo 1.2 PCM in Palanpur

(4) Summary of the Responses by the Feedback Form

62 out of 165 participants filled up the feedback form and it is approximately 38% of total participants. Out of 62 filled up the form, 30 (48%) responded to the questions but 32 (52%) did not. Many respondents who filled up the form only their name or some partial data did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 62 filled in forms only 11 (18%) responses were obtained including multiple responses from one respondent. The respondents answered in the feedback form about limitation of accessibility, income loss and compensation.

Table 1-1-2 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	2	19%
2.	Access to community centers, religious sites, cultural activity places will be affected	1	9%
3.	Access to market places will be affected	1	9%
4.	Access to school will be affected	1	9%
5.	Access to health care centers will be affected	1	9%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	1	9%
8.	Compensation by market rate against loss of land and structures	2	19%
9.	Loss of income and reduction in livelihood options	1	9%
10.	Employment of one family member of project affected family in railways	1	9%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		11	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 62 filled forms 5 (8%) responded. A total of only one (20%) respondent said that trees and environment should be conserved during implementation of the DFC project, 2 (40%) raised their concern about loss of trees, 1 (20%) said that air pollution should be minimized, and 1 respondents (20%) said that, due to the DFC there is a possibility of increased noise and vibration which need to be reduced.

Table 1-2 Classification of Responses for the Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	1	20%
2.	Loss of tree	2	40%
3.	Increase in air pollution	1	20%

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
4.	Increase in noise pollution, vibrations etc.	1	20%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		5	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
Under this section out of 62 filled up forms 36 (58%) responses were received. A total of 27 (75%) people said that the PAPs are not ready to give land, and 4 (11%) respondents requested the construction of RUB or ROB. Some responses listed below could be categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 1-3 Classification of Responses for the Other Issues

Sl. No.	Type of Responses (other issues)	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	27	75%
4.	Marginal farmer will become small farmer or landless	1	3%
5.	Request for land within village in public property	1	3%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	4	11%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	1	3%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	2	5%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		36	100%

Note: Multiple responses
Source: NKC

2. PCM in Sidhpur

District: Patan
Sub-District: Sidhpur
Venue: Hotel Siddharth, Tavadiya Cross Road, Sidhpur Highway, Sidhpur
Date: 21 September 2011
Villages covered: Khali, Lalpur, Sidhpur, Sujanpur, Dharewada, Manpura, Pasvadal, Kotdi, Chappi and Majadar

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- Most of the participants concerned whether DFCCIL will provide employment for at least one person from each affected family in railways.
- The participants requested to explain necessary area for land acquisition.
- The participants requested explanation on possibility of impact to existing utilities such as electricity line and water pipeline. It was informed that for the public utilities such as water supply, sewerage, telephone line and electricity to be affected, DFCCIL will give full costs for replacing these services.
- Clarification on the reasons for change in alignment from west to east was requested.
- Some of the participants enquired about the rehabilitation package for disable people, widow etc.
- The participants requested to explain detail entitlement related to compensation package.
- The participants requested clarifications regarding provision of DFCCIL to provide agriculture land elsewhere.
- The participants requested to explain the DFC plan to address loss of community assets.
- The participants informed that, there was a nala flowing along the highway, which was blocked due to new construction of buildings on the highway site. This nala ultimately flows into river Saraswati. Now, since this nala is blocked whole water flows on the highway. As a result, it floods the fields and parallel area of the railway line, especially near level crossing 191, and farmers face lots of problem during rainy season because of water logging. Further, it was requested to make arrangement for diversion of rainy water into nearby stream so that a field does not get flooded.
- The participants enquired about the criteria for calculation of compensation amount. They were of the opinion that, farmers should be given opportunity to decide and negotiate for the value of their own land. The participants also requested DFCCIL to give land in exchange of land equivalent to the land acquired. This badly affects land use, decrease the size of landholding small and divide land in two parts. The participants are ready to cooperate with DFCCIL for development of the area and requested officials to develop welfare program for the benefit of the PAPs.

[Environmental Issues]

- There were no questions/discussions related to environmental issues.

(2) Participants

- Number of the participants: 325 (there were no female participants)

(3) Photographs

Source: NKC

Photo 2.1 PCM in Sidhpur

Source: NKC

Photo 2.2 PCM in Sidhpur

(4) Summary of the Responses by the Feedback Form

Out of 325 persons who attended the meeting, 93 (29%) filled up the feedback form. Out of 93 filled of forms only 67 (72%) responded, while 26 (28%) did not. Many respondents who filled up the form only their name or some partial data did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 67 filled of forms 77 (115%) responses were submitted including the multiple responses from one respondent A total of 21 (27%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 22 (29%) respondents said that the there is a possibility of loss of income and reduction in livelihood options, and 7 (9%) respondents said that there will be possibilities of loss of agriculture land and production.

Table 2-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	6	8%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	1	1%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	2	3%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	4	5%
8.	Compensation by market rate against loss of land and structures	21	27%
9.	Loss of income and reduction in livelihood options	22	29%
10.	Employment of one family member of project affected family in railways	6	8%
11.	loss of agriculture land and production	7	9%
12.	Involuntary displacement/ relocation	4	5%
13.	Compensation amount is less to purchase land nearby	1	1%
14.	Railway stations should be far off from the resident area	1	1%
15.	Frequent closing of level crossing	2	3%
16.	Pension provision for the PAPs	0	0%
Total		77	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section, out of 67 filled forms 63 (94%) responded. A total of only 15 (23%) respondents said that trees and environment should be conserved during implementation of the DFC project, 18 (28%) respondents said that air pollution should be minimized, and 22 (35%) respondents said that, due to the DFC there is a possibility of increased noise and vibration which need to be reduced.

Table 2-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	4	6%
2.	Loss of tree	15	23%
3.	Increase in air pollution	18	28%
4.	Increase in noise pollution, vibrations etc.	22	35%
5.	Increase in water pollution	1	2%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	1	2%
8.	Impact to horticulture	1	2%
9.	Plantation of tree equivalent to number of tree cut	1	2%
10.	Impact on biodiversity	0	0%
Total		63	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
Under this section out of 67 filled up the forms 32 (48%) responses were obtained. A total of 7 (22%) respondents said that changes in the proposed alignment required. It should be parallel to the existing line, while 5 (17%) respondents requested to provide land within village available in public property, 6 (19%) respondents requested to provide information on reasons for change in the alignment, total land under acquisition, height of track is required, map related to land acquisition etc. Some responses listed below could be categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 2-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	7	22%
2.	Risk of infectious diseases/health problems	2	6%
3.	Not ready to give land and DFC not required	2	6%
4.	Marginal farmer will become small farmer or landless	1	3%
5.	Request for land within village in public property	5	17%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	2	6%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	1	3%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	6	19%
10.	Inconvenience to children/senior citizens need to be reduced	1	3%

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
11.	Children will have difficulty in going for open field defecation	1	3%
12.	Loss to structures of cultural and religious importance such as temples and mosque	1	3%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	1	3%
14.	Increase in employment generation	1	3%
15.	Passenger trains are more beneficial than freight corridor	1	3%
16.	PAPs participation in DFC should be ensured	0	0%
Total		32	100%

Note: Multiple responses
Source: NKC

3. PCM in Mehsana

District: Mehsana
Sub District/Taluka: Mehsana
Venue: Science Collage, Nagalpur, Mehsana
Date: 22 September 2011
Villages covered: Sobhasan, Kukas, Hedua, Mehsana, Ramosana, Taleti, Nani dau, Motidau, Palodar, Bhandu, Jetalvasana, Hethor, Unjha, Maktpur and Kamli.

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants requested to explain the reasons to modify the proposed alignment from the previous study.
- The participants requested to disclose the result of survey related to land acquisition caused by the project.
- The participants requested to explain necessary area for land acquisition. Farmers informed that this is for the third time railway is taking land in their village.
- The participants requested for the current market rate as compensation.
- The participants requested explanation on the DFCCIL provision to give compensaton to the PAPs for plots not divided according to revenue records, and amount to be distributed amongst the family members.
- The participants informed that the proposed DFC line passes through both sides of the land (east & west) in village Mewad, Mehsana district. One road passing near the PAPs land is under acquisition. This road is used by villagers to go to their fields. Further it was also informed that since last 25 years, the PAPs had developed their land and made it fertile, installed irrigation facility, etc. after getting benefits of government schemes. The participants raised their concern that after construction the land will be divided into two parts. The agriculture field is irrigated through bore wells which come under acquisition as a result other portion of the land will remain unirregated due to lack of alternative source of water for irrigation purpose. PAPs requested explanation on compensation provision in this concern.
- The participants raised their concern of growing fodder due to reduced size of land holding and impacts on income from milk production. Due to insufficient availability of fodder it is most likely that the quantity of milk production would be reduced.
- The participants requested to compensate their land loss by land. It was further suggested that there are many fallow lands available within village which are not fertile. This can be can be utilised for the same purpose.
- Most of the participants were concerned whether DFCCIL will provide employment for at least one person from each affected family nearer to Mehsana.
- The participants raised their concern that in some cases there is no proper record for registry of purchased land.
- The participants from Nani Dau were concern about impact on structure due to proposed alignment.

[Environmental Issues]

- There were no questions/discussions related to environmental issues.

(2) Participants

- Number of the participants: 200 (there were no female participants)

(3) Photographs

Source: NKC

Photo 3-1 PCM in Mehsana

Source: NKC

Photo 3-2 PCM in Mehsana

(4) Summary of the Responses by the Feedback Form

Out of 200 persons who attended the meeting, 72 (36%) filled up the feedback form. Out of 72 filled of forms only 53 (74%) responded, while 19 (26%) did not. Many respondents who filled up the feedback form did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 72 filled of the forms 74 (103%) responses were submitted including the multiple responses from one respondent. A total of 12 (16%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, 14 (19%) respondents requested provision of employment of one family member and 17 (23%) respondents said that there will be possibilities of loss of agriculture land and production.

Table 3-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	9	12%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	1	1%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	5	7%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	8	11%
8.	Compensation by market rate against loss of land and structures	12	16%
9.	Loss of income and reduction in livelihood options	7	10%
10.	Employment of one family member of project affected family in railways	14	19%
11.	loss of agriculture land and production	17	23%
12.	Involuntary displacement/ relocation	1	1%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		74	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 72 filled of forms only 31 (43%) responses were received. A total of only 14 (45%) respondents said that trees and environment should be conserved during implementation of the DFC project, 3 (10%) respondents said that air pollution should be minimized, and 12 (39%) respondents said that, due to the DFC there is a possibility of increased noise and vibration which need to be reduced.

Table 3-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	0	0%
2.	Loss of tree	14	45%
3.	Increase in air pollution	3	10%
4.	Increase in noise pollution, vibrations etc.	12	39%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	1	3%
9.	Plantation of tree equivalent to number of tree cut	1	3%
10.	Impact on biodiversity	0	0%
Total		31	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
Under this section out of 72 filled of forms only 41 (57%) responses were received. A total of 22 (54%) respondents said that changes in the proposed alignment required. It should be parallel to the existing line, while 4 (10%) respondents are not ready to give their land and not in favor of the DFC. While 9 (22%) respondents requested to provide land within village available in public property, 4 (10%) respondents raised their concern about the possibility of increase in accident/death of cattle during crossing of railway line. Some responses listed below could categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 3-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	22	54%
2.	Risk of infectious diseases/health problems	1	2%
3.	Not ready to give land and DFC not required	4	10%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	9	22%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	4	10%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%

Sl. No.	Type of Responses for Other issues	No. of Responses	Percentage
10.	Inconvenience to children/senior citizens need to be reduced	1	2%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		41	100%

Note: Multiple responses
Source: NKC

4. PCM in Mehsana

District: Mehsana
Sub-District/Taluka: Mehsana
Venue: Oxford School of Management, Julasan, Mehsana
Date: 23 September 2011
Villages covered: Ghumasan, Dandarva, Anandpura, Tankiya, Kaiyal, NaviShdhavi, Jornang, Ambaliyasan, Chaula, Dholasan, Garetpur, Mevad, Punasan, and Hebuva.

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants requested to do appropriate compensation by market price or land by land.
- Most of the participants were concerned whether the railway will provide employment for at least one person from each affected family, issue ration cards to poor families.
- The participants requested to disclose the result of survey related to land acquisition caused by the project.
- The participants requested to explain necessary area and portion for land under acquisition, reasons for change in alignment and impacts on accessibility within a community or to own land.
- The participants enquired about any possibilities of access limitation within a community or possession of land.
- The participants requested clarification on area to be acquired on both side of the existing railway track for construction of the DFC railway line.
- Some of the participants requested clarifications on the DFC provisions to provide support in procurement of basic household items such as fans, cupboards, electric fitting, water and sewerage line. The participants suggested issuing a card like BPL to the PAPs so that benefits of the government schemes can be availed.

[Environmental Issues]

- There were no questions/discussions related to environmental issues.

(2) Participants

- Number of the participants: 160 (there were no female participants)

(3) Photographs

Source: NKC
Photo 4.1 PCM in Mehsana

Source: NKC
Photo 4-2 PCM in Mehsana

(4) Summary of the Responses by the Feedback Form

Out of 160 persons who attended the meeting, 57 (36%) filled up the feedback form. Out of 57 filled of forms only 49 (86%) responded, while 8 (14%) did not. Many respondents who filled up the feedback form only for their name or some partial data did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 57 filled of forms 65 (114%) responses were received including the multiple responses from one respondent. A total of 15 (23%) respondents said that the there is a possibility of loss of income and reduction in livelihood options, 33 (51%) respondents requested to provide employment of one family member and 10 (15%) respondents said that there will be possibilities of loss of agriculture land and production.

Table 4-1Classification of Responses for Social Issues

Sl. No.	Type of Responses Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	2	3%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	3	5%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	2	3%
9.	Loss of income and reduction in livelihood options	15	23%
10.	Employment of one family member of project affected family in railways	33	51%
11.	loss of agriculture land and production	10	15%
12.	Involuntary displacement/ relocation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for PAPs	0	0%
Total		65	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 57 filled of forms only 12 (21%) responses were received. A total of only 7 (58%) respondents said that trees and environment should be conserved during implementation of the DFC project, 2 (17%) respondents said that air pollution should be minimized, and 3 (25%) respondents said that due to the DFC there is a possibility of increased noise and vibration which need to be reduced.

Table 4-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	0	0%
2.	Loss of tree	7	58%
3.	Increase in air pollution	2	17%
4.	Increase in noise pollution, vibrations etc.	3	25%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		12	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]

Under this section out of 57 filled of forms only 29 (51%) responses were received. A total of 15 (52%) respondents said that changes in the proposed alignment required. It should be parallel to the existing line. While 11 (38%) respondents requested to provide land within village available in public property, 2 (7%) respondents requested the construction of RUB or ROB for convenient access within village and vehicle movement. Some responses listed below could categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 4-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	15	52%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	0	0%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	11	38%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	2	7%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	1	3%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		29	100%

Note: Multiple responses
Source: NKC

5. PCM in Kalol

District: Gandhinagar
Sub-District/Taluka: Kalol
Venue: Hotel Amrit, Mehsana-Ahmedabad Highway, Ambikanagar, Kalol
Date: 26 September 2011
Villages Covered: Kalol, Vansjara, Vamaj, Ramnagar, Piyaz, Borisana, Pratappura, Chattral, Ola, Insand, Vadavswami, Pansar and Jhulsan.

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants requested to secure accessibility to linking roads, and keep provision for railway gates, underpass etc.
- The participants requested to explain any potential impacts to irrigation facilities.
- The participants raised their concern about risk of accident for residents around the existing railway track. They were apprehensive that proposed DFC railway line will further increase the possibility of accidents.
- The participants requested to provide the compensation for their land loss by alternative land or by cash in market price.
- Most of the participants concerned whether DFCCIL will provide the employment for at least one person from each affected family and landless PAPs.

[Environmental Issues]

- There were no questions/discussions related to environmental issues.

(2) Participants

- Number of the participants: 55 of which 7 were female participants

(3) Photographs

Source: NKC
Photo 5-1 PCM in Kalol

Source: NKC
Photo 5-2 PCM in Kalol

(4) Summary of the Responses by the Feedback Form

Out of 55 persons who attended the meeting, 5 (9%) filled up the feedback form. Out of 5 filled of forms only 4 (80%) respondents responded, while one (20%) did not. One respondent who filled up the feedback form did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 5 filled of forms only 4 (80%) responses were received. A total of one (25%) respondent raised his concern on the increased impact on social infrastructures such as water pipeline and electric line, 2 (50%) respondents said that the PAPs should get compensation by market rate

against loss of land and structures, while one (25%) respondent requested o provide employment of one family member in DFCCIL

Table 5-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	1	25%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	2	50%
9.	Loss of income and reduction in livelihood options	0	0%
10.	Employment of one family member of project affected family railways	1	25%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for PAPs	0	0%
Total		4	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 5 filled of forms only 2 (40%) responded. A total of 2 (100%) respondents said that due to the DFC there is a possibility of increased noise and vibration.

Table 5-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	0	0%
2.	Loss of tree	0	0%
3.	Increase in air pollution	0	0%
4.	Increase in noise pollution, vibrations etc.	2	100%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		2	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
No suggestions/comments were made by the participants.

6. PCM in Mehsana (Re-Holding for Jagudan and Ditasan villages)

District: Mehsana
Sub-District: Mehsana
Venue: Cooperative Dairy Hall, Jagudan Village
Date: 12 October 2011
Villages Covered: Ditasan and Jagudhan

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants suggested that information related to the DFC project be explained especially related to the RoW, exact number of plots, map of land acquisition, distance between the tracks proposed and the existing line etc.
- The participants requested to explain the possibility of any impacts on accessibility within a community or to own land.
- The participants requested to provide compensation for their land loss by alternative land or by cash in market price.
- Most of the participants concerned whether the railway will provide employment for at least one person from each affected family and landless PAPs.
- The participants requested explanation on DFC provision to minimize impact on existing public utilities such as water supply pipe line etc.

[Environmental Issues]

- The participants requested to explain any potential impacts relating to vibration. According to them if the track will pass through their land then due to vibration of the high speed train water course of their bore wells will be diverted and it is possible they may not be able to draw water. It is also possible that cracks in individual houses or total collapse of house may happen. It may also result in cracks on walls or in future complete breakdown of the houses.

(2) Participants

- Number of the participants: 43 of which one was female participant

(3) Photographs

Source: NKC
Photo 6-1 PCM in Mehsana (re-holding)

Source: NKC
Photo 6-2 PCM in Mehsana (re-holding)

(4) Summary of the Responses by the Feedback Form

Out of 43 persons who attended the meeting, 23 (53%) filled up the feedback form. Out of 23 filled of forms only 20 (87%) responded, while 3 (13%) did not. Many respondents who filled up the feedback

form only for their name or some partial data did not reply all the questions.

[Suggestions/Comments for Social Issues]
Under this section out of 23 filled of forms 23 (100%) responses were received. A total of 13 (57%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while one (4%) respondent said that there is a possibility of loss of income and reduction in livelihood options, 6 (26%) respondents said, to provide employment of one family member in the DFC and 3 (13%) respondents said that there will be possibilities of involuntary displacement/relocation and disturbance in caste based habitation.

Table 6-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	13	57%
9.	Loss of income and reduction in livelihood options	1	4%
10.	Employment of one family member of project affected family in railways	6	26%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation	3	13%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		23	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 23 filled of forms only 3 (13%) responses were received. A total of one (33%) respondent said that trees and environment should be conserved during implementation of the DFC project. In addition one (33%) respondent raised his concerns about the impact on biodiversity and also horticulture due to the DFC proposed alignment.

Table 6-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	0	0%
2.	Loss of tree	1	33%
3.	Increase in air pollution	0	0%
4.	Increase in noise pollution, vibrations etc.	0	0%
5.	Increase in water pollution	0	0%

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	1	33%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	1	33%
Total		3	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
Under this section out of 23 filled of forms only 5 (22%) responses were received. A total of 2 (40%) respondents said that changes in the proposed alignment required. It should be parallel to the existing line. While one (20%) respondent requested to provide land within village available in public property. While 2 (40%) respondents said that marginal farmer will become small farmer or landless. Some responses listed below could be categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 6-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	2	40%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	0	0%
4.	Marginal farmer will become small farmer or landless	2	40%
5.	Request for land within village in public property	1	20%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		5	100%

Note: Multiple responses
Source: NKC

Details of the PCM (Under CPM Ajimer Jurisdiction)

1. PCM in Palanpur

District: Banaskhantha
Sub-District: Palanpur
Venue: Agrawal Hall, Iqbalgadh Village, Amirgadh Block, Banaskantha
Date: 27 September 2011
Villages Covered: Sardarpura, Karjoda, Surajpur Hebatpur, Chitrasani, Jaspuriya, Jethi, and Iqbalgadh.

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- Necessary area for land acquisition is requested to be explained.
- The participants requested that it would be preferable for the PAPs to be provided with a job opportunity in the DFC.
- The participants informed that, within new DFC railway line, in Iqbalgarh village houses will be affected. The PAPs were apprehensive to purchase another land nearby from small amount of compensation given by the Government. It was suggested to provide land or constructed house instead of compensation amount.
- The participants requested to inform the status of structure loss in Sidhpur.
- The participants requested to explain the proposed alignment of the DFC at Iqbalgarh station.
- The participants requested to show documents/map which reflects land acquisition.
- The participants requested to change the alignment through their graveyard.
- Explanation of the reasons to modify the proposed alignment from the previous study is requested. According to the participants the present alignment is 10-12 km more than the previous alignment. The participants requested to give compensation at market rate.
- One participant informed that, he has laid down water pipeline in his field for irrigation purpose and taken loan from bank. According to him, the cost which has been offered by DFCCIL is very less and doesn't cover the cost of pipeline.
- The participants requested to explain the DFC provision for compensation of bore well existing near the border of land under acquisition, construction of new bore well, change in land status from irrigated to non-irrigated, and loss to cattle.
- The participants were concern about blockage of road for access to their agriculture fields and suggested to make alternative arrangements.
- The participants in general were not ready for land acquisition. It was suggested that the DFC should allow the PAPs to decide rates for their plots. Further, it was also suggested that the DFC is likely to use land for business or industry purpose, so consider the PAPs as shareholder.
- The participants suggested paying compensation according to new land acquisition bill. DFCCIL will now acquire less land as compare to earlier proposed alignment. Thus, DFCCIL have saved amount against compensation. It was further suggested to pay the saved amount as compensation.
- The participants suggested constructing the DFC line on the Government land in order to minimise acquisition of private land.
- The participants suggested providing pension to the PAPs.

[Environmental Issues]

- The participants requested to explain potential impacts related to the construction of DFC track and operation of trains.
- It is requested to explain any potential impacts relating to vibration. According to the participants if the track will pass through their land then due to vibration of the high speed train water course

of their bore wells will change and it is possible they may not be able to draw water from that source.

(2) Participants

- Number of the participants: 167 of which 25 were female participants.

(3) Photographs

Source: NKC

Photo 7-1 PCM in Palanpur

Source: NKC

Photo 7-2 PCM in Palanpur

(4) Summary of the Responses by the Feedback Form

Out of 167 persons who attended the meeting, 83 (50%) filled up the feedback form. Out of 83 filled of forms only 68 (82%) responded, while 15 (18%) did not. Many respondents who filled up the feedback form only for their name or some partial data did not reply all the questions.

[Suggestions/Comments for Social Issues]

Under this section out of 83 filled of forms only 21 (25%) respondents gave multiple responses on social issues and 34 (41%) respondents gave single response only on social issues. Out of total 91 responses a total of 2 (2%) respondents said that access to village, society, and farm land will be effected, 2 (2%) respondents raised their concern on the increased impact on social infrastructures such as water pipeline, electric line etc., 60 (66%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 5 (6%) respondents said that the there is a possibility of loss of income and reduction in livelihood options, 15 (17%) respondents said to provide employment of one family member in the DFC, 4 (4%) respondents requested to keep provision of pension for the PAPs and 2 (2%) respondents said that there will be possibilities of loss of agriculture land and production.

Table 7-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	2	2%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	2	2%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	60	66%
9.	Loss of income and reduction in livelihood options	5	6%

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
10.	Employment of one family member of project affected family in railways	15	17%
11.	Loss of agriculture land and production	2	2%
12.	Involuntary displacement/ relocation	1	1%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	4	4%
Total		91	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Environmental Issues]
Under this section out of 83 filled out the forms only 32 (39%) responses were received. A total of 12 (38%) respondents said that trees and environment should be conserved during implementation of the DFC project, while 6 (19%) respondents said that DFCCIL need to ensure plantation of trees equivalent to number of trees cut, 3 (9%) respondents said that air pollution should be minimized, and 7 (22%) respondents said that due to the DFC project there is a possibility of increased noise and vibration which need to be reduced. In addition 2 (6%) respondents raised their concerns about the impact on biodiversity.

Table 7-2 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	1	3%
2.	Loss of tree	12	38%
3.	Increase in air pollution	3	9%
4.	Increase in noise pollution, vibrations etc.	7	22%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	1	3%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	6	19%
10.	Impact on biodiversity	2	6%
Total		32	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]
Under this section out of 83 filled of forms only 35 (42%) responses were received. A total of 10 (28%) respondents said that changes in the proposed alignment required. It should be parallel to the existing line. While 23 (66%) respondents requested to provide land within village available in public property. Some responses listed below could be categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 7-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	10	28%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	1	3%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	23	66%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	1	3%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		35	100%

Note: Multiple responses
Source: NKC

Appendix-09c-1
Materials Used for PCM for Draft ESIA

1. Invitation Letters (English and Gujarati)

【Invitation Letter to Govt. Officials English】

O/C

DFCC
डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

To,
Mamlatdar,
Mamlatdar Office,
Kadi,
Dist. Mehsana

Date: 5th Nov 2011

Sub: Public Consultation Meeting for Environmental and Social Impact Assessment (ESIA), Resettlement and Rehabilitation Plan (RRP) for Development of Dedicated Freight Corridor (Western: Wamaj – Iqbalgarh Section)

Dear Sir/Madam:

Ministry of Railways has taken up the Dedicated Freight Corridor Project (DFC) on the Western & Eastern Trunk routes to augment transportation capacity over these busy routes.

The Western Corridor from Jawaharlal Nahru Port Trust (JNPT) to Dadri/Tughlakabad (TKD) passes through Maharashtra, Gujarat, Rajasthan, Haryana and Delhi on the JNPT-Surat-Vadodara-Ahmedabad-Palanpur-Ajmer-Rewari alignment. The Western DFC is being funded by Japan International Cooperation Agency (JICA) under Government of Japan Scheme.

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) under Ministry of Railways, Government of India is the executing agency for the development of DFC. In the Western Corridor DFC Wamaj – Iqbalgarh Section, the proposed alignment passes through four districts namely Gandhinagar, Patan, Mehsana and Banaskantha in Gujarat.

Based on the request of the Government of India, an Environmental & Social Impact Assessment (ESIA) and a Rehabilitation and Resettlement Plan (RRP) are being prepared as per JICA's environmental and social safeguard policy, "JBIC Guidelines for Confirmation of Environmental and Social Considerations (2002)" and National Rehabilitation and Resettlement Policy 2007 (NRRP-2007) by DFCCIL with technical assistance from Nippon Koei Consortium (NKC).

The JICA's safeguard guidelines stipulate participation of varieties of stakeholders for ESIA and Project Affected Persons (PAPs) in the RRP formulating process by disseminating the project, ESIA and RRP related information and taking feedback from PAPs through Public Consultation Meetings (PCMs). In this regard, now 7 large scale PCMs are planned to be conducted from 14th November, 2011 to 21th November, 2011 for 50 affected villages in 3 districts namely Patan, Mehsana and Banaskantha in Gujarat

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhavan, New Delhi-110 001. Web : www.dfcc.in

state. In addition, a PCM will be held in Gandhinagar later. The detail programme including venues and time & date is enclosed in Attachment I and II.

In the PCMs, a presentation regarding the project information, ESIA and rehabilitation and resettlement provisions as per extant Government of India Policies viz. NRRP-2007 would be given to the PAPs. A handout in a Guajarati would also be distributed to the stakeholders including PAPs. DFCCIL would coordinate for organizing these PCMs with the assistance of NKC.

Considering the high priority assigned to this project by the Government of India, it would be highly appreciated if you could attend the PCMs or send your Representative to them as per the programme. The representative from DFCCIL/NKC would be contacting your office shortly in this regard.

Suitable action in this regard may please be taken.

Looking forward to your participation.

Thanking you.

Yours faithfully,

05-11-11

Chief Project Manager

Dedicated Freight Corridor Corporation of India Ltd.
Ahmedabad

Encl: Attachment –I (Schedule of PCMs)
Attachment-II (Program of PCM)

Attachment-I

Schedule of PCMs for Draft ESIA and RRP

	Date	Venue	Targeting Taluka	Targeting Village
1	14th Nov. 2011 (Mon)	Ajmata Mnadir	Palanpur	Jaselani, Sedarsana, Jagana, Palanpur, Sadarpur
2	15th Nov. 2011 (Tue)	To be confirmed	Vadgam	Dharewada, Manpura, Pasvadal, Kotadi, Chhapi, Majadar, Malosana,
3	16th Nov. 2011 (Wed)	Hotel Siddharth	Sidhpur	Khali, Lalpur, Sidhpur, Sujanpur
4	17th Nov. 2011 (Thu)	To be confirmed	Unjha	Bhandu, Jethal Vasna, Ithor, Unjha, Maktupur, Kamali
5	18th Nov. 2011 (Fri)	Vigyan Bhavan Hall	Mehsana	Moti Dau, Hebova, Punasan, Shobhasan, Kukas, Hedua Hanumant, Mehsana, Ramosana, Taleti, Nani Daue, Palodara
6	19th Nov. 2011 (Sat)	Oxford University	Mehsana	Navi Sedhavi, Jornang, Ambliyasan, Chaluva, Dholasan, Geeratpur, Ditasan, Jagudan,
7	21st Nov. 2011 (Mon)	To be confirmed	Kadi	Julasan, Ghumasan, Dangarava, Anadpura, Tankiya, Kaial, Mevad, Wamaj, Vansajara (k)
8	22nd Nov. 2011 (Tue)	Agresen Bhavan	Banaskantha	Sadarpur, Karjoda, Surajpura, Hebatpur, Chitrasani, Jaspuriya, Rajpuriya, Jethi, Iqbalgarh

Attachment-2

Program of PCM

Session	Time	Themes/Topics
Registration	9.30 - 10.00	Registration of Participants
Inauguration	10.00 – 10.15	• Inauguration of the PCM • Purpose of the PCM
Presentation of Study Results	10.15 – 12.00	• Project description [ESIA] • Important findings of the ESIA • Mitigation measures [RRP] • Compensation policies and Entitlements • Grievance Redressal
Question and Answer	12.00-13:50	• Question and answer
Valediction	13.50 – 14.00	• Formal closing

【Invitation Letter to Village Sarpanch_Gujarati】

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

પ્રતિ,
સરપંચશ્રી, તથા ગ્રામપંચાયત શ્રી,
.....ગ્રામ પંચાયત,
તા.
જી.

તારીખ

વિષય : સમર્પિત રેલ માર્ગ માટે સમર્પિત માર્ગ (Corridor) પરિયોજના (પશ્ચિમ : વામજ-ઇકબાલગઢ વિભાગ) તૈયાર કરવા, પર્યાવરણ અને સામાજિક અસરના મૂલ્યાંકન (ESIA) અને પુન:સ્થાપન અને પુનર્વસન આયોજન (RRP)માટે લોક પરામર્શ માટેની બેઠક

શ્રીમાન/સુશ્રી:

રેલ્વે મંત્રાલયએ પશ્ચિમ અને પૂર્વ વિસ્તારમાં સમર્પિત રેલ માર્ગમાટે સમર્પિત માર્ગ (Corridor) પરિયોજના (Dedicated Freight Corridor Project (DFC)) હેઠળ માર્ગ (Corridor) તૈયાર કરવાનું કામ હાથ પર લીધું છે, જેથી આ વિસ્તારની વ્યસ્ત રહેતી પરિવહન વ્યવસ્થામાં સરળતા આવે.

જવાહરલાલ નહેરૂ પોર્ટ ટ્રસ્ટ (JNPT)થી દાદરી/તુગલખાબાદ (TKD)નો પશ્ચિમ કોરીડોર જે મહારાષ્ટ્ર, ગુજરાત, રાજસ્થાન, હરિયાણા અને દિલ્હી, JNPT-સુરત, વડોદરા, અમદાવાદ, પાલનપુર, અજમેર, રેવરીની લાઇન પરથી પસાર થાય છે. પશ્ચિમ સમર્પિત રેલ માર્ગ(DFC)ને જાપાન ઇન્ટરનેશનલ કો-ઓપરેશન એજન્સી (JICA) તરફથી જાપાન સરકારની યોજના હેઠળ ફંડ આપવામાં આવેલ છે.

ભારત સરકારના રેલ્વે મંત્રાલય હેઠળના Dedicated Freight Corridor Corporation of India Limited (DFCCIL), સમર્પિત રેલ માર્ગ(DFC) તૈયાર કરનાર એજન્સી છે. સમર્પિત રેલ માર્ગ(DFC)ના પશ્ચિમ કોરીડોરમાં વામજ-ઇકબાલગઢ વિભાગમાં, સૂચિત માર્ગ/ગુજરાતના ચાર જિલ્લાઓ, ગાંધીનગર, પાટણ, મહેસાણા અને બનાસકાંઠામાંથી પસાર થાય છે. ભારત સરકારની વિનંતીના આધારે, પર્યાવરણીય અને સામાજિક અસરના મૂલ્યાંકન (ESIA) અને પુન:સ્થાપન તેમજ પુર્નવસન આયોજન (RRP) જાપાન ઇન્ટરનેશનલ કો-ઓપરેશન એજન્સી (JICA)ની પર્યાવરણ અને સામાજિક સુરક્ષા નીતિ મુજબ પર્યાવરણીય અને સામાજિક બાબતોને પુષ્ટિ આપવાની JBICની માર્ગદર્શિકા (૨૦૦૨) અને રાષ્ટ્રીય પુન: સ્થાપન અને પુર્નવસન નીતિ ૨૦૦૭ (NRRP 2007) જે Dedicated Freight Corridor Corporation of India Limited (DFCCIL) દ્વારા તૈયાર કરવામાં આવેલ છે, અને Nippon Keoi Consrtium (NKC)ની ટેક્નિકલ સહાયથી તૈયાર કરવામાં આવેલ છે.

જાપાન ઇન્ટરનેશનલ કો-ઓપરેશન એજન્સી (JICA)ની સુરક્ષા માર્ગદર્શિકા મુજબ વિવિધ હિત ધરાવનારાઓ દ્વારા પ્રોજેક્ટના અમલીકરણની કામગીરીમાં સહભાગી થવું જરૂરી છે, જેમકે સામાજિક અસરના મૂલ્યાંકન (ESIA) અને પુન:સ્થાપન અને પુનર્વસન આયોજન (RRP) કામગીરીમાં પરિયોજનાથી અસર પામતા લોકો(PAPs)માં, પરિયોજનાનો પ્રચાર કરીને, સામાજિક અસરના મૂલ્યાંકન (ESIA) અને પુન:સ્થાપન અને પુનર્વસન આયોજન

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhavan, New Delhi-110 001. Web : www.dfcc.in

(RRP) સંબંધિત જાણકારી આપીને, પરિયોજનાથી અસર પામતા લોકો (PAP) પાસેથી તેમના પ્રતિભાવ, લોક પરામર્શ બેઠકો (PCMs) દ્વારા મેળવીને, તેના આધારે કામગીરી કરવાની રહે છે.

લોક પરામર્શ બેઠક(PCMs)માં પરિયોજનાની માહિતી, સામાજિક અસરના મૂલ્યાંકન (ESIA) અને પુન:સ્થાપન અને પુનર્વસન આયોજનની જોગવાઇઓ (ભારત સરકારની RRA ૨૦૦૮ અને NRRP-2007 મુજબની નીતિના આધારે તૈયાર કરવામાં આવેલ) પરિયોજનાથી અસર પામતા લોકો(PAPs)ને આપવામાં આવશે. હિત ધરાવનારાઓને અને અસરગ્રસ્ત લોકો(PAPs)ને ગુજરાતીમાં પણ હસ્તપત્રિકા વહેંચવામાં આવશે. Nippon Keoi Consrtium (NKC)ની સહાયથી Dedicated Freight Corridor Corporation of India Limited (DFCCIL) આ લોક પરામર્શ બેઠક(PCMs)નું આયોજન કરવા માટે સંકલનની કામગીરી કરશે.

આ પરિયોજનાને ભારત સરકાર દ્વારા ઉચ્ચ અગ્રતા આપવામાં આવેલ છે, તે જોતાં લોક પરામર્શની બેઠકોમાં હાજરી આપવા આપને વિનંતી છે, જેથી આપ તેમાં આપના મૂલ્યવાન સૂચનો આપી શકો અને આયોજકો (Dedicated Freight Corridor Corporation of India Limited (DFCCIL), Nippon Keoi Consrtium (NKC)ના સહકારમાં લોક પરામર્શ બેઠક(PCMs)ના સરળ આયોજન (execution)માટે સમર્થન આપી શકો.

આપને વિનંતી કરવામા આવે છે કે આ પરામર્ષક બેઠકમાં આપના ગામની મહિલાઓ ભાગ લઈ શકે તેવા પ્રયત્ન કરવા વિનંતી. જેથી બેઠકમાં તેઓ ભાગ લઈ તેના પ્રતિભાવો ઘણા ઉપયોગી થઈ શકશે તેવી અમને આશા છે. આપની કક્ષાએ આ અંગે યોગ્ય કાર્યવાહી કરવા વિનંતી છે.

લોક પરામર્શક બેઠકની વિગત:

બેઠકની તારીખ : ૧૭/૧૧/૨૦૧૨

બેઠકનો સમય : ૧૦:૦૦ વાગ્યા

સ્થળ : ઉમિયા મંદિર પોલ, ઉંઝા

આપનો વિશ્વાસુ,

05-11-12

મુખ્ય પ્રયોજના પ્રબંધક,

ડેડીકેટેડ ફ્રેટ કોરિડોર કોર્પોરેશન ઓફ ઈન્ડિયા લીમીટેડ,
અમદાવાદ

ફોન નં.: ૦૭૯-૨૨૧૭૫૧૦૭.
૯૪૨૭૩૧૭૬૩૫.

2. Public Notices (English and Gujarati)

【Public Notice in English】

Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Undertaking)
42A/3 Civil Lines, Ajmer (Raj.) - 305001
Phone: - 0145-2630360, 0145-2625548 Fax: - 0145-2630360

NO AWI /EM/ PCM/62/ Iqbalgarh Date: 9th Nov 2011

PUBLIC NOTICE

Ministry of Railways has taken up the Dedicated Freight Corridor Project (DFC) on the Western & Eastern Trunk routes to augment transportation capacity over these busy routes.

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) under Ministry of Railways is the executing agency for the development of DFC. In the Wamaj to Iqbalgarh Section in the Western Corridor, the proposed alignment passes through four districts namely Gandhinagar, Patan, Mehsana and Gandhinagar in Gujarat. Ministry of Railways aims to implement the project in a participative manner with a people centric approach.

An Environmental and Social Impact Assessment (ESIA) of the Project was conducted and the draft ESIA report has been prepared for consultation with different stakeholders including the Project Affected Persons through Public Consultation Meeting (PCM).

In addition to ESIA, a Rehabilitation and Resettlement Plan (RRP) has been prepared by DFCCIL together with the Government of India following the National Rehabilitation and Resettlement Policy 2007 (NRRP-2007). The Project funding guidelines require participation of Project Affected Persons (PAPs) in preparation of RRP through Public Consultations.

DFCCIL is organising a PCM to discuss with PAPs and other stakeholders on details of i) DFC Project, ii) outcome of the ESIA and suggested mitigation measures, and iii) resettlement and rehabilitation provisions as per extant Government of India policies viz. NRRP-2007. A handout in Gujarati would also be distributed to the participants.

In this regard, persons interested in the Project and representatives of Project Affected Families whose right, title or interest in any house, land or other asset acquired or possessed, in full or in part, (mainly those who have been involved in the Baseline Survey and Census or Joint Measurement Survey); or whose business, occupation, work, or place of residence would be adversely affected by the project (mainly those who are subject to the RRP); are requested to attend this meeting as per the details given below:

Date: 22nd November 2011
Time: 9.30 am
Venue: Agresen Bhavan, Iqbalgarh
Taluka – Palanpur
District - Banaskantha

Chief Project Manager
Dedicated Freight Corridor Corporation of India Ltd.
Ajmer

For further information, please contact
CPM Office in Ajmer
Phone No – 0145 – 2630360

APM Office in Abu Road
Phone No – 02974 - 226514

【Public Notice in Gujarati】

DFCC
ડેડીકેટેડ ફ્રેટ કોરીડોર કૉર્પોરેશન

ડેડીકેટેડ ફ્રેટ કોરીડોર કૉર્પોરેશન ઑફ ઇન્ડિયા લિ.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

જાહેર નોટિસ

રેલ્વે મંત્રાલયએ પશ્ચિમ અને પૂર્વ રેલ માર્ગ પર, જે અતિ વ્યસ્ત રહે છે, તેના પર પરિવહનની સેવાઓમાં સરળતા લાવવામાટે Dedicated Freight Corridor Project (DFC) પરિયોજના હાથ ધરી છે.

Dedicated Freight Corridor Corporation of India Limited (DFCCIL), Dedicated Freight Corridor Project (DFC) દ્વારા પરિયોજનાને અમલમાં મૂકી રહી છે, જેમાં Multiple High Axle Load Freight Corridorનું નિર્માણ કરવાનું સામેલ છે, તેમાં કમ્પ્યુટરાઇઝડ કંટ્રોલ હશે અને તે ઉત્તરપ્રદેશમાં દાદરીને મહારાષ્ટ્રમાં સ્થિત જવાહરલાલ નહેરૂ પોર્ટ ટ્રસ્ટ(JNPT)ને જોડશે. આ લાઇન હરિયાણા, રાજસ્થાન અને ગુજરાત રાજ્યોમાંથી પસાર થશે. રેલ્વે મંત્રાલય આ પરિયોજનાનો અમલ ભાગીદારીથી લોક કેન્દ્રિત અભિગમ અપનાવીને કરવાનો લક્ષ રાખે છે.

રેલ્વે મંત્રાલય હેઠળના Dedicated Freight Corridor Corporation of India Limited (DFCCIL) આ Dedicated Freight Corridor Project (DFC) પરિયોજનાના અમલીકરણમાટેની એજન્સી તરીકે કામ કરશે. પશ્ચિમ વામજથી ઇકબાલગઢ વિભાગમાં, સૂચિત રેલમાર્ગ ચાર જિલ્લાઓ અનુક્રમે ગાંધીનગર, પાટણ, મહેસાણા અને બનાસકાંઠામાંથી પસાર થાય છે.

પશ્ચિમ Dedicated Freight Corridor Project (DFC) પરિયોજનામાં વામજથી ઇકબાલગઢ વિભાગમાં પર્યાવરણીય અને સામાજિક અસરનું મૂલ્યાંકન (ESIA) હાથ ધરવામાં આવ્યું હતું, અને સામાજિક અસરનું મૂલ્યાંકન (ESIA) નો અહેવાલનો એક મુસદ્દો તૈયાર કરવામાં આવેલ છે. ફંડ આપનાર એજન્સીએ આપેલ માર્ગદર્શિકા મુજબ, વિવિધ હિત ધરાવનારાઓની સહભાગિતા દ્વારા, તેમને પ્રોજેક્ટની વિગતોની જાણકારી આપીને સામાજિક અસરનું મૂલ્યાંકન(ESIA)ના અહેવાલના મુસદ્દાની વિગતોની માહિતી આપીને, સામાન્ય જનતા અને વિવિધ હિત ધરાવનારાઓ પાસેથી અભિપ્રાય અને સૂચનો મેળવવાના રહે છે અને તેમાટે લોક પરામર્શ બેઠક (PCMs) બોલાવવા પર ભાર મૂકવામાં આવેલ છે.

પશ્ચિમ DFC પરિયોજના (વામજથી ઇકબાલગઢ વિભાગ) સામાજિક અસરનું મૂલ્યાંકન (ESIA) ઉપરાંત પુન:સ્થાપન અને પુર્નવસન આયોજન (RRP), પણ Dedicated Freight Corridor Corporation of India Limited (DFCCIL)એ તૈયાર કરવાનું છે, જે NRRP 2007ના આધારે તૈયાર કરવામાં આવશે. પુન:સ્થાપન અને પુર્નવસન આયોજન (RRP) તૈયાર કરતી વખતે, ફંડ આપનાર એજન્સીની માર્ગદર્શિકા મુજબ, પુન:સ્થાપન અને પુર્નવસન આયોજન(RRP)માં અસરગ્રસ્ત લોકો(PAP)ની સહભાગીદારીથી કામગીરી કરવાની રહે છે. આ સહભાગીદારી, અસરગ્રસ્ત લોકો(PAPs)ને પરિયોજનાની વિગતોની જાણકારી આપીને અને જેમની જમીન અથવા માળખાને અસર થાય તેમ છે, તેમને પ્રોજેક્ટ દ્વારા તેની જાણકારી આપવાની રહે છે.

ઉપરની વિગતોએ Dedicated Freight Corridor Corporation of India Limited (DFCCIL), લોક પરામર્શ બેઠક(PCM)ના આયોજન માટે સંકલનની કામગીરી કરશે. બેઠકમાં (૧) Dedicated Freight Corridor Project(DFC)ની વિગતો પર, (૨) સામાજિક અસરનું મૂલ્યાંકન(ESIA)ના પરિણામો અને સૂચવવામાં આવેલા ઉપાયો, અને (3) પુન:સ્થાપન અને પુર્નવસન આયોજન અને રાષ્ટ્રીય પુન: સ્થાપન અને પુર્નવસન નીતિ ૨૦૦૭

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel.: 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhawan, New Delhi-110 001 Web : www.dfcc.in

(NRRP 2007) મુજબની જોગવાઇઓની વિગતો પર પ્રેઝન્ટેશન આપવામાં આવશે. ગુજરાતી ભાષામાં આ વિગતોની હસ્તપત્રિકા પણ વહેંચવામાં આવશે.

આ સંદર્ભે આ પરિયોજનામાં રસ ધરાવતા અને પરિયોજનાથી અસરગ્રસ્ત કુટુંબના એક એવા પ્રતિનિધિ જેમના મકાન, જમીન અથવા અન્ય મિલ્કતને જે તેમની માલિકીની હોય કે કે મેળવી હોય તેને અસર થતી હોય અને તેમના હક, માલિકી અથવા હિત/અધિકારને અંશતઃ અથવા પૂરેપૂરી અસર થતી હોય, (મુખ્યત્વે એવા લોકો જેઓ બેઝલાઇન સર્વે અથવા વસ્તી ગણતરી અથવા સંયુક્ત માપણી સર્વે વખતે સામેલ કરવામાં આવ્યા હોય); અથવા જેમના ધંધા, વ્યવસાય, કામ અથવા રહેઠાણની જગ્યાને વિપરીત અસર થવાની હોય (ખાસ કરીને એવા લોકો જેમને પુનઃસ્થાપન અને પુર્નવસન આયોજન (RRP) લાગુ પડતું હોય તેમને આ બેઠકમાં હાજર રહેવા વિનંતી કરવામાં આવે છે.

આપને વિનંતી કરવામા આવે છે કે આ પરામર્ષક બેઠકમાં આપના ગામની મહિલાઓ ભાગ લઈ શકે તેવા પ્રયત્ન કરવા વિનંતી. જેથી બેઠકમાં તેઓ ભાગ લઈ તેના પ્રતિભાવો ઘણા ઉપયોગી થઈ શક્શે તેવી અમને આશા છે. આપની કક્ષાએ આ અંગે યોગ્ય કાર્યવાહી કરવા વિનંતી છે.

લોક પરામર્શક બેઠકની વિગત: તા. ૧૪/૧૧/૨૦૧૧

બેઠકની તારીખ : આજમાતા મંદીર હોલ; દૂધ મંડળીની બાજુમાં; ગામ- સેદ્રાસણા; તા- પાલનપુર; જિ. બનાસકાંઠા.

બેઠકનો સમય : ૧૦:૦૦ વાગે

સ્થળ : આજમાતા મંદિર હોલ, સેદ્રાસણા

આપનો વિશ્વાસુ,

(signature) 05-11-11

મુખ્ય પ્રોજેક્ટ પ્રબંધક,

ડેડીકેટેડ ફ્રેટ કોરિડોર કોર્પોરેશન ઓફ ઈન્ડિયા લીમીટેડ,
અમદાવાદ

ફોન નં.: 079-22175107 (2), 9427317634.

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3. Handout (English and Gujarati)

[Handout_English]

(The same handout was used during PCM organized on 31st July 2012 in Gandhinagar District)

PUBLIC CONSULTATION MEETING FOR DEVELOPMENT OF DEDICATED FREIGHT CORRIDOR (DFC) PROJECT PHASE-1 (Wamaj to Iqbalgadh)

MINISTRY OF RAILWAYS GOVERNMENT OF INDIA AND DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (DFCCIL)

Environmental & Social Management Plan (ESMP) and Environmental & Social Monitoring Plan (ESMoP)

ESMP & EMoP are prepared for (1) providing measures to mitigate identified adverse environmental and social impacts; and (2) providing the environmental & social monitoring plan with responsibility at each party. ESMoP proposes to conduct the following major monitoring activities:

[Biodiversity]
- Recording plantation progress and site observation regularly.
- Site observation from preliminary and secondary data with officers of Balaram Ambaj Wildlife Sanctuary.

[Noise & Vibration]
- Measurement according to the national standard and international standards at the construction and operation phases.

[Water Quality]
- Sampling & analysis of water and wastewater according to the national water quality standard at the construction and operation phases.

[Air Quality]
- Sampling & analysis for selected parameters (e.g. dust & exhaust emission) according to the national ambient air quality standard during the construction phase.

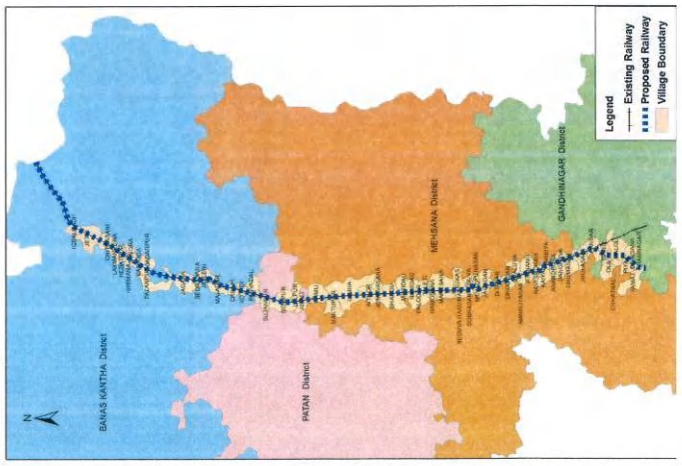
[Land Acquisition & Livelihood Stabilization]
- Monthly check of compensation payment record and problems raised by communities at the planning and construction phases.

For any further information, please contact:

DFCCIL Headquarters
Add: 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi –110001
Tel: (0)11-2345890, Fax: (0)11-23454701
Chief Project Manager, Ahmedabad
Add: 1st Floor, Old DRM Office Building, Kalupur, Ahmedabad-380002
Tel: (0)79-22175107, Fax: (0)79-22163101
Chief Project Manager, Ajmer
Add: 42A/3, Civil Lines, Ajmer-305001
Tel: (0)145-2625548, Fax: (0)145-2630360
E-mail Address: dfc.package3@gmail.com

General Features:

The Project stretches approximately 140km between Wamaj and Iqbalgadh in Gujarat involving 68 villages in total at Gandhinagar, Mehsana, Patan and Banaskantha districts, and includes junction stations, crossing stations, important & major bridges. Maximum speed is planned at 100 km/hr.



Study Area

Objectives of Environmental and Social Impact Assessment (ESIA) and Public Consultation Meeting (PCM):

The general objectives of ESIA and PCM for Phase 1 (Wamaj – Iqbalgadh Section) in the DFC Project (the Project) are outlined below:

[ESIA]

- Identifying and assessing potential environmental and social impacts due to implementation of the Project;
- Formulating an implementable Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) to avoid/minimize the identified impacts and an appropriate monitoring and supervision mechanism to ensure its implementation; and
- Recommending suitable institutional mechanisms to monitor and supervise effective implementation of ESMP and ESMoP

[PCM]

- Holding an opinion exchange process in the ESIA study by sharing potential positive and negative environmental and social impacts and proposed mitigation measures; and
- Ensuring transparency of decision-making process of the Project by enhancing public involvement into project planning.

Noise & vibration measurement survey

Natural environmental survey

Major Potential Environmental and Social Impacts and Proposed Mitigation Measures

Parameter	Stage	Potential Impacts	Proposed Mitigation Measures
Natural Environment			
Biodiversity	Construction & Operation	Increasing risks of; i) distraction/loss of habitat and wildlife, and ii) disturbance of wildlife movement.	- Compensatory plantation with local species - Green Belt Development - Preparation of culverts and underpasses to facilitate wildlife movement
Pollution Control			
Noise & Vibration	Construction	Increasing noise & vibration level due to operation of construction equipments	- Advance notice of construction activities to neighbors - Installing noise barriers at residential area and sensitive area if necessary - Ensuring correct track geometry by advanced measurement
	Operation	Increasing noise & vibration level due to train operation	
Water Quality	Construction	Deterioration of water quality such as turbidity by the earth work.	- Prevention of contamination directly to river - Appropriate maintenance of stockpiled soil and loose materials - Preparation of emergency mitigations such as floating oil booms
Air Quality	Construction	Generating dust from earthmoving and construction work.	- Plantation along the DFC line - Sprinkling of water - Using low emission construction equipments and vehicles
Social Environment			
Land Acquisition	Before Construction	Land acquisition of private land and involuntary resettlement	Providing compensation for the affected land and structures as per the policies to be established in the RRP
Local Economy/ Livelihood	Before Construction & Construction	- Affecting source of income at some extent due to land acquisition. - Increasing local business opportunities due to construction activities	- Awarding appropriate rehabilitation programs - Providing job opportunities related to the Project to local people and project affected people
Social Infrastructure	Construction	Disturbed accessibility to local social infrastructure such as religious places and water pipelines for domestic water supply and irrigation system to some extent	Securing a temporary passage to local infrastructure and religious places during construction
	Operation		- Securing access to local infrastructure including religious places by providing a road, bridge and/or underpass - Arrangement of cross drainage works such as bridges, culverts, etc.

[Handout_Gujarati]

(The same handout was used during PCM organized on 31st July 2012 in Gandhinagar District)

લોકપરામર્શ બેઠક (PCM)

સમર્પિત રેલ માર્ગ પ્રોજેક્ટ (DEC)ના વિકાસ માટે તબક્કો-૧ (વામજ - ઈકબાલગઢ વિભાગ)

રેલ્વે મંત્રાલય, ભારત સરકાર
અને
ડેડીકેટેડ ફ્રેટ કોરિડોર કોર્પોરેશન ઓફ
ઈન્ડીયા લીમીટેડ (DFCCIL)

INDIAN RAILWAYS

DFCC

સામાન્ય લાક્ષણિકતાઓ

આ પ્રોજેક્ટ વામજ અને ઈકબાલગઢ વચ્ચે ગુજરાતમાં ૧૪૦ કિ.મી.ની લંબાઈના વિસ્તારમાં ફેલાયેલ છે અને ૧૧૫ ગામો, પાટણ, મહેસાણા, પાટણ અને બનાસકાંઠા [જેલ્લા-૧૧ ૬૮ ગામોમાંથી પસાર થાય છે. તેમાં જંકશન સ્ટેશનો, ક્રોસિંગ સ્ટેશનો, અગોલનના અને મુખ્ય પુલો જેની મહતમગતિ મર્યાદા ૧૦૦ કિ.મી. પ્રતિ કલાક છે, તેમનો સમાવેશ થાય છે.

કોર્પોરેટ વહુ બાબતોની માટે સંપર્ક કરો

(DFCCIL) મુખ્ય મથક
પાંચમો માળ, પ્રગતિ મેદાન, મેટ્રો સ્ટેશન બિલ્ડીંગ કોમપ્લેક્ષ,
નવી દિલ્હી - ૧૧૦૦૦૧
ટેલીફોન : (ઓ) ૧૧-૨૩૪૫૮૯૦, ફેક્સ : (ઓ) ૧૧-૨૩૪૫૪૦૦૧

ચીફ પ્રોજેક્ટ મેનેજર, અમદાવાદ
પ્રથમમાળ, જૂની ગ્રી.આર.એમ. બિલ્ડીંગ, કાલુપુર,
અમદાવાદ - ૩૮૦૦૦૨.ટેલીફોન : (ઓ) ૦૭૯-૨૨૧૭૫૧૦૭,
ફેક્સ : (ઓ) ૦૭૯-૨૨૧૬૩૦૧

ચીફ પ્રોજેક્ટ મેનેજર, વાપર્વ
સરનામું : ૪૨ એ /૩, સિવિલ લાઈન્સ, અજમેર - ૩૦૫ ૦૦૧.
ટેલીફોન : (ઓ) ૧૪૫-૨૬૨૫૫૪૮,
ફેક્સ : (ઓ) ૧૪૫-૨૬૩૦૩૬૦
ઈ-મેઈલ : dfc.package3@gmail.com

સામાજીક વ્યવસ્થાપન આયોજન (ESMP) અને સામાજિક નિરીક્ષણ આયોજન (ESMoP)

નીચેની બાબતો માટે પર્યાવરણ અને સામાજીક વ્યવસ્થાપન આયોજન તૈયાર કરવામાં આવેલ છે.

- પર્યાવરણ પર વિપરીત અસર કરનાર બાબતોને દૂર કરવા / ઘટાડવા પરવા માટેના ઉપાયો પૂરા પાડવા માટે.
- પર્યાવરણીય અને સામાજીક દેખરેખ માટેનું આયોજન, દરેક પક્ષની જવાબદારીઓ સાથે, પૂરો પાડવા માટે

નીચેની બાબતો પર દેખરેખ રાખવા માટે પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન(ESMoP) તૈયાર કરવામાં આવેલ છે.

<u>વાતાવરણ ગુણવત્તા</u>

- વિવિધ પારામિતિના નમૂના લઈ તેનું રાષ્ટ્રીય પરિસરનું વાતાવરણની ગુણવત્તાના ધોરણો મુજબ વિશ્લેષણ કરવું. આ કામગીરી બાંધકામતબક્કામાં કરવાની રહેશે.

<u>પાણીની ગુણવત્તા</u>

- પાણીના નમુના લઈ, ઉપયોગી પાણીની અને બિન ઉપયોગી પાણીની ચકાસણી કરવાના ધોરણો / પદ્ધતિ મુજબની ચકાસણી, બાંધકામના કામગીરીના તબક્કામાં કરવી.

<u>ઘોંઘાટ અને ધ્રુજારી</u>

- ઘોંઘાટ અને ધ્રુજારીના સ્તરની ચકાસણી રાષ્ટ્રીય નિયમો અને આંતર રાષ્ટ્રીય ધોરણો મુજબ બાંધકામના તબક્કે અને પ્રોજેક્ટના વાસ્તવિક અમલના તબક્કે કરવામાં આવશે.

<u>જૈવિક વિવિધતા</u>

- વૃક્ષોના ઉછેરનો અને સ્થળના અવલોકનોનો રેકર્ડ રાખવામાં આવશે.
- પ્રાથમિક અને ગૌણ ડાટાની મદદથી પ્રોજેક્ટના સ્થળનું નિરીક્ષણ. આ નિરીક્ષણ બાબતમાંબાબ્ત વન્ય પ્રાણીઓના અભ્યાસસ્થળના અધિકારીઓ સાથે રહીને કરવામાં આવશે. <u>જુનીત સંપાદન અને રોજગારની સ્થિતિ</u>
- વળતર ચૂકવણીના રેકર્ડ અને લોકો હાર રજૂ કરવામાં આવતી સમસ્યાઓની, આયોજન અને બાંધકામતબક્કે દર મહિને ચકાસણી.

પર્યાવરણીય અને સામજિક અસરનું મૂલ્યાંકન (ESIA) અને લોકપરામર્શ બેઠક (PCM) નો હેતુ

સમર્પિત રેલ માર્ગ (DEC) પ્રોજેક્ટ (વામજ - ઈકબાલગઢ વિભાગ) માં પર્યાવરણીય અને સામજિક અસરનું મૂલ્યાંકન (ESIA) અને લોક પરામર્શ બેઠક (PCM) ના સામાન્ય હેતુઓ નીચે મુજબ છે.

પર્યાવરણીય અને સામાજિક અસરનું મૂલ્યાંકન (ESIA)

- પ્રોજેક્ટના અમલીકરણના કારણે પર્યાવરણીય અને સમાજ પર સંભાવ્ય અસરો શોધી કાઢવી.
- અમલ કરી શકાયતેવો પર્યાવરણ અને સામાજિક વ્યવસ્થાપન આયોજન (ESMP) અને પર્યાવરણ અને સામાજિક નિરીક્ષણ યોજના (ESMoP) તૈયાર કરવું. જેથી શોધી કાઢવામાં આવેલ સંભવનીય અસરો નાબૂદ / હળવી કરી શકાય અને તેના અસરકારક અમલ માટે દેખરેખનું એક યોગ્ય તંત્ર તૈયાર કરી શકાય.
- યોગ્ય સંસ્થાકીય તંત્રની કાર્યપધ્ધતિની ભલામણ કરવામાં આવે, જે પર્યાવરણ અને સામજિક વ્યવસ્થાપન આયોજન (ESMP) અને પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન (ESMoP) નો અસરકારક અમલ કરી શકે.

લોક પરામર્શ બેઠક (PCM)

- પર્યાવરણ અને સામાજિક અસરના મૂલ્યાંકન (ESIA) અભ્યાસ બાબતે, અભિપ્રાયોની આપ-લેની પ્રક્રિયા હાથ ધરવા, જેથી પર્યાવરણ અને સામાજિક અસરના મૂલ્યાંકન (ESIA) ના સકારાત્મક અને નકારાત્મક પાસાઓની જાણકારી મળે અને તે હળવા કરવાના સૂચવે
- પ્રોજેક્ટર બાબતે નિર્ણયો લેવાની પ્રક્રિયાઓમાં પારદર્શિતા રહે તે માટે પ્રોજેક્ટના આયોજનમાં લોકોની સહભાગીતામાં વધારો કરવાનો છે.
- મુખ્ય સંભાવ્ય પર્યાવરણ અને સામાજિક અસરો અને તેને હળવા કરવા માટેના સૂચિત ઉપાયો

પરિમિતિ	પ્રોજેક્ટનો તબક્કો	સંભાવ્ય અસરો	તે હળવા કરવા માટેના સૂચિત ઉપાયો
કુદરતી પર્યાવરણ			
જૈવિક વિવિધતા	નિર્માણ અને પ્રોજેક્ટનો વાસ્તવિક અમલ	૧. જંગલો અને જંગલી પ્રાણીઓને ખલેલ / નુકશાન ૨. જંગલી પ્રાણીઓની ગતિવિધિમાં ખલેલના જોખમમાં વધારો થાય	- સ્થાનિક જાતોના વૃક્ષો કપાવીને જંગલોને થતું નુકશાન ઓછું કરવામાં આવશે. - નાળા અને ગરનાળા તૈયાર કરવામાં આવશે, જેથી જંગી પ્રાણીઓની ગતિવિધિ સરળ બને.
પ્રદૂષણ નિયંત્રણ			
વાતાવરણની ગુણવત્તા	બાંધકામ	બાંધકામઅને ખોદકામને કારણે વાતાવરણમાં ધૂળનું પ્રમાણ વધશે.	- સમર્પિત રેલ માર્ગ પ્રોજેક્ટ ના માર્ગ પર વૃક્ષો ઉગાડવામાં આવશે. - પાણી છાંટીને. - ઓછું પ્રદૂષણ કરે તેવા સાધનો અને વાહનોનો ઉપયોગ કરીને
પાણીની ગુણવત્તા	બાંધકામ	માટીકામને કારણે પાણીમાં માટીનું પ્રમાણ વધે	- બગાડને સીધું નદીમાં ભળતું અટકાવવું. - માટીના ઢગલા અને છૂટક સામગ્રીની યોગ્ય રીતે જાળવણી કરવી - તાદીકની પરિસ્થિતિ સમયેના ઉપાયોની તૈયારી કરવી. જેમકે તરતા લાકડાની આડ
ઘોંઘાટ અને ધ્રુજારી	બાંધકામ પ્રોજેક્ટનો વાસ્તવિક અમલ	બાંધકામોના સાધનોના હલનચલનથી ઘોંઘાટ અને ધ્રુજારીના સ્તરમાં વધારો	-પાડોશીઓને બાંધકામ બાબતે અગાઉથી જાણ કરવી. - રહેઠાણના અને સંવેદનશીલ વિસ્તારોમાં, અવાજ રોકવાના સાધનો નાખવામાં આવશે. - અગાઉથી માપણી લઈ, સાચા ભૌમિતિક ટ્રેક તૈયાર કરવાની ખાતરી રાખવી.
સામજિક પર્યાવરણ			
જમીન સંપાદન	આયોજન	ખાનગી જમીનોનું સંપાદન અને ઈચ્છા વિનાનું પુનઃસ્થાપન	- પુનઃસ્થાપન અને પુનર્વસન આયોજન માટે સ્થાપિત કરવામાં આવેલ નીતિ મુજબ અસરગ્રસ્તોને જમીન / બાંધકામ માટે યોગ્ય વળતર આપવું.
સ્થાનિક અર્થ વ્યવસ્થા/ રોજગાર	આયોજન અને બાંધકામ	- જમીન સંપાદનના કારણે આવકના સ્ત્રોત પર અસર - સિંચાઈ અને પીવાના પાણીની પાઈપલાઈનને અસર થવાની સંભાવના છે. - સ્થાનિક વ્યાપાર પ્રવૃત્તિમાં નિર્માણ કામના કારણે વધારો.	- પુનઃસ્થાપન માટે યોગ્ય કાર્યક્રમો આપવા. - પ્રોજેક્ટની અસરગ્રસ્ત લોકોને અને સ્થાનિક લોકોને પ્રોજેક્ટ સંબંધી રોજગારની તકો પૂરી પાડવી
સામજિક માળખું	બાંધકામ પ્રોજેક્ટરનો વાસ્તવિક અમલ	૧. સ્થાનિક સામાજિક માળખા સુધી પહોંચવામાં રૂકાવટ અને ૨. ધાર્મિક સ્થાનો સુધી પહોંચવામાં રૂકાવટ આવશે. જેથી આવા સ્થાનો સુધી પહોંચી શકાય.	- બાંધકામની કામગીરી દરમ્યાન સ્થાનિક માળખાકીયા સુવિધાઓ અને ધાર્મિક સ્થાનો સુધી પહોંચવા માટે રસ્તા બનાવવામાં આવશે. - યોગ્ય સુવિધાઓ જેવી કે, પુલ અને નાળાઓ ઉપર નાના પુલ બનાવવામાં

4. Presentation Materials (English and Gujarati)

[Presentation material _ English]

DEVELOPMENT OF DEDICATED FREIGHT CORRIDOR PROJECT
(PHASE-1 Wamaj to iqbalgarh Section)

Draft ENVIRONMENT & SOCIAL IMPACT ASSESSMENT (ESIA)
Draft Resettlement and Rehabilitation Plan (RRP)

PUBLIC CONSULTATION MEETING (PCM)

XXXX DISTRICT

XX/11/2011

Section-1
Outline of DFC Project

Today's Agenda

Section-1
1. Outline of Entire DFC Project
2. Outline of the Project (Wamaj - Iqbalgarh)

Section-2
1. Objectives of the ESIA Study
2. Summary of Impact Assessment Results with Proposed Mitigation Measures
3. Break

Section-3
1. Objectives of the RRP Study
2. Relevant Legislations
3. Proposed Compensation Package
4. Questions and Answers

1. Outline of the Entire Project

Objectives of the Public Consultation Meetings

1. Receiving opinions from the public and to feed-back the same to the planning process of the Project
2. Incorporating public views and opinions to ESIA and RRP studies
3. Exchanging opinion in the study process by sharing potential positive/negative environmental and social impacts
4. Presenting results of the draft ESIA and the draft RRP studies including suggested mitigation measures

1-1. Project Proponent

Project Proponent

MINISTRY OF RAILWAYS (MOR), GOVT. OF INDIA

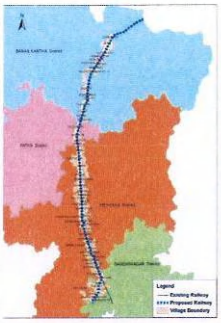
Project Implementing Agency

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LTD. (DFCCIL)

■Established as "Special Purpose Vehicle" to undertake construction, operation and maintenance of Dedicated Freight Corridor (DFC) from MOR

1-2. Objective of the Project

- **Develop the Multiple High Axle Load Freight Corridor has been conceived to facilitate faster and safer mass transportation of goods in bulk.**
- **Contribute to sustaining and boosting the present trends of economic growth.**
- **Create job opportunities, increase household income and serve public interest.**



2-1. Project Scope

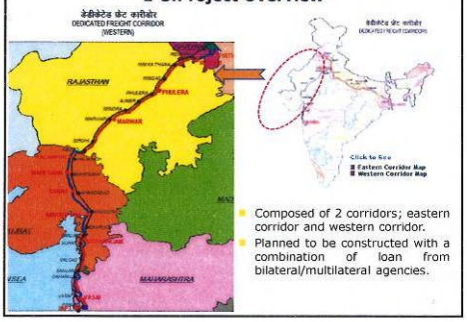
Proposed Facilities:
- Gandhinagar – Approx.14 Km
- Mehsana – Approx. 64 Km
- Patan – Approx.12 Km
- Banaskantha – Approx.47 Km

Total – Approx. 140 Km

Proposed Facilities:
- Terminal Stations
- Junction Stations
- Crossing Stations
- Major and Important Bridges
- Minor Bridges

Project Schedule:
ESIA & RRP Studies: Jul 2011 - Dec 2011 (planned)

1-3.Project Overview



- Composed of 2 corridors; eastern corridor and western corridor.
- Planned to be constructed with a combination of loan from bilateral/multilateral agencies.

Section-2
Outline of Draft ESIA

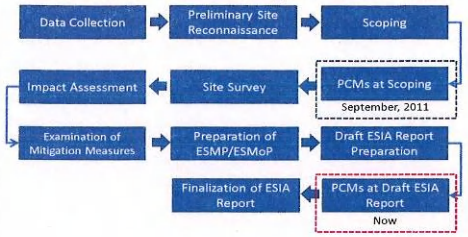
2. Outline of the Project (Wamaj – Iqbalgarh Section)

1.Objectives of the ESIA Study

- To collect environmental & social baseline information in order to identify and assess potential impacts on social/ natural environment caused by the Project.
- To prepare the mitigation measures, namely the Environmental & Social Management Plan (ESMP), Environmental & Social Monitoring Plan (ESMoP) for necessary actions to address the potential environmental and social impacts.

1. Objectives of the ESIA Study (Continued)

Public Consultation Meetings in ESIA Procedure



2-3 Major Environmental Impacts and Mitigation Measures (Pollution Control)

Type	Phase	Impact Assessment	Mitigation Measures
Noise	Construction	Temporal noise level might be increased due to operation of construction equipment.	-Advance notice of construction activities to neighbors -Regular maintenance of construction equipments
	Operation	Noise level might be increased due to daily train operation.	-Introducing temporal noise barriers during construction and permanent noise barriers during operation, wherever necessary
Vibration	Construction	Vibration level might be increased temporally due to operation of construction equipments.	-Advance notice of construction activities to neighbors -Ensuring correct track geometry by advanced measurement
	Operation	Vibration level might be increased permanently due to train operation.	

2. Summary of Impact Assessment Results with Proposed Mitigation Measures

2-1. Major Study Items Identified at Scoping

Natural Environment	Social Environment
- Flora, fauna, biodiversity ✓Endangered species ✓Tree census - Noise and vibration measurement - Water quality measurement - Air Quality	- Socio-economic aspects ✓Land acquisition ✓Livelihood ✓Vulnerable groups - Social Infrastructure

2-3 Major Environmental Impacts and Mitigation Measures (Pollution Control: Continued)

Type	Phase	Impact Assessment	Mitigation Measures
Air Pollution	Construction	Particulate matter would be predominant pollutant affecting air quality in vicinity of construction sites.	-Plantation along the DFC line -Proper storage of construction materials -Covering payload area of the trucks or dumpers to prevent spillage -Sprinkling of water -Low emission construction equipment and vehicles -Regular air quality monitoring
Water Pollution	Construction	Deterioration of water quality such as turbidity by the earth work.	- Retaining site drainage in purpose-built lagoons for appropriate discharge of waste water -Appropriate maintenance of stockpiled soil and loose materials -Preparation of emergency mitigations such as floating oil booms

2-2 Major Environmental Impacts and Mitigation Measures (Natural Environment)

Type	Phase	Impact Assessment	Mitigation Measures
Biodiversity	Construction & Operation	-Habitat and wildlife distraction/loss might be caused due to cutting trees at the entire length of the alignment. -Risks of wildlife disturbance and restriction of wildlife movement might be increased.	-Compensatory Plantations -Green Belt development -Local species to be planted -No honking in 3km distance from the sanctuary -Preparation of culverts and underpasses to facilitate wildlife movement

2-4 Major Social Impacts and Mitigation Measures

Type	Phase	Impact Assessment	Mitigation Measures
Land Acquisition & Livelihood	Before Construction	Total 1,867 plots in 68 villages will be affected. Livelihood would be affected due to land acquisition.	-Provision of proper compensation and livelihood assistance. -More details to be presented at Section-3: Draft RRP Outline
Social Infrastructure	Construction	Disturbed accessibility to local social infrastructure such as religious places and water pipelines for domestic water supply and irrigation system will be predicted to some extent.	Securing passage to local infrastructure and religious places during construction
	Operation		- Securing accessibility to local infrastructure and religious places by preparing roads, bridges and/or underpasses if necessary - Arrangement of cross drainage works such as bridges, culverts, etc.

2-5. Environment & Social Monitoring Plan (Summary)

During construction and operation phases, environmental & social impacts and mitigation activities will be monitored by SEMU (Social & Environmental Management Unit) in DFCCIL

Type	Phase	Monitoring Activity
Biodiversity (Plantation, Fauna disturbance)	Construction	Reporting plantation progress and comparison of progress every 6 months.
	Operation	Checking the site condition each season.
Noise & Vibration	Construction	Measuring noise & vibration level according to the national standards (noise) and international standards (vibration).
	Operation	
Water quality	Construction	Sampling & analysis of river water at the construction site and wastewater as per the national water quality standard
	Operation	
Air quality	Construction	Sampling & analysis of air for selected parameters (e.g. dust & exhaust emission) according to the national air quality standard
Land Acquisition & Livelihood	Planning	Monthly check of compensation payment record and problems raised by communities.
	Construction	
Access to Social Infrastructure	Planning	Monthly/quarterly check of problems raised by communities.
	Construction	

1. Objectives of the RRP Study

1. To identify the Project Affected Persons (PAPs) of the Project and potential negative impacts by the Baseline Survey and Census.
2. To minimise the negative impacts as much as possible by considering alternatives.
3. To prepare the compensation policy, namely the Entitlement Matrix to mitigate expected negative impacts of land acquisition and resettlement.
4. To collect opinions/suggestions from PAPs and stakeholders via PCMs and information disclosure to incorporate them into the Final RRP.

2-6. Further Information Disclosure of the Draft ESIA Report and Your Comments

Draft and Final ESIA Report will be available for public viewing in the following locations:

Draft ESIA

- Summary of Draft ESIA in Gujarati will be available in Sarpanch offices of all the project affected villages from late Nov. 2011 for 1 week.
- Full report of Draft ESIA will be available in English at DFCCIL Head Office, Chief Project Manager (CPM) Ahmedabad and Ajmer, major stations along the proposed DFC alignment, and respective District Offices from late Nov. 2011 for 1 week.
- Comments can be submitted to the DFCCIL Head Office or respective CPM offices either by post or through email at dfc.package3@gmail.com from late Nov. 2011 for 1 week.

Final ESIA

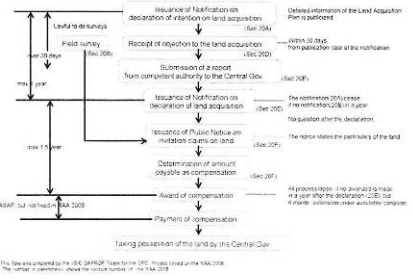
- Final ESIA report will be available in the same locations from late Dec. 2011 (planned).

2. Relevant Legislations

2-1. Basic Legislation & Policy of Land Acquisition and Rehabilitation & Resettlement for DFC Project

- Railways (Amendment) Act, 2008
  - The Act under which the land acquisition is being done by the DFC Project (declared as Special Railway Project).
  - Land Acquisition Act 1894 is not applied to the land acquisition under this Act.
- National Rehabilitation & Resettlement Policy, 2007
  - In DFC project, a narrow stretch of Land is to be acquired. Para 7.19 of NRRP 2007 is basically applicable to DFC project
- State Legislation

Section-3
Outline of Draft RRP



2-2. Flowchart of the Land Acquisition Process under Railways (Amendment) Act, 2008

2-3. Brief Explanations of Important Sections of RAA 2008

Power to Acquire Land (Section 20A)

- Declaration of intention to acquire land required for execution of a special railway project by notification.
- Brief description of land and special railway project.
- Notification to be published in two local news papers, one of which shall be in vernacular language.

Hearing of Objections (Section 20D)

- Objections must be made by interested persons to Competent Authority within 30 days from the date of publication of the notification under sub-section (1) of section 20A.
- Every objection will be judged by CA.
- Final order made by CA.

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)

Cut-off Date for Entitlement

For titleholders, non-titleholders (encroachers and squatters), tenants, users of the land plot including kiosk, vendors, etc., the date on which notification is issued as per the notification prescribed under the Section 20A. If more than one notification 20A is issued, the date of publication of the latest notification is applicable.

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)

Declaration of Acquisition of Land (Section 20E)

- On publication of the declaration under sub-section (1) of 20E, the land shall vest absolutely in the Central Government free from all encumbrances.
- This declaration to come within 12 months of notification under 20A . The period, however, excludes time wasted due to stay, on disputed property etc by court.
- Above Declaration not questionable by any Court / Authority.

Determination of amount payable as compensation (Section 20F)

- Amount to be paid as compensation shall be determined by an order of CA.
- CA shall make an award under this section within a period of one year from the date of publication of the declaration.
- All process lapse, if no awarded is made in a year after the declaration (20E), but 6 month-extension under avoidable condition.
- In case of delay, additional (not less than) 5% interest should be paid for each month delay.

3. Proposed Compensation Package of DFC Project (Summary)

3-1.Compensation for Land

3-2.Compensation for Assets

3-3.Rehabilitation and Resettlement Assistance

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)

Calculation of Compensation Amount (Section 20F)

- The market value of the land on the date of publication of the notification under Section 20A [8(a), Section 20F]
- Damage to land PAP due to severance of land from other land [8(b), Section 20F]
- Damage of PAP due to the acquisition affecting other immovable property in any manner or his earnings [8(c), Section 20F]
- Expenses incurred by PAP changing his residence or place of business as a result of land acquisition [8(d), Section 20F]
- In addition to the market value of land as above provided, the competent authority or the arbitrator, as the case may be, shall in every case award a solatium of 60% on such market-value, in consideration of the compulsory nature of the acquisition.

3-1. Compensation for Land

Land compensation as per RAA 2008 consists of

- (i) cash compensation for the land at market value, which will be determined as follows as mentioned in Section 20G of RAA 2008

The minimum land value, if any, specified in the Indian Stamp Act,1899, for registration of sale deeds in the area, where the land is situated;

↑↓ **whichever is higher**

The average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than fifty percent of the sale deeds registered during the preceding three years, where higher price has been paid.

- (ii) 60% solatium on the compensation determined in the above (Section 20F(9) of RAA 2008).

3-1. Compensation for Land (Continued)

- **OR** a land compensation rate approved by any authority of State Government can be adopted by CA in lieu of (i) and (ii).
- Additional ex-gratia amount of Rs 20,000 (para 7.19 NRRP) for those losing land up to 1,500 sqmts plus @Rs.15/sqmt for area acquired above 1,500 sqmts.
- Stamp duty and registration charges for replacement land purchased within a year from the compensation payment will be refunded.

3-2. Compensation for Assets (Continued)

Public Structure (Common Property Resources)

- Reconstruction of community structures & replacement of common property resources in consultation with the community as appropriate.

Trees/ Crops

- 3-month advance notice to harvest fruits, standing crops and remove trees, **OR** compensation at market value estimated by
  - The Forest Department for timber trees
  - State Agriculture Extension Department for crops
  - Horticulture Department for perennial trees.

3-2. Compensation for Assets

Private Structure:

a. Title holders/Owners

- Cash compensation for structure at replacement cost, determined by referring to relevant Basic Schedule of Rates*.
- Right to salvage material from the demolished structures.
- Three months' notice to vacate structures.
- Refund of stamp duty and registration charges of new alternative houses/shops at prevailing market rate within one year.

Note: *Basic Schedule of Rates: The rate used for public works in each state.

3-3. Rehabilitation & Resettlement Assistance

Overall:

- Transition Allowance of Rs.4,000/- per household whose residential or commercial structure is affected.
- Training Assistance of Rs.4,000/- for income generation per household.

Families losing livelihood:

- Rehabilitation grant equivalent to 750 days minimum agricultural wages.

3-2. Compensation for Assets (Continued)

b. Encroachers

- Cash compensation for loss of structure only if 3-month notice is not given

c. Squatters

- Cash assistance for structures at replacement cost

d. Tenants/Lease Holders

- An apportionment of the compensation payable to structure owners for registered lessees (by local laws)
- 3 month written notice + Rs. 10,000 shifting allowance for tenants
- In case 3 month notice is not given, 3 month rental allowance

3-3. Rehabilitation & Resettlement Assistance (Continued)

Small & Marginal Farmers*:

- In case of PAPs who are rendered landless or reduced to the status of small or marginal farmer due to land acquisition, rehabilitation grant equivalent to 750 days minimum agricultural wages (NRRP para 7.14).
  - ***Small farmer**: A cultivator with an un-irrigated land holding up to two hectares or with an irrigated land holding up to one hectare, but more than the holding of a marginal farmer.
  - ***Marginal farmer**: Cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare.

3-3. Rehabilitation & Resettlement Assistance (Continued)

PAPs to be Displaced:

- Shifting allowance of Rs.10,000/family (para 7.10 NRRP 2007).
- Financial assistance of Rs.15,000 for construction of cattle shed if having cattle (para 7.10 NRRP 2007).

Rural Artisan, Small Trader & Self-employed to be Displaced:

- One time financial assistance of Rs.25,000 for construction of working shed or shop (para 7.12 NRRP 2007) .

3-4. Grievance Redressal

Chief Project Manager (CPM), CA or DFCCIL Head Office (SEMU:Social & Environmental Management Unit) can be contacted for grievance redressal.

CPM Office Ahmedabad
CPM Office Amjer
SEMU, DFCCIL Head Office
Competent Authority (One per District)

for contact details, see the last page of the Handout.

3-3. Rehabilitation & Resettlement Assistance (Continued)

Vulnerable Groups:

- One time additional financial assistance equivalent to 300 days of minimum agricultural wages.

Below Poverty Line:

- Temporary employment in the project construction work to Affected Persons with particular attention to PAPs below poverty line by the project contractor during construction, to the extent possible.
- House construction assistance for those living below poverty line equivalent to the latest construction cost of Indira Awas Yojana Scheme for Rural Areas and cost of house construction under JNURM for urban areas.

NRRP 2007 defines Vulnerable Persons as disabled, destitute, orphans, widows, unmarried girls, abandoned women or persons above 50 years of age; who are not provided or cannot immediately be provided with alternative livelihood, and who are not otherwise covered as part of family (para 6.4 (v), NRRP 2007).

3-5. Further Information Disclosure of RRP Report and Your Comments

For further detailed information, the RRP will be disclosed following places:

•Draft RRP Report:
Summary of Draft RRP will be available in Gujarati at each affected village office from late Nov. 2011 for 1 week.

•Full report of Draft RRP will be available in English at CPM Ahmedabad and Ajmer Offices, DFCCIL Head Office, major railway stations, District Collectorate offices from late Nov. 2011 for 1 week.

Comments can be submitted to the DFCCIL Head Office or respective CPM offices either by post or through email at dfc.package3@gmail.com from late Nov. 2011 for 1 week.

•Final RRP Report:
Final RRP report will be available in the same locations from late Dec. 2011 (planned).

3-3. Rehabilitation & Resettlement Assistance (Continued)

Scheduled Tribe (ST) Family:

- Additional one time financial assistance equivalent to 500 days minimum agricultural wages for loss customary right or usage of forest produce (para 7.21.5, NRRP 2007).
- At least one third of compensation amount due shall be paid to the affected families at the outset as first installment and rest at the time of taking over the possession of the land (para 7.21.4, NRRP 2007).

For further inquiries and comments, please contact

DFCCIL Headquarters
Add: 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi –110001

Chief Project Manager (CPM), Ahmedabad
Add: 1st Floor, Old DRM Office Building, Kalupur, Ahmedabad-380002

Chief Project Manager (CPM), Ajmer
Add: 42A/3, Civil Lines, Ajmer-305001

[Presentation material _ Gujarati]

ડેડીકેટેડ ફ્રેટ કોરિડોર યોજનાનો વિકાસ
(ભાગ-1 વામજ-ઇકબાલગઢ વિભાગ)

લોક પરામર્શ બેઠક

સુચિત પર્યાવરણીય અને સામાજીક અસરના મુલ્યાંકન

અને

સુચિત પુન:સ્થાપન અને પુન:વસન યોજના

એજન્ડા

ભાગ-1
- સમગ્ર યોજનાની રૂપરેખા
- વામજ-ઈકબાલગઢ યોજનાની રૂપરેખા

ભાગ-2
- ESIA અભ્યાસનો હેતુ
- અસરો હળવી કરવા માટેના સુચીત પગલા અને આકારણીના પરિણામો

ભાગ-3
- RRP અભ્યાસનો હેતુ
- જમીન સંપાદન, પુન:સ્થાપન અને પુન:વસન અંગેની નીતિ અને તેના મહત્વના કાયદાઓ
- સુચીત વળતર અંગેનું પેકેજ
- પ્રશ્ન અને જવાબ

લોક પરામર્ષ બેઠકનો હેતુ

લોકો પાસેથી તેમના મંતવ્ય મેળવવા અને પ્રોજેકટ તૈયાર કરવાની કામગીરીમાં તેમનો સમાવેશ કરવો

ઈએસઆઈએ અભ્યાસમાં લોકોના મતવ્યો સામેલ કરવા

ઈએસઆઈએ અભ્યાસની પ્રક્રિયામાં પર્યાવરણીય અને સામાજીક સકારાત્મક/નકારાત્મક અભિપ્રાયોમાં સહભાગીથી મતવ્યોની આપલે કરવી.

ઈએસઆઈએ અભ્યાસમાં વિપરીત અસરો હળવી કરવાના સુચવેલ ઉપાયો સામેલ કરી તેના પરિણામો રજુ કરવા

ભાગ -1
યોજનાની રૂપરેખા

1. સમગ્ર યોજનાની રૂપરેખા

૧-૧. યોજના

યોજનાની દરખાસ્ત કરનાર
રેલ્વે મંત્રાલય, ભારત સરકાર

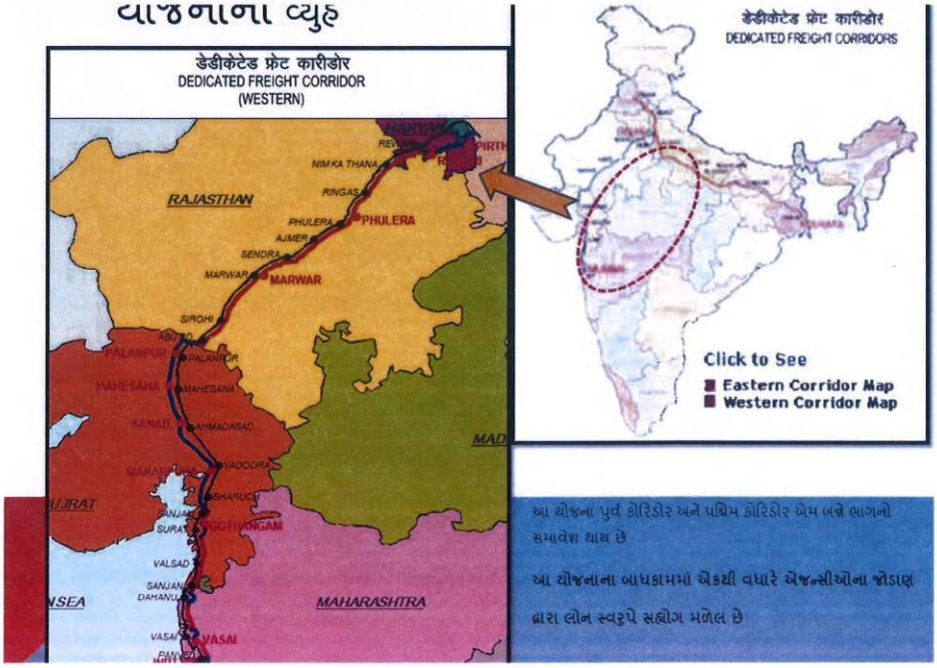
યોજના અમલીકરણ સંસ્થા
ડેડીકેટેડ ફ્રેટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL)

- ભારત સરકારના રેલ્વે મંત્રાલયના ઉપક્રમે ડીએફસી પ્રોજેકટ ખાસ હેતુ સરના વાહનો માટેની બાંધકામ, સંચાલન અને મરામત માટે ઉભુ કરેલ સંસ્થા છે.

૧-૨. યોજનાનો હેતુ

- મોટા જથ્થામાં માલનો ઝડપી અને સુરક્ષીત રીતે લઇ જવા માટે બહુવિધ ઉચી ધરીપટ માલવાહન યંત્રના રસ્તાઓનો વિકાસ કરવા
- આર્થિક વિકાસદરની હાલની દિશાને સમગતિશીલ વિકાસમાં મદદરૂપ બનવું
- નોકરીની તકો, આવકમાં વધારો, કુટુંબદિઠ આવક અને લોકોની રૂચીમાં ઉપયોગી થવા માટે નિમાર્ણ કરવું

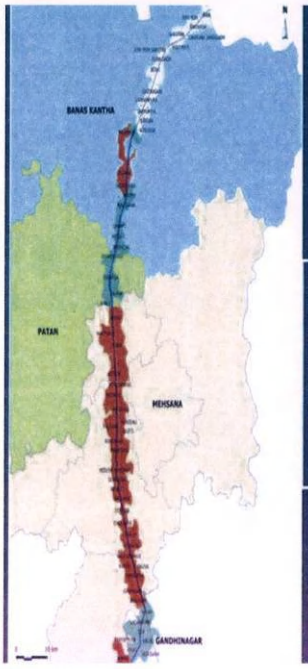
વાજનાના વ્યુહ



આ યોજના પુર્વ કોરિડોર અને પશ્ચિમ કોરિડોર એમ બન્ને ભાગનો સમાવેશ થાય છે

આ યોજનાના બાધકામમાં એકથી વધારે એજન્સીઓના જોડાણ દ્વારા લોન સ્વરૂપે સહયોગ મળેલ છે

૨. યોજનાની રૂપરેખા
(વામજ થી ઈકબાલગઢ વિભાગ)



૨-૧. યોજનાનો વિસ્તાર

- ગાંધીનગર - અંદાજિત ૧૪ કિ.મી.
- મહેસાણા - અંદાજિત ૬૪ કિ.મી.
- પાટણ - અંદાજિત ૧૨ કિ.મી.
- બનાસકાંઠા - અંદાજિત ૪૭ કિ.મી.

કુલ - અંદાજિત ૧૪૦ કિ.મી.

દરખાસ્ત સુવિધા

- અંતિત સ્ટેશન
- જંક્શન સ્ટેશન
- ક્રોશીગ સ્ટેશન
- મુખ્ય અને મહત્વના પુલ
- નાના પુલ

યોજનાનું આયોજન

ESIA & RRP અભ્યાસ –

જુલાઈ-2011
થી
ડિસેમ્બર-2011

ભાગ - 2

DRAFT પર્યાવરણીય અને સામાજીક અસરની આકારણી રૂપરેખા

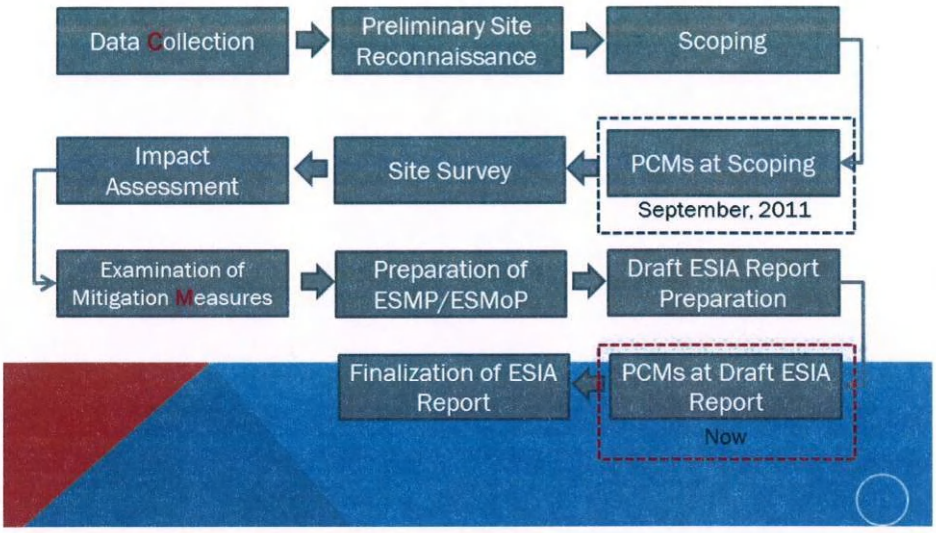
ESIA અભ્યાસનો હેતુ

પર્યાવરણીય અને સામાજીક આધારભુત માહિતી એકત્ર કરવી અને સંભવીત અસરોની ઓળખ અને માપણી કરવી

સંભવીત પર્યાવરણીય અને સામાજીક અસરને ઘટાડવા માટે પર્યાવરણ અને સામાજીક મુલ્યાંકન આયોજન તૈયાર કરવું અને જરૂરી એકશન લેવા.

1. ESIA અભ્યાસનો (Continued)

ESIA માટેની લોક પરામર્ષ બેઠકની પ્રક્રિયા



અસરો હળવી કરવા માટેના સુચીત પગલા અને

2.1 કાર્યક્ષેત્ર માટેના અભ્યાસની મુખ્ય બાબતો

કુદરતી પર્યાવરણ

વનસ્પતિ અને પ્રાણીઓ જૈવીક વિવિધતાનો અભ્યાસ
1. ભયગ્રસ્ત જાતિઓ
2. વૃક્ષોની ગણતરી

ઘોઘાટ અને કંપનનુ માપન

પાણીની ગુણવત્તાનું માપન

હવાની ગુણવત્તા

સામાજીક પર્યાવરણ

1) સામાજીક-આર્થિક સદભે
- જમીન સંપાદન
- આજીવિકા
- વંચીત સમુદાય

2) સામાજીક ઇંફાસ્ટ્રકચર સંદર્ભે

મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો (કુદરતી પર્યાવરણ)

પ્રકાર	તબ્બકો	અસરનું મુલ્યાકન	હળવી કરવાના ઉપાયો
જૈવિક વિવિધતા	બાંધકામ અને પ્રોજેકટની વાસ્તવિક કામગીરી	• સમગ્ર રેલ માર્ગ પરની વનસ્પતી અને વન્ય પ્રાણીઓની સુષ્ટીને ખલેલ થવુ/નાશ થવો • વન્ય પ્રાણીઓની સુષ્ટીને ખલેલ અને તેમની ગતિવિધીમાં રૂકાવટનો ખતરો વધી શકે છે.	• વૃક્ષારોપણ • ગ્રીન બેલ્ટ તૈયાર કરવા • સ્થાનીક વનસ્પતીઓનું ઉછેર • અભ્યારણ્યથી 3 કીમી સુધીના વિસ્તારમાં કોઈ ઘોંઘાટ/અવાજ ન કરવો • નાળા, ગરનાળા અને સુરંગ માર્ગો/બોગદા તૈયાર કરવા જેવી વન્ય પ્રાણીઓની ગતિવિધીમાં સરળતા રહે.

મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો (કુદરતી પર્યાવરણ)

પ્રકાર	તબ્બકો	અસરનું મુલ્યાકન	હળવી કરવાના ઉપાયો
ઘોંઘાટ	બાંધકામ	• બાંધકામ તબક્કા દરમ્યાન બાંધકામના સાધનોની કામગીરીના લીધે ઘોંઘાટનુ સ્તર હંગામી રીતે વધી શકે છે.	• વિસ્તારના લોકોને બાંધકામ પ્રવુતીની અગાઉથી જાણ કરવામા આવશે. • બાધકામના સાધનોની નિયમિત જાળવણી કરવામા આવશે • બાધકામ દરમ્યાન હંગામી રીતે ઘોંઘાટ અટકાવવાના સાધનોનો ઉપયોગ કરવામાં આવશે અને પ્રોજેકટની વાસ્તવીક કામગીરી દરમ્યાન કાયમી રીતે ઘોંઘાટ અટકાવવાના સાધોનોનો ઉપયોગ કરવામાં આવશે.
	અમલીકરણ	• કાયમી રેલ વ્યવહાર શરૂ થયા પછી ઘોંઘાટનુ પ્રદુષણ વધી શકે છે.	

મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો (કુદરતી પર્યાવરણ)

પ્રકાર	તબ્બકો	અસરનું મુલ્યાકન	હળવી કરવાના ઉપાયો
ધુજારી	બાંધકામ	• બાંધકામ તબક્કા દરમ્યાન બાંધકામના સાધનોની કામગીરીના લીધે ધુજારી સ્તર હંગામી રીતે વધી શકે છે.	• વિસ્તારના લોકોને બાંધકામ પ્રવુતીની અગાઉથી જાણ કરવામા આવશે. • બાધકામના સાધનોની નિયમિત જાળવણી કરવામા આવશે • બાધકામ દરમ્યાન હંગામી રીતે ધુજારી અટકાવવાના સાધનોનો ઉપયોગ કરવામાં આવશે અને પ્રોજેકટની વાસ્તવીક કામગીરી દરમ્યાન કાયમી રીતે ધુજારી અટકાવવાના સાધોનોનો ઉપયોગ કરવામાં આવશે. • અગાઉથી માપણી લઈ સાચા ભોમિતીક ટ્રેક તૈયાર કરવાની ખાતરી રાખવી
	અમલીકરણ	• કાયમી રેલ વ્યવહાર શરુ થયા પછી ઘોંઘાટનુ પ્રદુષણ વધી શકે છે.	

મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો (હવાનું પર્યાવરણ)

પ્રકાર	તબ્બકો	અસરનું મુલ્યાકન	હળવી કરવાના ઉપાયો
હવાનું પ્રદુષણ	બાંધકામ	• બાંધકામ તબક્કા દરમ્યાન બાંધકામના સ્થળની હવામાં પ્રદુષણ વધી શકે છે.	• ડીએફસી લાઈન પર વુક્ષોરોપણ કરવામાં આવશે • બાધકામની સામગ્રીનું યોગ્ય રીતે સગ્રહ કરવામાં આવશે. • ટ્રક અને ડમ્પર પર કવર પાથરવામાં આવશે જેથી સામગ્રી ઢોળાય નહી. • પાણી છાટીને ઓછા ધુમાડા કાઢતા હોય તેવા બાધકામના સાધનો અને વાહનોનો ઉપયોગ કરવામા આવશે. • હવાની ગુણવત્તાની નિયમિત ચકાસણી કરવામાં આવશે.
પાણીનુ પ્રદુષણ	બાધકામ	• જમીન ખોદકામને લીધે પાણીની ગુણવત્તામા બગાડ થવાની સંભાવના છે.	• નકામા પાણીના નિકાલ માટે સ્થળ ઉપર ગટર વ્યવસ્થા રાખવી. • માટીના ઢગલાની અને છુટી સામગ્રીની યોગ્ય જાળવણી રાખવી. • તાકીદની સ્થીતીના ઉપાય તરીકે તૈલિય લાકડાનાપાટિયા રાખવા.

મુખ્ય સામાજીક અસર અને તેને હળવી કરવાના ઉપાયો

પ્રકાર	તબ્બકો	અસરનું મુલ્યાકન	હળવી કરવાના ઉપાયો
જમીન સંપાદન	બાંધકામ પહેલા	• 68 ગામોમાં કુલ 1867 જમીનોને અસર થસે • જમીન સંપાદનના કારણે આવકના સ્ત્રોત પર અસર પડશે.	• તમામ અસરગ્રસ્તો માટે યોગ્ય પુન:વસન અને આજીવીકા માટેની યોજના તૈયાર કરવી • વધુ વિગત માટે ભાગ 3માં RRPના મુસદ્દામા દર્શાવેલ વિગત જોવી
સામાજીક ઢાંચો	બાધકામ	• બાધકામ દરમ્યાન સ્થાનિક સ્થળો સુધી પહોચાડવામાં હંગામી રૂકાવટ • પ્રોજેકટનો અમલ શરૂ થતા સ્થાનિક સ્થળો સુધી પહોચાડવામાં કાયમી રૂકાવટ .	• બાધકામ તબ્બકે સ્થાનિક અને ધાર્મિક સ્થળો સુધી પહોચવામાં રસ્તા બનાવવામાં આવશે. • સ્થાનિક માળખાઓ અને ધાર્મિક સ્થળો સુધી પહોચવામ માટે રસ્તા, પુલો અને અન્ડર ગ્રાઉન્ડ રસ્તા બનાવવામાં આવશે.

બાધકામ અને અમલીકરણ દરમ્યાન પર્યાવરણીય અને સામાજીક અસરઓ અને તેને ઓછી કરવાના પ્રવુતીની દેખરેખ **SEMU-DFCCIL** રાખશે

પ્રકાર	તબ્બકો	દેખરેખ માટેની પ્રવુતી
જૈવિક વિવિધતા	બાધકામ અને અમલીકરણ	વૃક્ષારોપણની પ્રવુતી અહેવાલ પ્રગતીની સરખામણીનો આપવામાં આવશે.
ધોંધાટ અને ધુજારી	બાંધકામ અને અમલીકરણ	ધોંધાટ અને ધુજારીના સ્તરની ચકાસણી રાષ્ટ્રિય નિયમો અને આંતર રાષ્ટ્રિય ધોરણો મુજબ કરવાનુ રહેશે
પાણીનુ પ્રદુષણ	બાંધકામ અને અમલીકરણ	પાણીના નમુના લઈને ઉપયોગી અને બીન ઉપયોગી પાણીની ચકાસણી કરવાના ધોરણો મુજબની ચકાસણી કરવી
હવાનુ પ્રદુષણ	બાધકામ	વિવિધ પારમિતિના નમુના લઈ તેનુ રાષ્ટ્રિય પરિસરનુ વાતાવરણની ગુણવત્તાના ધોરણો મુજબ વિશ્લેષણ કરવુ.
રોજગાર અને પુન:સ્થાપન્	આયોજન અને બાધકામ્	વળતર ચુકવણીના રેકર્ડ અને લોકો દ્વારા રજુ કરવામાં આવેલ સમસ્યાઓની દર મહિને ચકાસણી કરવી

પુન:સ્થાપન અને પુન:વસન અંગેની વધુ માહિતી અને અહેવાલ નીચેના સ્થળે ઉપલબ્ધ રહેશે.

RRP સારાંશ (અહેવાલ)

સ્થાનીક ભાષામાં દરેક અસરગ્રસ્ત ગામે નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે

સમગ્ર RRP અહેવાલ (અંગ્રેજીમાં)

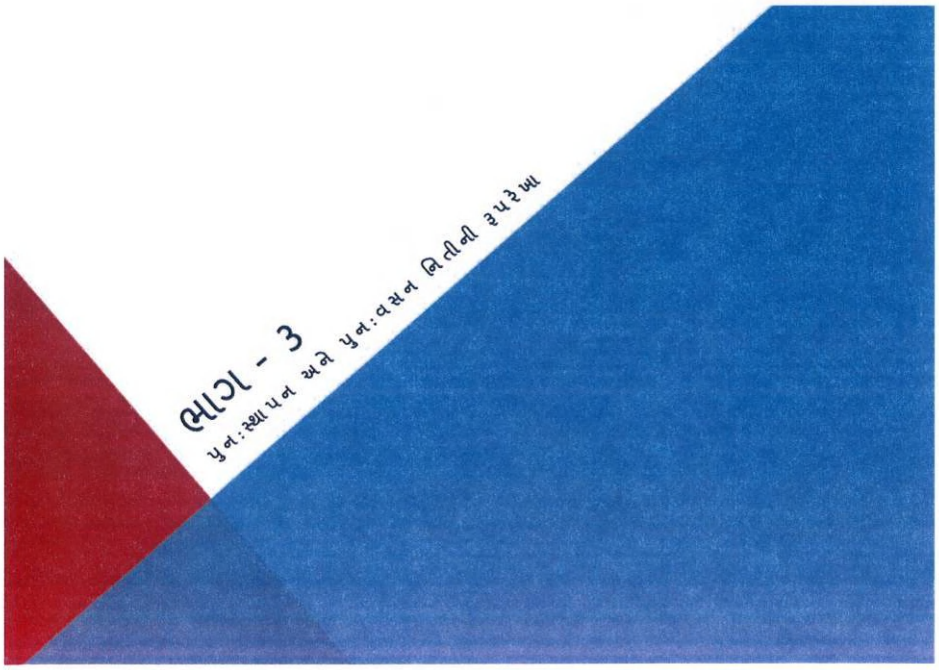
સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ, મોટા રેલ્વે સ્ટેશનોમાં તથા જીલ્લા કલેકટર કચેરીએ નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે

અભીપ્રાય કે સુચનો

અહેવાલ સંદર્ભે આપના સુચનો સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ પત્ર દ્વારા કે Email દ્વારા dfc.package3@gmail.com અઠવાડિયામા મોકલી શકો છો.

અંતિમ RRP અહેવાલ સ્થાનિક ભાષામાં

ઉપરોકત તમામ જગ્યાએ અંતિમ અહેવાલ ડિસેમ્બર-2011 સુધીમાં મુકવામાં આવશે.



RRP અભ્યાસનો હેતુ

બેઝલાઈન સર્વે અને સેન્સસની માહિતીને આધારે યોજનાથી નકારાત્મક અસર પામનાર લોકોની ઓળખ કરવી

વિકલ્પોને લક્ષમાં લઈને શક્ય હોય તેટલી નકારાત્મક અસરોને ઘટાડવી

પ્રવર્તમાન કાયદાઓ અને નિતી અનુસાર સુચીત પુન:સ્થાપન અને પુન:વસન યોજના અને માલિકી હક્ક અંગેના મુદ્દા અંગે સમજ આપવી.

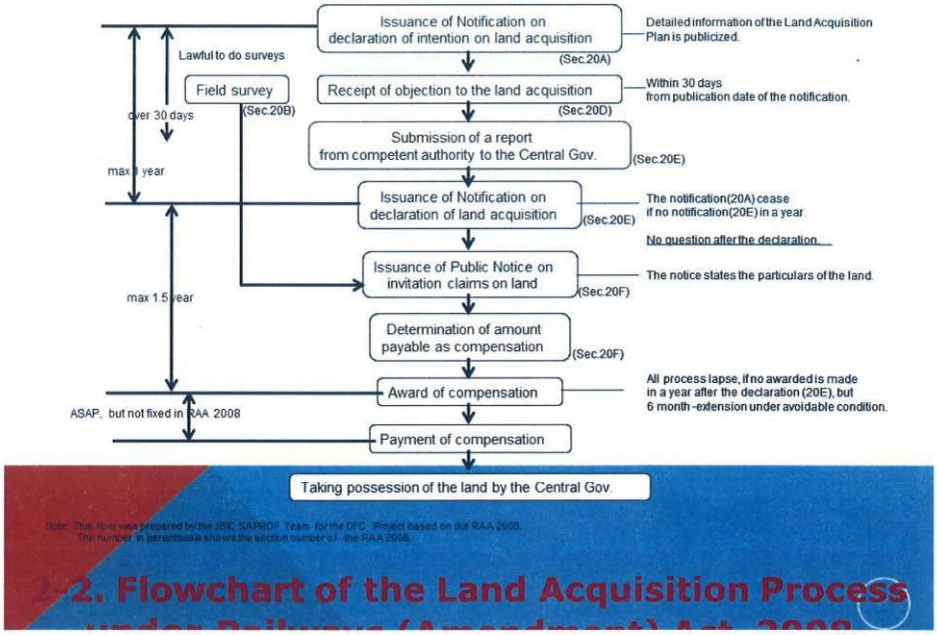
PCM દ્વારા અસર્ગ્રસ્ત અને લક્ષિત જુથ પાસેથી અભિપ્રાયો સુચનો મેળવવા કે જેથી તેનો નિતીમાં સમાવેશ થઈ શકે અને તે માહિતીની જાણકાર કરીને અંતિમ પુન:સ્થાપન અને પુન:વસન યોજનામા સમાવીષ્ટ કરી શકાય

સંબધીત કાયદાઓ

2-1. ડેડિકેટેડ ફ્રેટ કોરિડોર યોજના માટે જમીન સંપાદન, પુન: સ્થાપન અને પુન:વસન સંબધી પાયાના કાયદાઓ અને નીતિ.

- રેલ્વે (એમેન્ડમેન્ટ) એક્ટ, 2008:
  - ડીએફસી યોજનામા જમીન સંપાદન આ કાયદા હેઠળ થઈ રહેલ છે
  - જમીન સંપાદન ધારો 1894 આ કાયદા હેથળ સંપાદીત થતી જમીનને લાગુ પડતો નથી

- રાષ્ટ્રિય પુન: સ્થાપન અને પુનર્વાસ - 2007
  - ડીએફસી યોજના પાતળી પટ્ટીમાં જમીન સંપાદન થવાનુ હોવાથી મુખ્યત્વે NRRP 2007 ની 7.19 જોગવાઈ લગુ પડશે.



રેલ્વે (એમેન્ડમેન્ટ) એક્ટ, 2008ના મહત્વના વિભાગોના કાયદાની જોગવાઈઓ અંગે ટુંકી ચર્ચા

સ્પેશ્યલ રેલ્વે યોજના માટે જમીન સંપાદન કરવાના ઈરાદાના જાહેરનામાં દ્વારા જાણ.

સ્પેશ્યલ રેલ્વે પ્રોજેકટ તથા જમીન અંગેનું ટંકુ વર્ણન

જાહેરનામુ બે સ્થાનિક વર્તમાન પત્રોમાં પ્રસિદ્ધ કરાશે જેમાનુ એક વર્તમાન પત્ર સ્થાનિક ભાષામાં રહેશે.

સર્વેક્ષણ/મોજણી માટે પ્રવેશ અધિકાર કલમ 20બી

આ વિશિષ્ટ યોજના માટે સક્ષમ અધિકારી દ્વારા નિયુકત વ્યક્તિને કલમ 20એ ના પેટા વિભાગ (1) મુજબ જાહેરનામું પ્રસિદ્ધ થયાના 30 દિવસની અંદર વિરોધ કે વાંધાઓ રજુ કરી શકે છે.

પ્રત્યેક વિરોધ કે વાંધાઓ ને સંક્ષમ અધિકારી દ્વારા ન્યાયપુર્વક તપાસવામા આવશે

સંક્ષમ અધિકારીનો નિર્ણય અંતિમ ગણાશે.

જમીન સપાદન જાહેરાત (કલમ-20ઈ)

20 ઈની પેટાકલમ 1 મુજબ જમીન સંપાદન જાહેરાત પ્રસિદ્ધ થતા જમીનની માલીકી કોઈ પણ પ્રકારના વિરોધ કે વાધા વગર ફક્ત ભારત સરકારની ગણાશે.

આ જાહેરનામું કલમ 20 એ હેથળના જાહેરનામાના 12 માસની મર્યાદામા આવશે. જો કે આ સમય મર્યાદામા મિલકતના વિવાદની કોર્ટ દ્વારા પતાવટ કે રોકમા લાગતો સમય ગણાશે નહી.

ઉપરોક્ત જાહેરાતને કોઈ કોર્ટ કે સત્તા આગળ પડકારી શકાશે નહી.

વળતરની ચુકવણીની રકમ નક્કી કરવી (કલમ 20 એફ)

સક્ષમ અધિકારીના હુકમ દ્વારા વળતરની રકમની ચુકવણી નક્કી થશે.

સક્ષમ અધિકારી આ કલમની જોગવાઈ અનુસાર જાહેરનામાંની પ્રસિદ્ધીના એક વર્ષના સમયગાળામાં લવાદી કરીની ચુકાદો આપશે.

જો કલમ 20 ઈ ના જાહેરનામાની એક વર્ષની સમયમર્યાદામાં ચુકાદો નહી થાય તો તમામ પ્રકિયા રદ બાતલ ગણાશે.

નિવારી શકાયતેવી પરિસ્થીતીમાં ઓછા 5% લેખે પ્રત્યેક માસના વિલંબ પેટે વ્યાજ ચુકવવાનું રહેશે.

વળતરની રકમની ગણતરી (ભાગ - 20 એફ)

કલમ 20 એ (8 (એ) કલમ 20 એફ હેઠળ જાહેરનામું પ્રસિદ્ધ થવાની તારીખની જમીનની બજાર કિંમત.

અન્ય જમીનના પ્રભુત્વથી અસરગ્રસ્ત વ્યક્તિની જમીનને થયેલ નુકશાન (8 (બી) કલમ 20 એફ)

કોઈપણ પ્રકારે અન્ય સ્થાવર મિલકતને કે તેની આવકને સંપાદનને કારણે અસરગ્રસ્તને થયેલ નુકશાન (8 (સી) કલમ 20 એફ)

જમીન સંપાદનના પરિણામે રહેણાંક કે ધંધાની જગ્યામાં અસરગ્રસ્તને ઘરને કરવા પડેલા ફેરફારને કારણે થયેલ ખર્ચ. (8 (ડી) કલમ 20 એફ)

ઉપર દર્શાવેલ બજારભાવ ઉપરાંત સક્ષમ અધિકારી કે લવાદને, જે તે કિસ્સામાં, જમીન સંપાદનની અનિવાર્યતાને ધ્યાનમાં લઈને યોગ્ય લાગેતો તો 60% વિશેષ વળતરનો ચુકાદો આવી શકે છે.

કબજાહકની નિર્ધારણ તારીખ

કબજાહક ધરાવનાર કે ન ધરાવનાર માટે, RRA-2008ની કલમ 20એ હેઠળ જાહેરનામું બહાર પડાયાની તારીખ એ કબજાહકની નિર્ધારીત તારીખ ગણાશે. જો એકથી વધુ જાહેરનામાં પ્રસિદ્ધ થયા હોયતો છેવટનું પ્રકાશિત જાહેરનામું ધ્યાનમાં લેવાશે.

ડી. એફ. સી. પ્રોજેકટના સુચીત વળતરનું માળખું/પેકેજ

જમીનનું વળતર
મિલકતનું વળતર
પુન:સ્થાપન અને પુન:વસન સહાય

(1) **RRA 2008** ની કલમ 20 જી મુજબ જમીનનું વળતર

RRA 2008માં દર્શાવેલ કલમ 20 જી મુજબ નક્કી થયેલ જમીનની બજાર કિમત પ્રમાણે રોકડા

જ્યા જમીન આવેલી હોય ત્યાંના વેચાણ કરારમાં નોધાયેલ કે ભારતીય સ્ટેમ્પ એકટ, 1899માં દર્શાવેલી હોય તે લધુત્તમ કિંમત; જે વધુ હોય તે

ગામ કે તેની નજીક સમાન પ્રકારની જમીનની સરેરાસ વેચાણ કિંમત, કે જેનુ નિર્ધારણ પાછલા 3 વર્ષના 50%થી ઓછા નહી તેવા વેચાણ કરારોને આધારે થયેલ હોય, કે જેમાં ઉચી કિંમતો ચુકવાઈ હોય

ઉપર મુજબ નક્કી થયેલ વળતર ઉપરાત 60% વધારાનું વળતર .....

(section 20 F (9) of RAA 2008)

(1) **RRA 2008** ની કલમ 20 જી મુજબ જમીનનું વળતર

RRA 2008માં દર્શાવેલ કલમ 20 જી મુજબ નક્કી થયેલ જમીનની બજાર કિમત પ્રમાણે રોકડા

જ્યા જમીન આવેલી હોય ત્યાંના વેચાણ કરારમાં નોધાયેલ કે ભારતીય સ્ટેમ્પ એકટ, 1899માં દર્શાવેલી હોય તે લધુત્તમ કિંમત; જે વધુ હોય તે

ગામ કે તેની નજીક સમાન પ્રકારની જમીનની સરેરાસ વેચાણ કિંમત, કે જેનુ નિર્ધારણ પાછલા 3 વર્ષના 50%થી ઓછા નહી તેવા વેચાણ કરારોને આધારે થયેલ હોય, કે જેમાં ઉચી કિંમતો ચુકવાઈ હોય

ઉપર મુજબ નક્કી થયેલ વળતર ઉપરાત 60% વધારાનું વળતર .....

(section 20 F (9) of RAA 2008)

ઉપરોકત 1 અને 2 મુદ્દાને ધ્યાનમા રાખી

રાજ્ય સરકારના ગેઝેટેડ નોટિફિકેશન દ્વારા જાહેર કરાયેલ સુધારેલા નવા જમીન વળતર દરને સક્ષમ અધીકારી સ્વીકારી શકે છે.

1500 ચો.મી. સુધીની જમીન ગુમાવનારને રૂ. 20000/-નું વિશેષ વળતર, 1500 ચો.મી. થી વધુ જમીન ગુમાવનારને રૂ. 15 પ્રતિ ચો.મી. પ્રમાણે ચુકવાશે. (ફકરો 7.19 NRRP મુજબ)

એક વર્ષના સમયગાળામાં નવા વૈકલ્પિક ઘર/દુકાન માટે પ્રવર્તમાન બજાર ભાવ અને નોધણી ફીમાંથી વળતર

1 - અસ્કયામતોનું વળતર

ખાનગી બાંધકામ

બાંધકામનું પુન:બાધકામ જેટલી કિમતનું રોકળ વળતર

તોડી પડાયેલ બાંધકામનો કાટમાળ લઈ જવાનો હક

બાંધકામ ખાલી કરવા માટે 3 મહિનાની નોટિશ

એક વર્ષના સમયગાળામાં નવા વૈકલ્પિક ઘર/દુકાન માટે પ્રવર્તમાન બજાર ભાવ અને નોધણી ફીમાંથી વળતર

નોંધ: જે તે રાજ્ય સરકારના પબ્લિક વર્કના પ્રવર્તમાન ભાવો ગણવામા આવશે

2 - અસ્કયામતોનું વળતર

અ. કબજા હક્ક ન ધરાવનાર/દબાણકર્તા/પચાવી પાડનાર:

1) 3 મહિનાની આગોતરી નોટીશ ન અપાઈ હોયતો બાધકામના નુકશાનનું રોકડ વળતર.
2) અન્ય લાગુ પડતી પુનઃસ્થાપન અને પુનઃવસન સહાય ચુકવાશે.

બ. દબાણકર્તા/પચાવી પાડનાર:

1) અન્ય લાગુ પડતી પુનઃસ્થાપન અને પુનઃવસન સહાય ચુકવાશે.

ક. ભાડુઆત :

1) સ્થાનીક કાયદા પ્રમાણે જમીનની માલીકી ધરાવનારે ભાડુઆતને રોકડ વળતરની ચુકવણી.
2) બાંધકામ ખાલી કરવા માટે ત્રણ મહિનાની નોટીશનુ.10000/- સ્થાળાતર રૂપે વળતર
3) 3 મહિનાની આગોતરી નોટીશ ન અપાઈ હોયતો બાધકામના નુકશાનનું રોકડ વળતર.

અસ્કયામતોનું વળતર

જાહેર બાધકામ:

સાર્વજનિક મિલકત/સંશાધનો સમુદાયિક સાથે સંવાદ કરીને સામુદાયીક મકાનોના પુનઃનિર્માણ અને વૈકલ્પિક વ્યવસ્થા માટે યોગ્ય વળતર

વૃક્ષો અને પાકો:

ફળોનાં વાવેતર, ઉગેલા પાક કે વૃક્ષો કાપવા 3 મહિનાની આગોતરી નોટીસ અથવા બજારભાવ પ્રમાણે વળતરની આ રકમ નીચે દર્શાવેલા ડીપાર્ટમેન્ટ દ્વારા નિર્ધારીત થશે.

1) ધ ફોરેસ્ટ ડિપાર્ટમેન્ટ ફોર ટીમ્બર ટ્રીઝ
2) સ્ટેટ એગ્રીકલ્ચર એક્સટેન્સન ડિપાર્ટમેન્ટ ફોર ક્રોપ્સ
3) હોર્ટીકલ્ચર ડીપાર્ટમેન્ટ.ફોર પેરેનીયલ ટ્રીઝ

પુન:સ્થાપન અને પુનર્વસવાટ મદદ: સમગ્ર

અસરગ્રસ્ત રહેણાંક કે વ્યવસાયીક બાંધકામ પેટે પ્રતિ પરીવાર રૂ. 4000/-નું વચગાળાનું વળતર

રૂ. 4000/- પ્રતિ ઘર આવક ઉભી કરવાની તાલીમ અંગેની સહાય રૂપે વળતર

રોજગાર ગુમાવનાર પ્રત્યેક પરિવારના પુન:સ્થાપન માટે 750 દિવસની ન્યુતનમ કુષિ રોજગારી.

પુન:સ્થાપન અન પુનવસવાટ મદદ: સમગ્ર

અસરગ્રસ્ત નાના/સિમાંત ખેડુતો જમીન સંપાદનને કારણે અસરગ્રસ્ત જમીન વિહોણા થઈ જતા હોય કે નાના કે સિંમાત ખેડુતની વ્યાખ્યામાં આવી જતા હોયતો 750 દિવસની લધુત્તમ કુષી રોજગારી જેટલી રકમ મેળવવા પાત્ર થસે (NRRP ફકરો 7.14)

<u>નાના ખેડુત</u> :

બે હેક્ટરની મર્યાદામાં બિનપીયત જમીન ખેડનાર કે એક હેકટર પીયત જમીન ધરાવનાર (સિમાંત ખેડુતની વ્યાખ્યાથી વધુ જમીન ધરાવનાર) નાના ખેડુત ગણાય છે.

<u>સિમાંત ખેડુત</u> :

એક હેકટર બિનપીયત કે અડધો હેકટર પીયતવાળી જમીન ધરાવનાર સિમાંત ખેડુત ગણાય છે.

પુન:સ્થાપન અન પુનવસવાટ મદદ: સમગ્ર

પ્રત્યેક અસરગ્રસ્ત પરિવારને રૂ. 10,000/- ની એક વખતની આર્થીક મદદ સ્થળાંતર વળતર તરીકે (NRRP-2007 ફકરો 7.10)

પ્રત્યેક પશુધન ધરાવનાર પરિવારને પશુ માટે શેડ બનાવવા રૂ. 15,000/-ની સહાયતા (NRRP-2007 ફકરો 7.10)

પ્રત્યેક અસરગ્રસ્ત ગ્રામિણ કારીગર, નાના વેપારી કે સ્વરોજગારી ધરાવતી વ્યક્તીને કામ કરવા માટે શેડ કે દુકાન બનાવવા માટે એક વખતની રૂ. 25,000/- ની આર્થીક સહાય (NRRP-2007 ફકરો 7.10)

પુન:સ્થાપન અન પુનવસવાટ મદદ: સમગ્ર

વચીત સમુદાય :

એક વખતની વધારાની 300 દિવસની લઘુત્તમ રોજગારીની આર્થીક સહાય

ગરીબી રેખા નીચે જીવતા પ્રત્યેક અસરગ્રસ્ત પરિવારને પ્રોજેક્ટ કોન્ટ્રાક્ટર દ્વારા બાધકામ માટે શક્યતા મુજબની રોજગારી.

ગરીબી રેખા નીચે જીવતા પ્રત્યેક પરિવારને ગ્રામ્ય વિસ્તારનમાં ઈન્દિરા આવાસ યોજના જેટલી છેલ્લામાં છેલ્લી કિંમત તથા શહેરી વિસ્તારના માટે જેએનયુઆરએમ હેઠળની મકાન કિંમત

NRRP 2007- અપંગ, અનાથ, ત્યજાયેલા, નિરાધાર વિધવા, અપરણિત કન્યા, છુટાછેડા થયેલ મહિલા કે 50 વર્ષથી ઉપરની ઉંમરની વ્યક્તિને તિવ્ર અસરગ્રસ્ત વ્યક્તિ ગણેલ છે જેને તાત્કાલીક કે વૈકલ્પિક રોજગારી આપી શકાતી નથી અને જે કુટુબના સભ્ય તરીકે ગણી શકાતી નથી તેને વ્યાખ્યાતીત કરે છે. {ફકરો 64 (વ) NRRP 2007}

વિવાદોની પતાવટ

મુખ્ય પ્રોજેક્ટ મેનેજર, ખાસ જમીન સંપાદન અધીકારી, DFCCIL, હેડ ઓફિસ, (SEMU- સામાજીક & પર્યાવરણીય વ્યવસ્થાપન યુનિટ) સંબધીત કાર્યક્ષેત્રના વિવાદ નિવારણના વડા રહેશે.

મુખ્ય પ્રોજેક્ટ મેનેજર- અમદાવાદ
મુખ્ય પ્રોજેક્ટ મેનેજર – અજમેર
સામાજીક & પર્યાવરણીય વ્યવસ્થાપન યુનિટ: DFCCIL મુખ્ય કચેરી, દિલ્હી
ખાસ જમીન સંપાદન અધિકારી- તમામ જીલ્લાઓ

પુન:સ્થાપન અને પુન:વસન અંગેની વધુ માહિતી અને અહેવાલ નીચેના સ્થળે ઉપલબ્ધ રહેશે.

RRP સારાંશ (અહેવાલ)

સ્થાનીક ભાષામાં દરેક અસરગ્રસ્ત ગામે નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે

સમગ્ર RRP અહેવાલ (અંગ્રેજીમાં)

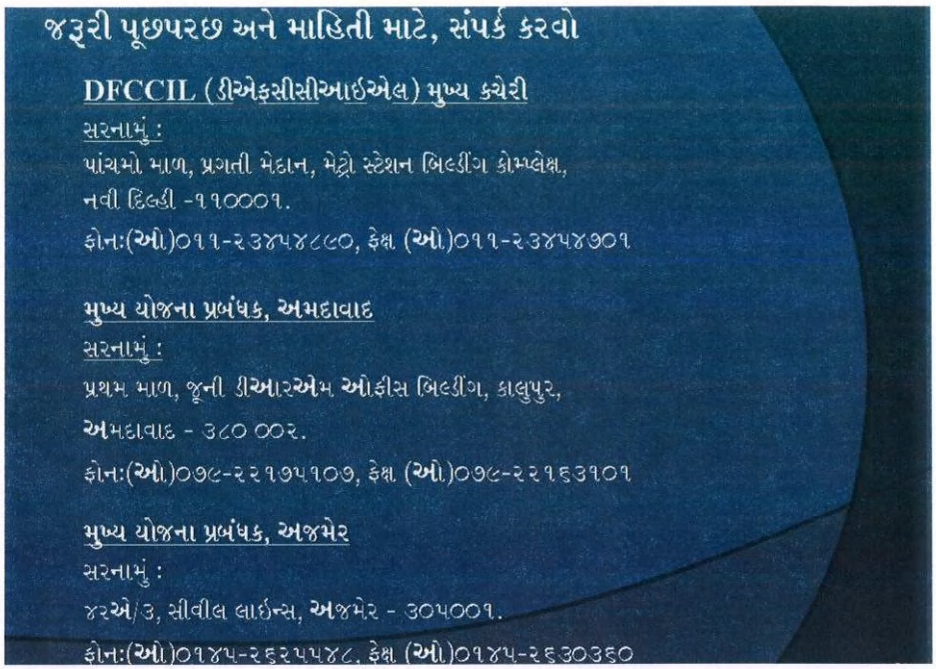
સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ, મોટા રેલ્વે સ્ટેશનોમાં તથા જીલ્લા કલેકટર કચેરીએ નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે

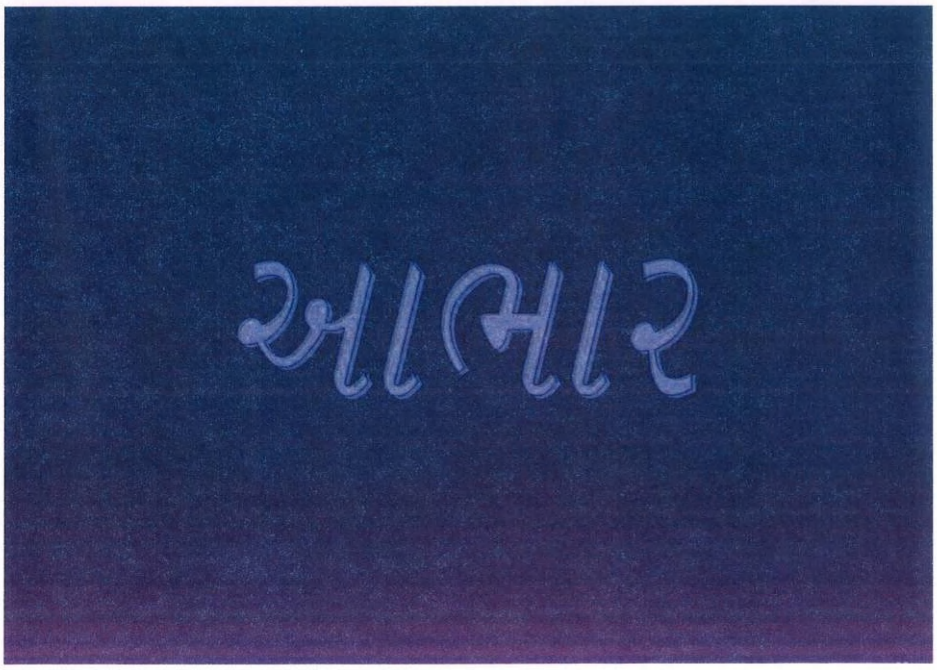
અભીપ્રાય કે સુચનો

અહેવાલ સંદર્ભે આપના સુચનો સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ પત્ર દ્વારા કે Email દ્વારા dfc.package3@gmail.com અઠવાડિયામા મોકલી શકો છો.

અંતિમ RRP અહેવાલ સ્થાનિક ભાષામાં :

ઉપરોકત તમામ જગ્યાએ અંતિમ અહેવાલ ડિસેમ્બર-2011 સુધીમાં મુકવામાં આવશે.


જરૂરી પૂછપરછ અને માહિતી માટે, સંપર્ક કરવો
DFCCIL (ડીએફસીસીઆઇએલ) મુખ્ય કચેરી
સરનામું :
પાંચમો માળ, પ્રગતી મેદાન, મેટ્રો સ્ટેશન બિલ્ડીંગ કોમ્પ્લેક્ષ,
નવી દિલ્હી -૧૧૦૦૦૧.
ફોન:(ઓ)૦૧૧-૨૩૪૫૪૮૯૦, ફેક્ષ (ઓ)૦૧૧-૨૩૪૫૪૭૦૧
મુખ્ય યોજના પ્રબંધક, અમદાવાદ
સરનામું :
પ્રથમ માળ, જૂની ડીઆરએમ ઓફીસ બિલ્ડીંગ, કાલુપુર,
અમદાવાદ - ૩૮૦ ૦૦૨.
ફોન:(ઓ)૦૭૯-૨૨૧૭૫૧૦૭, ફેક્ષ (ઓ)૦૭૯-૨૨૧૬૩૧૦૧
મુખ્ય યોજના પ્રબંધક, અજમેર
સરનામું :
૪૨એ/૩, સીવીલ લાઈન્સ, અજમેર - ૩૦૫૦૦૧.
ફોન:(ઓ)૦૧૪૫-૨૬૨૫૫૪૮, ફેક્ષ (ઓ)૦૧૪૫-૨૬૩૦૩૬૦


આભાર

Appendix-9c-2
Materials Used for PCM for Draft ESIA and RRP in Gandhinagar District [Organised on 31st July 2012]

1. Invitation Letters (English and Gujarati)

【Invitation Letter to Govt. Officials English】

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LTD.
(A Public Sector Undertaking of Ministry of Railways)
First floor, Old DRM Office Building, Kalupur, Ahmedabad – 380 002

To,
The Divisional Forest Officer
Gandhinagar

Date: 19.07.2012

Sub: Public Consultation Meeting (PCM) for Social and Environmental Scope for Development of Dedicated Freight Corridor Project –phase-1 (Package-3: Wamaj- Ikbalgarh)

Dear Sir/Madam:

The Ministry of Railways (MOR), Government of India has given top priority to strengthen rail infrastructure in the country for faster and safer transportation of bulk goods for economic advancement and in line with the same, development of Dedicated Freight Corridor Project has been conceived to facilitate faster and safer transportation of goods in bulk which will help in faster distribution of goods service. The project aims to create tremendous high quality job opportunities, higher profits and growth of household income and will serve in the interests of the public at large. The project is currently in the planning stage.

Your district is among one of the 4 districts through which the proposed railway corridor of Phase 1 Package 3 will pass. In order to disseminate information about the project to the general public and other stakeholders and to seek their opinion and suggestions on expected environment and social impact of the project, DFCCIL is organizing a Public Consultation Meeting in the district. The second stage Public Consultation meeting will be held 31th July, 2012 to inform the public on the outcome of environmental and social study on the project and to take valuable opinion in the final planning stage.

In this context, we would like to sincerely request you to attend the meeting and share your opinion and suggestions for planning of the project at the date, time and venue given bellow:

If you were not available, attendance of your representatives would be highly appreciated.

Date of Meeting: 31th July 2012.Thuesday
Time of Meeting: 11:00AM
Venue: Jain wadi,
Nr. Vardhman nagar,
Sharda circle,
kalol.
Looking forward to your participation.

Thanking you.

Yours faithfully,
19-7-12
Authorized Signatory
(DFCCIL)

Attachment -1

31st July 2012, Kalol, Gandhinagar District

Date and Time: 11.00 am -2.00 pm
Venue: Jainwadi, Vardhman Nagar, Near Sharda Circle, Kalol, Gandhinagar

Schedule of PCM

Session	Time	Themes/Topics
Registration	11.00 - 11.30 am	Registration of Participants
Inauguration	11.30 – 11.45 am	• Inauguration of the PCM • Purpose of the PCM
Environmental and Social Impact Assessment (ESIA) and Rehabilitation and Resettlement Plan (RRP)	11.45 am – 12.45 pm	• Outline of DFC in general and details of 140 km in specific • Important findings of the draft ESIA • Mitigation measures • Environment and social monitoring plan • Outline of draft RRP • Process of land acquisition • Land acquisition and resettlement policies and entitlements • Rehabilitation and Resettlement Plan • Grievance redress mechanism • Information disclosure: ESIA and RRP
Open discussion	12.45 – 2.00 pm	• Question and answer session: information sharing, clarifications on issues, and suggestions of PAPs
Valediction	2.00 pm	• Formal closing

【Invitation Letter to Village Sarpanch_Gujarati】

જા નં. ડીએફસીસીઆઈએલ/પીસીએમ/ /૨૦૧૨
તા. ૧૯-૦૭-૨૦૧૨

પ્રતિ
સરપંચશ્રી
પાનસર. . ગ્રામ પંચાયત
તા. કલોલ, જિ. ગાંધીનગર

વિષય : ડેડીકેટેડ ફ્રાઈટ કોરીડોર પ્રોજેક્ટ - ભાગ-૧ (પેકેજ-૩ : વામજ - ઈકબાલગઢ) માટેની કામગીરી માટે સામાજિક અને પર્યાવરણીય શકયતા ચકાસવા બાબત.

સાહેબશ્રી,
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL) દ્વારા ડેડીકેટેડ ફ્રાઈટ કોરીડોર (DFC) પ્રોજેક્ટ અમલીકરણ કરવામાં આવનાર છે. જેમાં કોમ્પ્યુટરાઈડ કંટ્રોલથી ભારે માલગાડી માટેની રેલ્વે લાઈન પશ્ચીમ ઔદ્યોગિક કોરીડોર સાથે જોડાણ કરવામાં આવનાર છે. જે ઉત્તર પ્રદેશના-દાદરીથી જેએનપીટી-મહારાસ્ટ્ર સુધી બનનાર છે. જે હરીયાણા, રાજસ્થાન અને ગુજરાતમાંથી પસાર થનાર છે. સમગ્ર યોજનાનું અમલીકરણ લોકભાગીદારીના અભિગમથી લોકકેન્દ્રીત બની રહે તેવો રેલ્વે મંત્રાલયનો હેતુ છે.

આપની ગ્રામ પંચાયત ફ્રાઈટ કોરીડોરના ભાગ-૧ના પેકેજ-૩માં સમાવિષ્ટ ૪ જિલ્લાઓ પૈકીની એક ગ્રામ પંચાયત છે, જેમાંથી સદર યોજનાની લાઈન પસાર થઈ રહી છે. આ યોજનાના અમલીકરણ દરમિયાન થનાર પર્યાવરણીય અને સામાજિક સંભવિત અસર માટે લોકોના સલાહ સુચન અને પ્રતિભાવો માટે એક બેઠકનું આયોજન કરવામાં આવેલ છે. ઉપરોકત હેતુને ધ્યાને રાખીને યોજનાના આયોજન અને અમલીકરણ માટે આપના સલાહ, સુચનો, પ્રતિભાવો આપવા માટે આપને આમંત્રીત કરવામાં આવે છે.

નીચે દર્શાવેલ વિગતે પ્રમાણે આપને આ જાહેર મીટીંગમાં હાજર રહેવા માંટે વિનંતી કરવામાં આવે છે.

તારીખ : ૩૧.૦૭.૨૦૧૨ સમય : સવારે ૧૧:૦૦ કલાકે
સ્થળ: જૈન વાડી, વર્ધમાન નગર પાસે, શારદા સર્કલ, કલોલ.

આભાર સહ,

આપનો વિશ્વાસુ,
19-7-12
(આશુતોષ રંકાવત)
મુખ્ય યોજના પ્રબંધક
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન
ઓફ ઈન્ડિયા લી.
અમદાવાદ

સરપંચ
પાનસર ગ્રામ પંચાયત
તા. કલોલ

વધુ વિગત માટે સંપર્ક કરવો
૧) ૯૮૨૮૬ ૫૦૨૨૩
ત્રિવેદી શશાંક
૨)

Attachment I

જાહેર પરામરશ બેઠક માટે કાર્યક્રમ

૩૧ જુલાઈ ૨૦૧૨, કલોલ, ગાંધીનગર જીલ્લા

તારીખ અને સમય : ૧૧:૦૦ થી ૩:૦૦ જુલાઈ ૨૦૧૨

સ્થળ : જૈન વાડી, વર્ધમાનનગર પાસે, શારદા સર્કલ, કલોલ, ગાંધીનગર જીલ્લો.

જાહેર પરામરશ બેઠક ની સૂચિ :-

સૂચિ.	સમય	વિષયો
નોંધણી	૧૧:૦૦ – ૧૧:૩૦	સહભાગીઓ નોંધણી
ઉદ્ઘાટન	૧૧:૩૦ – ૧૧:૪૫	જાહેર પરામરશ બેઠકના ઉદ્ઘાટન આ જાહેર પરામરશ બેઠકના હેતુ
પર્યાવરણ અને સામાજિક અસર (ઈ.એસ.આઈ.એ) આકારણી અને પુનર્વસન અનેપુનઃ સ્થાપન યોજના.	૧૧:૪૫ – ૩:૦૦	સામાન્ય ડી.એફ.સી. ની રૂપરેખા અને ચોકકસમાં ૧૪૦ કિ.મી. વિગતો. આ ડ્રાફટ ઈ.એસ.આઈ.એ. મહત્વની તારણો. શમન પગલા પર્યાવરણ અને સામાજિક દેખરેખ તથા સૂચિત પુનર્વસન અને પુનઃ સ્થાપન યોજના ની રૂપરેખા. જમીન સંપાદન પ્રક્રિયા. જમીન સંપાદન અને પુનઃ સ્થાપન નીતિઓ અને ઉમેદવારીઓ. પુનર્વસન અને પુનઃ સ્થાપન યોજના. ફરિયાદ નિવારણ તંત્ર. માહિતી જાહેરે ઈ.એસ.આઈ.એ.અને આર.આર.પી.
ખુલ્લી ચર્ચા	૩:૦૦ – ૩:૩૦	પ્રશ્ન અને જવાબ સત્ર માહિતી શેરિંગ મુદાઓ પર ખુલાસાઓ, અને પી.એ.પી.એસ. ની સૂચના.
સમાપન કરવુ	૩:૩૦ – ૩:૪૦	સામાન્ય બંધ.

આભાર.

2. Public Notices (English and Gujarati)

【Public Notice in English】

Date

PUBLIC NOTICE

Ministry of Railways has taken up the Dedicated Freight Corridor Project (DFC) on the Western & Eastern Trunk routes to augment transportation capacity over these busy routes.

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) is implementing the Dedicated Freight Corridor (DFC) Project, which involves development of Multiple High Axle Load Freight Corridor with Computerized Control on the Western Industrial Corridor connecting from Dadri in Uttar Pradesh to JNPT in Maharashtra passing through Haryana, Rajasthan and Gujarat states. Ministry of Railways aims to implement the project in a participative manner with a people centric approach.

DFCCIL under Ministry of Railways is the executing agency for the development of DFC. In the Wamaj to Iqbalgarh Section in the Western Corridor, the proposed alignment passes through four districts namely Gandhinagar, Patan, Mehsana and Gandhinagar in Gujarat.

An Environmental and Social Impact Assessment (ESIA) for Wamaj to Iqbalgarh Section in the Western DFC Project was conducted, and the draft ESIA report has been prepared. The funding guidelines require participation of varieties of stakeholders by way of disseminating the project outline and the outcome of the draft ESIA report and seek opinion and suggestions on the report from general public and stakeholders of the project through Public Consultation Meetings (PCMs).

In addition to ESIA, a Rehabilitation and Resettlement Plan (RRP) for Western DFC Project (Wamaj – Iqbalgarh Section) is to be prepared by DFCCIL together with the Government of India based on the National Rehabilitation and Resettlement Policy 2007 (NRRP-2007). In the course of RRP preparation, the funding guidelines require participation of Project Affected Persons (PAPs) in RRP by way of disseminating the project and RRP related information and taking feedback from PAPs whose land and/or structure will be affected by the Project.

DFCCIL will coordinate for organising a PCM from the above viewpoints. In the Meeting, a presentation on details of; i) DFC project, ii) outcome of the ESIA and suggested mitigation measures, and iii) resettlement and rehabilitation provisions as per extant Government of India policies viz. NRRP-2007 will be given. A handout in Gujarati would also be distributed.

In this regard, a person interested in the Project and a representative from a Project Affected Family whose right, title or interest in any house, land or other asset acquired or possessed, in full or in part, (mainly those who have been involved in the Baseline Survey and Census or Joint Measurement Survey); or whose business, occupation, work, or place of residence would be adversely affected by the project (mainly those who are subject to the RRP); are requested to attend this meeting as per the details given below:

Date: …….

Time: …….

Venue: …….

…….

Signed by (DFCCIL)

For further information, please contact
CPM Office in ……..
Phone No……

【Public Notice in Gujarati】

તા. 26.09.2012

જાહેર નોટીસ

પ્રતિ
તમામ ગ્રામ જનો
વિયાજ

આથી આપને જણાવવામાં આવે છે કે ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લી. (DFCCIL) દ્વારા ડેડીકેટેડ ફ્રાઈટ કોરીડોર (DFC) પ્રોજેકટ અમલીકરણ કરવામાં આવનાર છે. જેમાં કોમ્પ્યુટરાઈડ કંટ્રોલથી મોટા ભારે માલગાડી માટેની રેલ્વે લાઈન પશ્ચીમ આદ્યોગિક કોરીડોર સાથે જોડાણ કરવામાં આવનાર છે. જે ઉત્તર પ્રદેશના-દાદરીથી જેએનપીટી-મહારાસ્ટ્ર સુધી બનનાર છે. જે હરીયાણા, રાજસ્થાન અને ગુજરાતમાંથી પસાર થનાર છે. સમગ્ર યોજનાનું અમલીકરણ લોકભાગીદારીના અભિગમથી લોકકેન્દ્રીત બની રહે તેવો રેલ્વે મંત્રાલયનો હેતુ છે.

આપની ગ્રામ પંચાયત સૂચિત ફ્રાઈટ કોરીડોર યોજનાના જિલ્લાઓ પૈકીની એક ગ્રામ પંચાયત છે, જેમાંથી સદર યોજનાની લાઈન પસાર થઈ રહી છે. આ યોજનાના અમલીકરણ દરમિયાન થનાર પર્યાવરણીય અને સામાજિક સંભવિત અસર માટે લોકોના સલાહ સુચન અને પ્રતિભાવો માટે એક બેઠકનું આયોજન કરવામાં આવેલ છે. ઉપરોકત હેતુને ધ્યાને રાખીને યોજનાના આયોજન અને અમલીકરણ માટે આપના સલાહ, સુચનો, પ્રતિભાવો આપવા માટે આપને આમંત્રીત કરવામાં આવે છે.

નીચે દર્શાવેલ વિગતે પ્રમાણે આપ ગ્રામજનોને હાજર રહેવા માટે વિનંતી કરવામાં આવે છે.

તારીખ : 32/09/2012 મંગળવાર સમય : સવારે 11:00 કલાકે
સ્થળ: જૈન વાડો, વર્દ્ધમાન નગર ચારરસ્તા, દાદરા સર્કલ, કલીલ;

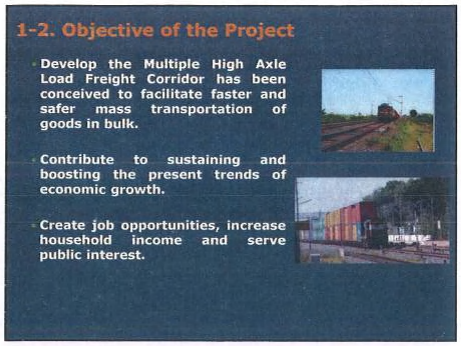
આભાર સહ,

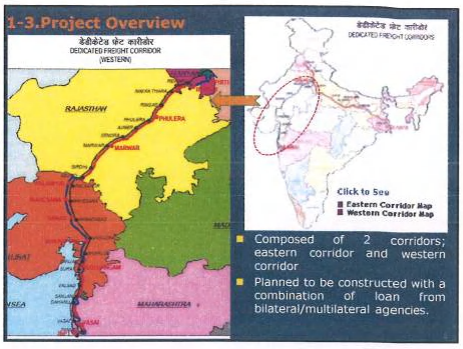
આપનો વિશ્વાસુ,
26-9-12
(આશુતોષ ચ્હાવત)
મુખ્ય યોજના પ્રબંધક
ડેડીકેટેડ ફ્રાઈટ કોરીડોર કોર્પો રેશન
ઓફ ઈન્ડિયા લી.
અમદાવાદ

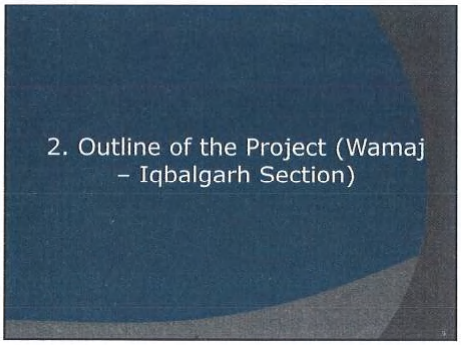
વધુ વિગત માટે સંપર્ક કરવો
૧) 2226402223 ૨)
ત્રિવેદી સાહેબ

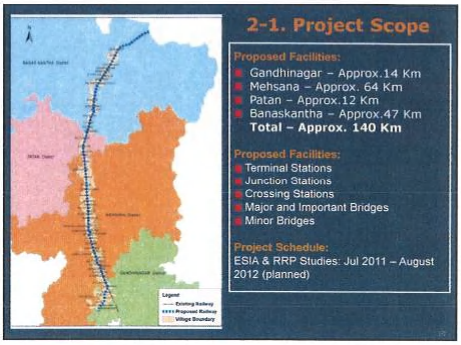
3. Presentation Materials (English and Gujarati)

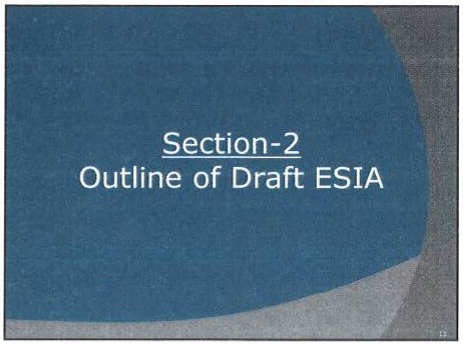
[Presentation material _ English]

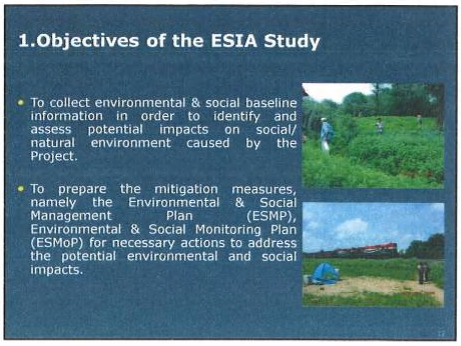

1-2. Objective of the Project
Develop the Multiple High Axle Load Freight Corridor has been conceived to facilitate faster and safer mass transportation of goods in bulk.
Contribute to sustaining and boosting the present trends of economic growth.
Create job opportunities, increase household income and serve public interest.

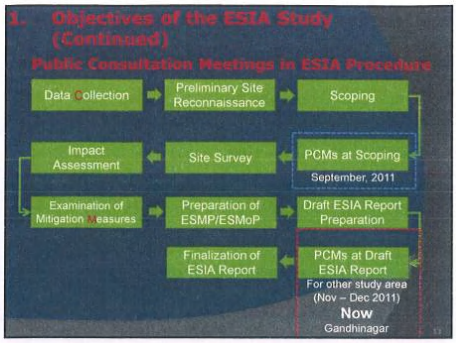

1-3.Project Overview
DEDICATED FREIGHT CORRIDOR (WESTERN)
RAJASTHAN
GUJARAT
MAHARASHTRA
Click to See
Eastern Corridor Map
Western Corridor Map
Composed of 2 corridors; eastern corridor and western corridor
Planned to be constructed with a combination of loan from bilateral/multilateral agencies.

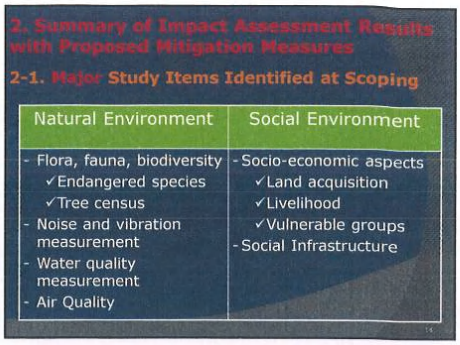

2. Outline of the Project (Wamaj – Iqbalgarh Section)

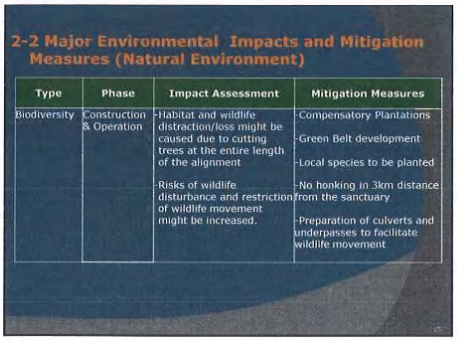

2-1. Project Scope
Proposed Facilities:
Gandhinagar – Approx.14 Km
Mehsana – Approx. 64 Km
Patan – Approx.12 Km
Banaskantha – Approx.47 Km
Total – Approx. 140 Km
Proposed Facilities:
Terminal Stations
Junction Stations
Crossing Stations
Major and Important Bridges
Minor Bridges
Project Schedule:
ESIA & RRP Studies: Jul 2011 – August 2012 (planned)

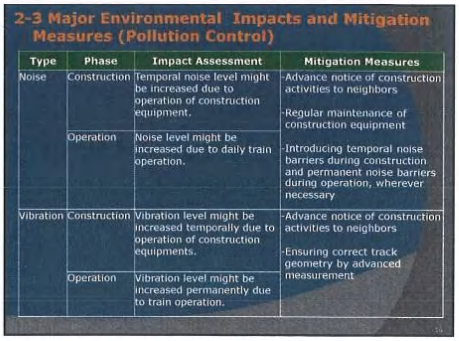

Section-2
Outline of Draft ESIA

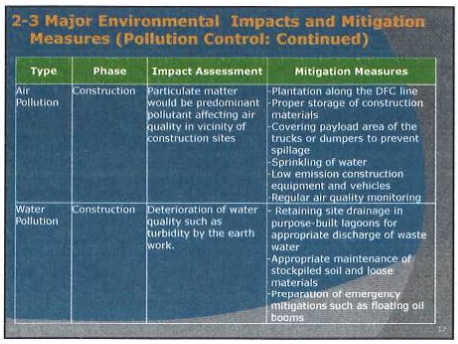

1.Objectives of the ESIA Study
To collect environmental & social baseline information in order to identify and assess potential impacts on social/ natural environment caused by the Project.
To prepare the mitigation measures, namely the Environmental & Social Management Plan (ESMP), Environmental & Social Monitoring Plan (ESMoP) for necessary actions to address the potential environmental and social impacts.

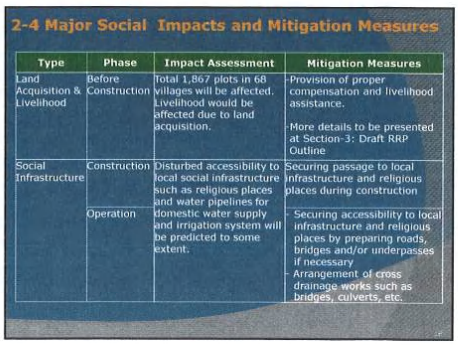

1. Objectives of the ESIA Study (Continued)
Public Consultation Meetings in ESIA Procedure
Data Collection
Preliminary Site Reconnaissance
Scoping
Impact Assessment
Site Survey
PCMs at Scoping
September, 2011
Examination of Mitigation Measures
Preparation of ESMP/ESMoP
Draft ESIA Report Preparation
Finalization of ESIA Report
PCMs at Draft ESIA Report
For other study area
(Nov – Dec 2011)
Now
Gandhinagar


2. Summary of Impact Assessment Results with Proposed Mitigation Measures
2-1. Major Study Items Identified at Scoping
Natural Environment
- Flora, fauna, biodiversity
✓Endangered species
✓Tree census
- Noise and vibration measurement
- Water quality measurement
- Air Quality
Social Environment
- Socio-economic aspects
✓Land acquisition
✓Livelihood
✓Vulnerable groups
- Social Infrastructure


2-2 Major Environmental Impacts and Mitigation Measures (Natural Environment)
Type
Phase
Impact Assessment
Mitigation Measures
Biodiversity
Construction & Operation
-Habitat and wildlife distraction/loss might be caused due to cutting trees at the entire length of the alignment
-Risks of wildlife disturbance and restriction of wildlife movement might be increased.
-Compensatory Plantations
-Green Belt development
-Local species to be planted
-No honking in 3km distance from the sanctuary
-Preparation of culverts and underpasses to facilitate wildlife movement


2-3 Major Environmental Impacts and Mitigation Measures (Pollution Control)
Type
Phase
Impact Assessment
Mitigation Measures
Noise
Construction
Temporal noise level might be increased due to operation of construction equipment.
-Advance notice of construction activities to neighbors
-Regular maintenance of construction equipment
Operation
Noise level might be increased due to daily train operation.
-Introducing temporal noise barriers during construction and permanent noise barriers during operation, wherever necessary
Vibration
Construction
Vibration level might be increased temporally due to operation of construction equipments.
-Advance notice of construction activities to neighbors
-Ensuring correct track geometry by advanced measurement
Operation
Vibration level might be increased permanently due to train operation.


2-3 Major Environmental Impacts and Mitigation Measures (Pollution Control: Continued)
Type
Phase
Impact Assessment
Mitigation Measures
Air Pollution
Construction
Particulate matter would be predominant pollutant affecting air quality in vicinity of construction sites
-Plantation along the DFC line
-Proper storage of construction materials
-Covering payload area of the trucks or dumpers to prevent spillage
-Sprinkling of water
-Low emission construction equipment and vehicles
-Regular air quality monitoring
Water Pollution
Construction
Deterioration of water quality such as turbidity by the earth work.
- Retaining site drainage in purpose-built lagoons for appropriate discharge of waste water
-Appropriate maintenance of stockpiled soil and loose materials
-Preparation of emergency mitigations such as floating oil booms


2-4 Major Social Impacts and Mitigation Measures
Type
Phase
Impact Assessment
Mitigation Measures
Land Acquisition & Livelihood
Before Construction
Total 1,867 plots in 68 villages will be affected. Livelihood would be affected due to land acquisition.
-Provision of proper compensation and livelihood assistance.
-More details to be presented at Section-3: Draft RRP Outline
Social Infrastructure
Construction
Disturbed accessibility to local social infrastructure such as religious places and water pipelines for domestic water supply and irrigation system will be predicted to some extent.
Securing passage to local infrastructure and religious places during construction
Operation
- Securing accessibility to local infrastructure and religious places by preparing roads, bridges and/or underpasses if necessary
- Arrangement of cross drainage works such as bridges, culverts, etc.

2-5. Environment & Social Monitoring Plan (Summary

During construction and operation phases, environmental & social impacts and mitigation activities will be monitored by SEMU (Social & Environmental Management Unit) in DFCCIL.

Type	Phase	Monitoring Activity
Biodiversity (Plantation, Fauna disturbance)	Construction	Reporting plantation progress and comparison of progress every 6 months.
	Operation	Checking the site condition each season.
Noise & Vibration	Construction	Measuring noise & vibration level according to the national standards (noise) and international standards (vibration)
	Operation	
Water quality	Construction	Sampling & analysis of river water at the construction site and wastewater as per the national water quality standard
	Operation	
Air quality	Construction	Sampling & analysis of air for selected parameters (e.g. dust & exhaust emission) according to the national air quality standard
Land Acquisition & Livelihood	Planning	Monthly check of compensation payment record and problems raised by communities.
	Construction	
Access to Social Infrastructure	Planning	Monthly/quarterly check of problems raised by communities.
	Construction	

2-6. Further Information Disclosure of the Draft ESIA Report and Your Comments

Draft and Final ESIA Report will be available for public viewing in the following locations:

Draft ESIA

- Summary of Draft ESIA in Gujarati will be available in Sarpanch offices of all the project affected villages from late December. 2011 for 10 days.
- Full report of Draft ESIA will be available in English at DFCCIL Head Office, Chief Project Manager (CPM) Ahmedabad and Ajmer, major stations along the proposed DFC alignment, and respective District Offices from late Dec. 2011 for 10 days.
- Comments can be submitted to the DFCCIL Head Office or respective CPM offices either by post or through email at dfc.package3@gmail.com from late Dec . 2011 for 10 days.

Final ESIA

- Final ESIA report will be available in the same locations from late September. 2012 (planned).

Section-3
Outline of Draft RRP

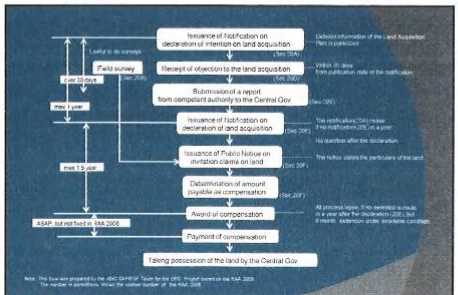
1. Objectives of the RRP Study

1. To identify the Project Affected Persons (PAPs) of the Project and potential negative impacts by the Baseline Survey and Census.
2. To minimise the negative impacts as much as possible by considering alternatives.
3. To prepare the compensation policy, namely the Entitlement Matrix to mitigate expected negative impacts of land acquisition and resettlement.
4. To collect opinions/suggestions from PAPs and stakeholders via PCMs and information disclosure to incorporate them into the Final RRP.

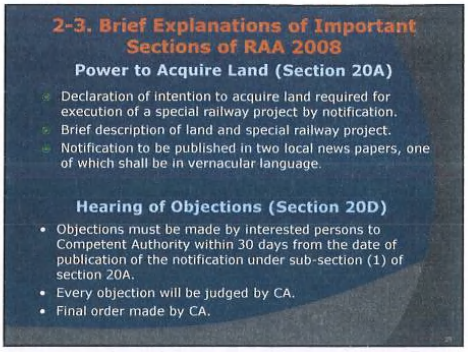
2. Relevant Legislations

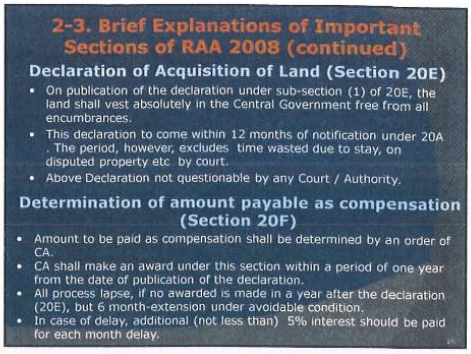
2-1. Basic Legislation & Policy of Land Acquisition and Rehabilitation & Resettlement for DFC Project

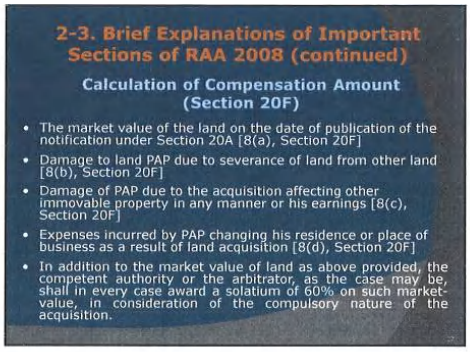
- Railways (Amendment) Act, 2008
  - The Act under which the land acquisition is being done by the DFC Project (declared as Special Railway Project).
  - Land Acquisition Act 1894 is not applied to the land acquisition under this Act.
- National Rehabilitation & Resettlement Policy, 2007
  - In DFC project, a narrow stretch of Land is to be acquired. Para 7.19 of NRRP 2007 is basically applicable to DFC project
- State Legislation

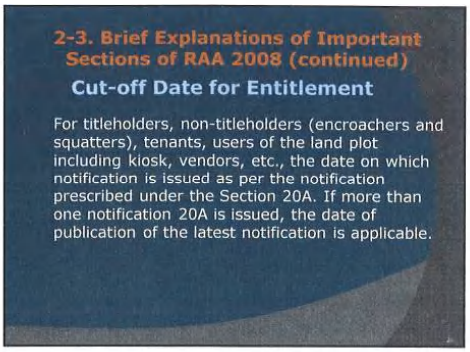


2-2. Flowchart of the Land Acquisition Process under Railways (Amendment) Act, 2008

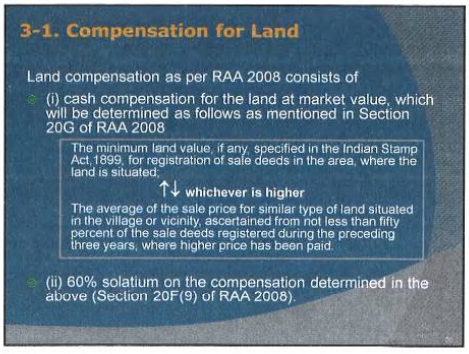

2-3. Brief Explanations of Important Sections of RAA 2008
Power to Acquire Land (Section 20A)
Declaration of intention to acquire land required for execution of a special railway project by notification.
Brief description of land and special railway project.
Notification to be published in two local news papers, one of which shall be in vernacular language.
Hearing of Objections (Section 20D)
Objections must be made by interested persons to Competent Authority within 30 days from the date of publication of the notification under sub-section (1) of section 20A.
Every objection will be judged by CA.
Final order made by CA.

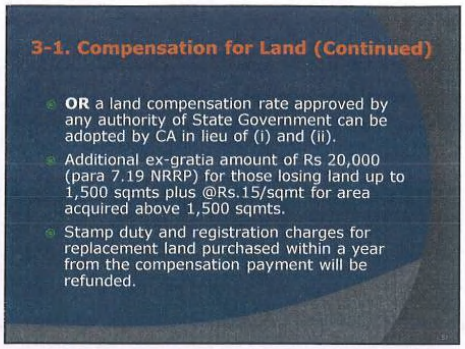

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)
Declaration of Acquisition of Land (Section 20E)
On publication of the declaration under sub-section (1) of 20E, the land shall vest absolutely in the Central Government free from all encumbrances.
This declaration to come within 12 months of notification under 20A . The period, however, excludes time wasted due to stay, on disputed property etc by court.
Above Declaration not questionable by any Court / Authority.
Determination of amount payable as compensation (Section 20F)
Amount to be paid as compensation shall be determined by an order of CA.
CA shall make an award under this section within a period of one year from the date of publication of the declaration.
All process lapse, if no awarded is made in a year after the declaration (20E), but 6 month-extension under avoidable condition.
In case of delay, additional (not less than) 5% interest should be paid for each month delay.

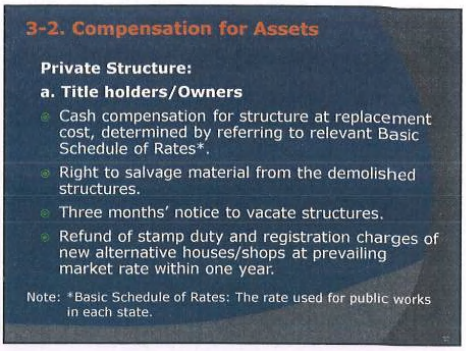

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)
Calculation of Compensation Amount (Section 20F)
The market value of the land on the date of publication of the notification under Section 20A [8(a), Section 20F]
Damage to land PAP due to severance of land from other land [8(b), Section 20F]
Damage of PAP due to the acquisition affecting other immovable property in any manner or his earnings [8(c), Section 20F]
Expenses incurred by PAP changing his residence or place of business as a result of land acquisition [8(d), Section 20F]
In addition to the market value of land as above provided, the competent authority or the arbitrator, as the case may be, shall in every case award a solatium of 60% on such market-value, in consideration of the compulsory nature of the acquisition.

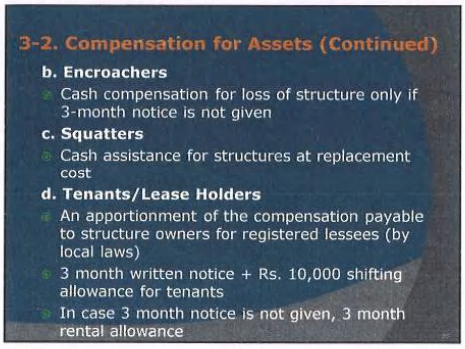

2-3. Brief Explanations of Important Sections of RAA 2008 (continued)
Cut-off Date for Entitlement
For titleholders, non-titleholders (encroachers and squatters), tenants, users of the land plot including kiosk, vendors, etc., the date on which notification is issued as per the notification prescribed under the Section 20A. If more than one notification 20A is issued, the date of publication of the latest notification is applicable.

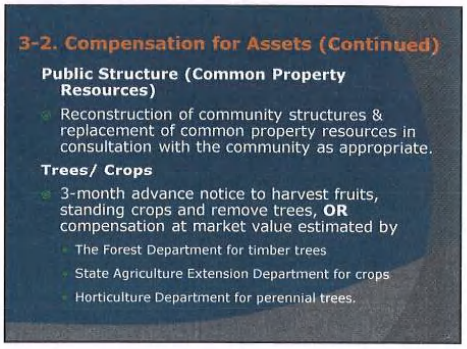

3. Proposed Compensation Package of DFC Project (Summary)
3-1.Compensation for Land
3-2.Compensation for Assets
3-3.Rehabilitation and Resettlement Assistance

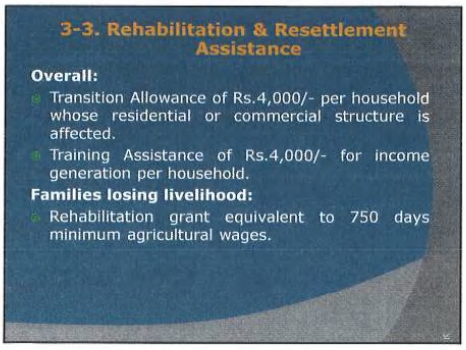

3-1. Compensation for Land
Land compensation as per RAA 2008 consists of
(i) cash compensation for the land at market value, which will be determined as follows as mentioned in Section 20G of RAA 2008
The minimum land value, if any, specified in the Indian Stamp Act,1899, for registration of sale deeds in the area, where the land is situated.
↑↓ whichever is higher
The average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than fifty percent of the sale deeds registered during the preceding three years, where higher price has been paid.
(ii) 60% solatium on the compensation determined in the above (Section 20F(9) of RAA 2008).

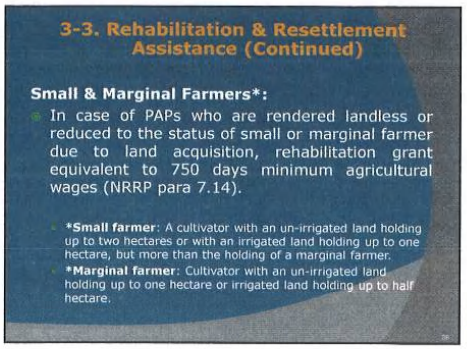

3-1. Compensation for Land (Continued)
OR a land compensation rate approved by any authority of State Government can be adopted by CA in lieu of (i) and (ii).
Additional ex-gratia amount of Rs 20,000 (para 7.19 NRRP) for those losing land up to 1,500 sqmts plus @Rs.15/sqmt for area acquired above 1,500 sqmts.
Stamp duty and registration charges for replacement land purchased within a year from the compensation payment will be refunded.

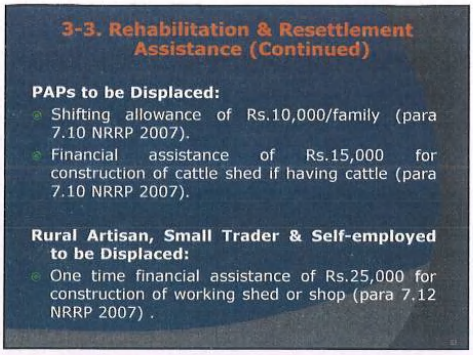

3-2. Compensation for Assets
Private Structure:
a. Title holders/Owners
Cash compensation for structure at replacement cost, determined by referring to relevant Basic Schedule of Rates*.
Right to salvage material from the demolished structures.
Three months' notice to vacate structures.
Refund of stamp duty and registration charges of new alternative houses/shops at prevailing market rate within one year.
Note: *Basic Schedule of Rates: The rate used for public works in each state.

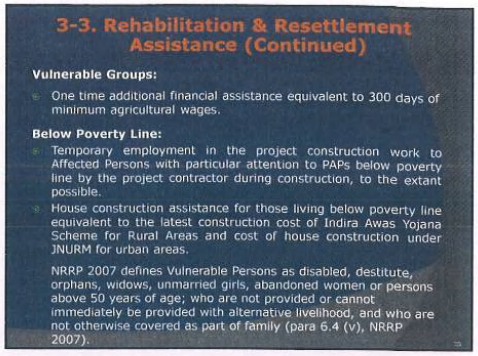

3-2. Compensation for Assets (Continued)
b. Encroachers
Cash compensation for loss of structure only if 3-month notice is not given
c. Squatters
Cash assistance for structures at replacement cost
d. Tenants/Lease Holders
An apportionment of the compensation payable to structure owners for registered lessees (by local laws)
3 month written notice + Rs. 10,000 shifting allowance for tenants
In case 3 month notice is not given, 3 month rental allowance

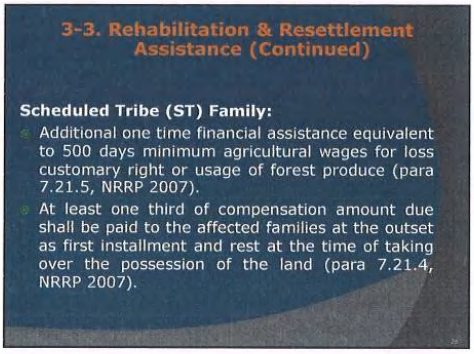

3-2. Compensation for Assets (Continued)
Public Structure (Common Property Resources)
Reconstruction of community structures & replacement of common property resources in consultation with the community as appropriate.
Trees/ Crops
3-month advance notice to harvest fruits, standing crops and remove trees, OR compensation at market value estimated by
The Forest Department for timber trees
State Agriculture Extension Department for crops
Horticulture Department for perennial trees.

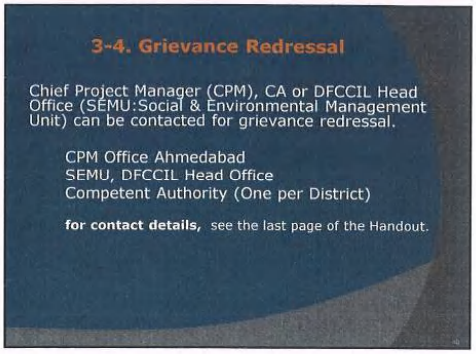

3-3. Rehabilitation & Resettlement Assistance
Overall:
Transition Allowance of Rs.4,000/- per household whose residential or commercial structure is affected.
Training Assistance of Rs.4,000/- for income generation per household.
Families losing livelihood:
Rehabilitation grant equivalent to 750 days minimum agricultural wages.

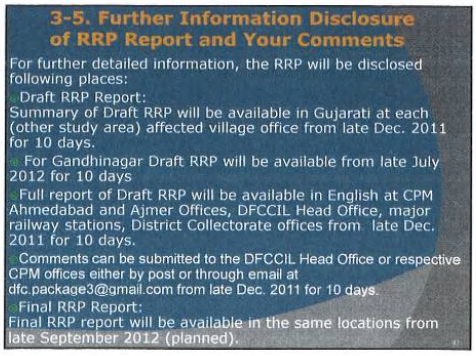

3-3. Rehabilitation & Resettlement Assistance (Continued)
Small & Marginal Farmers*:
In case of PAPs who are rendered landless or reduced to the status of small or marginal farmer due to land acquisition, rehabilitation grant equivalent to 750 days minimum agricultural wages (NRRP para 7.14).
*Small farmer: A cultivator with an un-irrigated land holding up to two hectares or with an irrigated land holding up to one hectare, but more than the holding of a marginal farmer.
*Marginal farmer: Cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to half hectare.

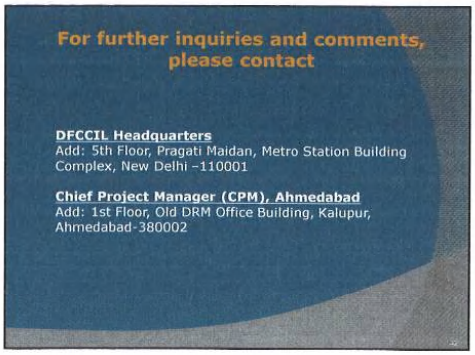

3-3. Rehabilitation & Resettlement Assistance (Continued)
PAPs to be Displaced:
Shifting allowance of Rs.10,000/family (para 7.10 NRRP 2007).
Financial assistance of Rs.15,000 for construction of cattle shed if having cattle (para 7.10 NRRP 2007).
Rural Artisan, Small Trader & Self-employed to be Displaced:
One time financial assistance of Rs.25,000 for construction of working shed or shop (para 7.12 NRRP 2007) .


3-3. Rehabilitation & Resettlement Assistance (Continued)
Vulnerable Groups:
One time additional financial assistance equivalent to 300 days of minimum agricultural wages.
Below Poverty Line:
Temporary employment in the project construction work to Affected Persons with particular attention to PAPs below poverty line by the project contractor during construction, to the extant possible.
House construction assistance for those living below poverty line equivalent to the latest construction cost of Indira Awas Yojana Scheme for Rural Areas and cost of house construction under JNURM for urban areas.
NRRP 2007 defines Vulnerable Persons as disabled, destitute, orphans, widows, unmarried girls, abandoned women or persons above 50 years of age; who are not provided or cannot immediately be provided with alternative livelihood, and who are not otherwise covered as part of family (para 6.4 (v), NRRP 2007).

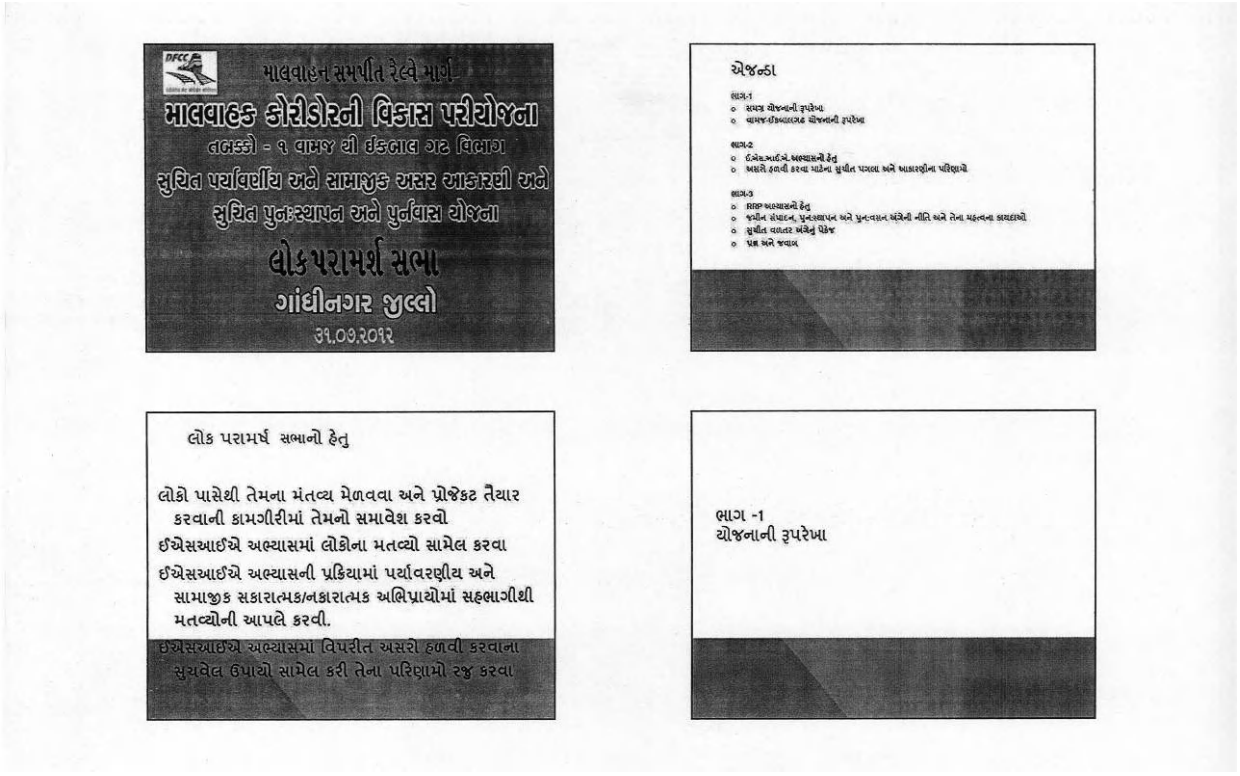

3-3. Rehabilitation & Resettlement Assistance (Continued)
Scheduled Tribe (ST) Family:
Additional one time financial assistance equivalent to 500 days minimum agricultural wages for loss customary right or usage of forest produce (para 7.21.5, NRRP 2007).
At least one third of compensation amount due shall be paid to the affected families at the outset as first installment and rest at the time of taking over the possession of the land (para 7.21.4, NRRP 2007).


3-4. Grievance Redressal
Chief Project Manager (CPM), CA or DFCCIL Head Office (SEMU:Social & Environmental Management Unit) can be contacted for grievance redressal.
CPM Office Ahmedabad
SEMU, DFCCIL Head Office
Competent Authority (One per District)
for contact details, see the last page of the Handout.


3-5. Further Information Disclosure of RRP Report and Your Comments
For further detailed information, the RRP will be disclosed following places:
Draft RRP Report:
Summary of Draft RRP will be available in Gujarati at each (other study area) affected village office from late Dec. 2011 for 10 days.
For Gandhinagar Draft RRP will be available from late July 2012 for 10 days
Full report of Draft RRP will be available in English at CPM Ahmedabad and Ajmer Offices, DFCCIL Head Office, major railway stations, District Collectorate offices from late Dec. 2011 for 10 days.
Comments can be submitted to the DFCCIL Head Office or respective CPM offices either by post or through email at dfc.package3@gmail.com from late Dec. 2011 for 10 days.
Final RRP Report:
Final RRP report will be available in the same locations from late September 2012 (planned).


For further inquiries and comments, please contact
DFCCIL Headquarters
Add: 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi -110001
Chief Project Manager (CPM), Ahmedabad
Add: 1st Floor, Old DRM Office Building, Kalupur, Ahmedabad-380002

[Presentation material _ Gujarati]


માલવાહક સમર્પીત રેલ્વે માર્ગ
માલવાહક કોરીડોરની વિકાસ પરીયોજના
તબક્કો - ૧ વામજ થી ઈકબાલ ગઢ વિભાગ
સુચિત પર્યાવર્ણીય અને સામાજીક અસર આકારણી અને
સુચિત પુનઃસ્થાપન અને પુર્નવાસ યોજના
લોક પરામર્શ સભા
ગાંધીનગર જીલ્લો
૩૧.૦૩.૨૦૧૨

એજન્ડા

ભાગ-૧
- સમગ્ર યોજનાની રૂપરેખા
- વામજ-ઈકબાલગઢ યોજનાની રૂપરેખા

ભાગ-૨
- ઈએસ.આઈએ.અભ્યાસનો હેતુ
- અસરો ઠાળવી કરવા માટેના સુચીત પગલા અને આકારણીના પરિણામો

ભાગ-૩
- લોક અભ્યાસનો હેતુ
- જમીન સંપાદન, પુનઃસ્થાપન અને પુનઃવસન અંગેની નીતિ અને તેના મહત્વના પ્રાવધાનો
- સુચીત વળતર અંગેનું પેકેજ
- પ્રશ્ન અને જવાબ

લોક પરામર્ષ સભાનો હેતુ

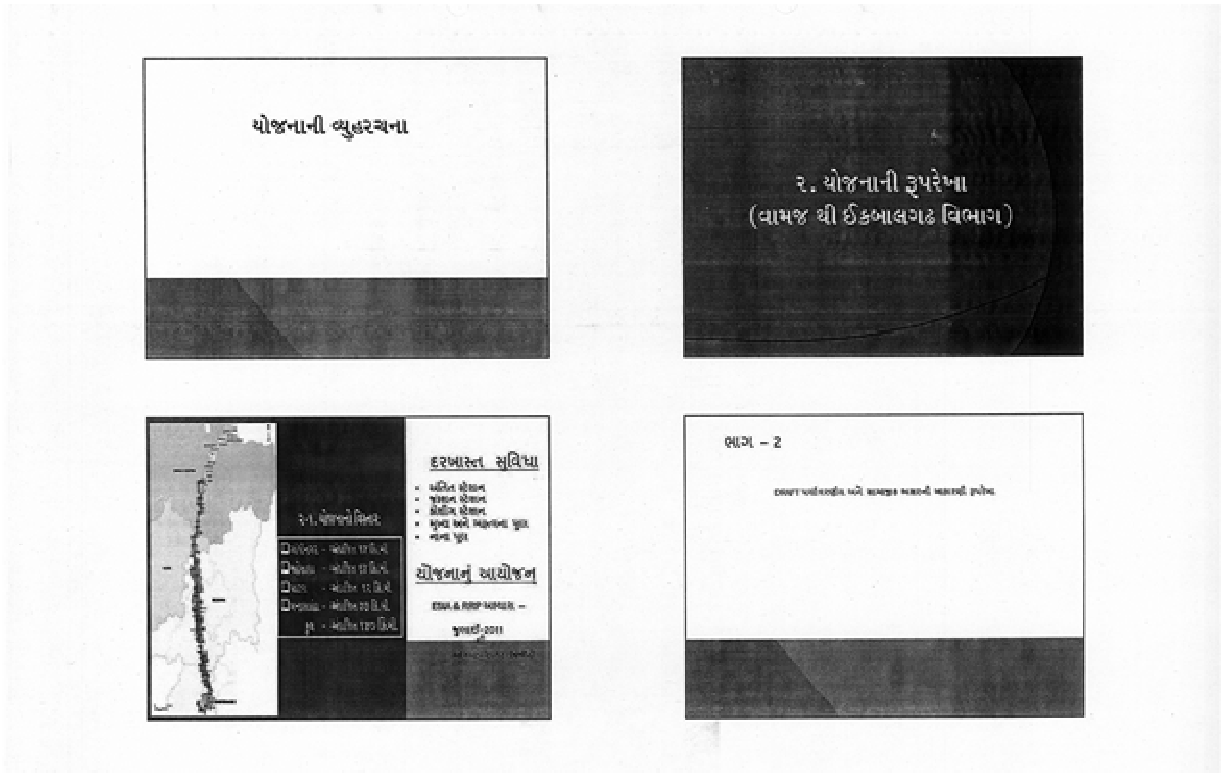
લોકો પાસેથી તેમના મંતવ્ય મેળવવા અને પ્રોજેકટ તૈયાર કરવાની કામગીરીમાં તેમનો સમાવેશ કરવો

ઈએસઆઈએ અભ્યાસમાં લોકોના મતવ્યો સામેલ કરવા

ઈએસઆઈએ અભ્યાસની પ્રક્રિયામાં પર્યાવરણીય અને સામાજીક સકારાત્મક/નકારાત્મક અભિપ્રાયોમાં સહભાગીથી મતવ્યોની આપલે કરવી.

ઈએસઆઈએ અભ્યાસમા વિપરીત અસરો ઠાળવી કરવાના સુચવેલ ઉપાયો સામેલ કરી તેના પરિણામો રજુ કરવા

ભાગ -1
યોજનાની રૂપરેખા

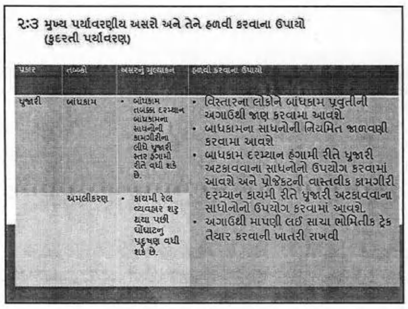

યોજનાની વ્યુહરચના

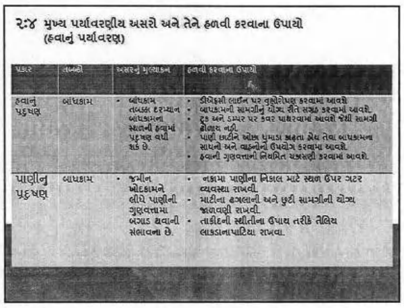
૨. યોજનાની રૂપરેખા
(વામજ થી ઈકબાલગઢ વિભાગ)

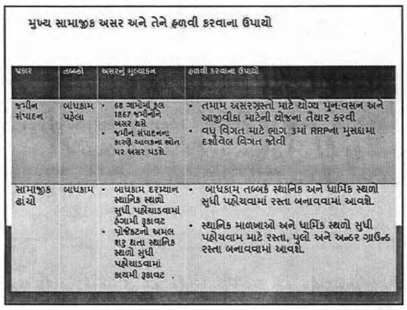
દરખાસ્ત સુવિધા
- મલિત સ્ટેશન
- યાર્ડ્સ સ્ટેશન
- ટર્મીનલ સ્ટેશન
- મુખ્ય માર્ગ ક્રોસીંગના પુલ
- નાના પુલ

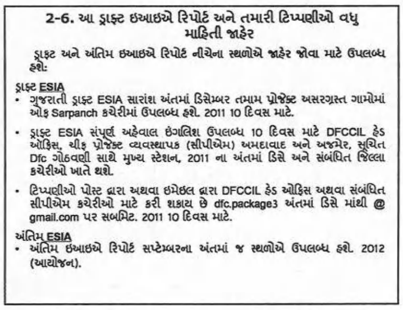
યોજનાનું આયોજન

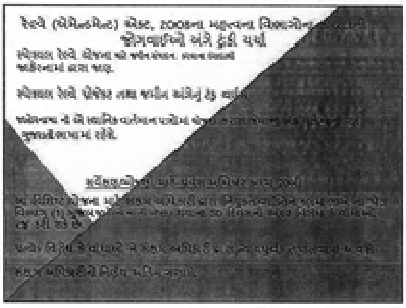
ભાગ – 2

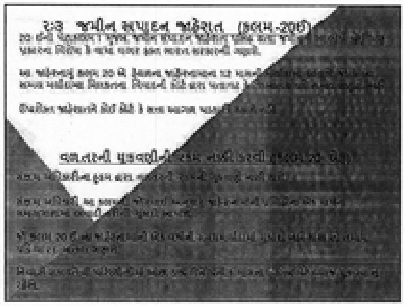

૨:૩ મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો
(કુદરતી પર્યાવરણ)
પ્રકાર
તબક્કો
અસરનું મુલ્યાંકન
હળવી કરવાના ઉપાયો
ધ્રુજારી
બાંધકામ
બાંધકામ તબક્કા દરમ્યાન બાંધકામના સાધનોની કામગીરીના લીધે ધ્રુજારી સ્તર હંગામી રીતે વધી શકે છે.
વિસ્તારના લોકોને બાંધકામ પ્રવુતીની અગાઉથી જાણ કરવામા આવશે.
બાધકામના સાધનોની નિયમિત જાળવણી કરવામા આવશે
બાધકામ દરમ્યાન હંગામી રીતે ધ્રુજારી અટકાવવાના સાધનોનો ઉપયોગ કરવામાં આવશે અને પ્રોજેકટની વાસ્તવીક કામગીરી દરમ્યાન કાયમી રીતે ધ્રુજારી અટકાવવાના સાધોનોનો ઉપયોગ કરવામાં આવશે.
અગાઉથી માપણી લઈ સાચા ભોમિતીક ટ્રેક તૈયાર કરવાની ખાતરી રાખવી
અમલીકરણ
કાયમી રેલ વ્યવહાર શરુ થયા પછી ઘોંઘાટનુ પ્રદુષણ વધી શકે છે.

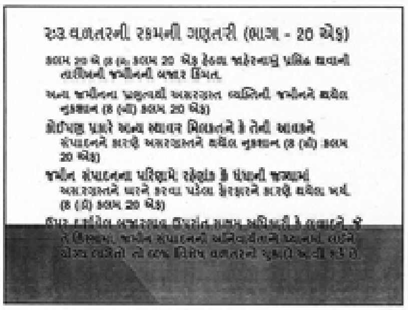

૨:૪ મુખ્ય પર્યાવરણીય અસરો અને તેને હળવી કરવાના ઉપાયો
(હવાનું પર્યાવરણ)
પ્રકાર
તબક્કો
અસરનું મુલ્યાંકન
હળવી કરવાના ઉપાયો
હવાનું પ્રદુષણ
બાંધકામ
બાંધકામ તબક્કા દરમ્યાન બાંધકામના સ્થળની હવામાં પ્રદુષણ વધી શકે છે.
ડીએફસી લાઈન પર વૃક્ષોરોપણ કરવામાં આવશે
બાધકામની સામગ્રીનું યોગ્ય રીતે સગ્રહ કરવામાં આવશે.
ટ્રક અને ડમ્પર પર કવર પાથરવામાં આવશે જેથી સામગ્રી ઢોળાય નહી.
પાણી છાટીને ઓછા ધુમાડા કાઢતા હોય તેવા બાધકામના સાધનો અને વાહનોનો ઉપયોગ કરવામા આવશે.
હવાની ગુણવત્તાની નિયમિત ચકાસણી કરવામાં આવશે.
પાણીનુ પ્રદુષણ
બાધકામ
જમીન ખોદકામને લીધે પાણીની ગુણવત્તામા બગાડ થવાની સંભાવના છે.
નકામા પાણીના નિકાલ માટે સ્થળ ઉપર ગટર વ્યવસ્થા રાખવી.
માટીના ઢગલાની અને છુટી સામગ્રીની યોગ્ય જાળવણી રાખવી.
તાકીદની સ્થીતીના ઉપાય તરીકે તૈલિય લાકડાનાપાટિયા રાખવા.

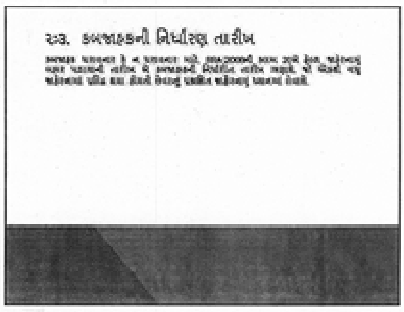

મુખ્ય સામાજીક અસર અને તેને હળવી કરવાના ઉપાયો
પ્રકાર
તબક્કો
અસરનુ મુલ્યાંકન
હળવી કરવાના ઉપાયો
જમીન સંપાદન
બાંધકામ પહેલા
68 ગામોમાં કુલ 1867 જમીનોને અસર થસે
જમીન સંપાદનના કારણે આવકના સ્રોત પર અસર પડશે.
તમામ અસરગ્રસ્તો માટે યોગ્ય પુનઃવસન અને આજીવીકા માટેની યોજના તૈયાર કરવી
વધુ વિગત માટે ભાગ 3માં RRPના મુસદ્દામા દર્શાવેલ વિગત જોવી
સામાજીક ઢાંચો
બાધકામ
બાધકામ દરમ્યાન સ્થાનિક સ્થળો સુધી પહોચાડવામાં હંગામી રૂકાવટ
પ્રોજેકટનો અમલ શરુ થતા સ્થાનિક સ્થળો સુધી પહોચાડવામાં કાયમી રૂકાવટ .
બાધકામ તબ્બકે સ્થાનિક અને ધાર્મિક સ્થળો સુધી પહોચવામાં રસ્તા બનાવવામાં આવશે.
સ્થાનિક માળખાઓ અને ધાર્મિક સ્થળો સુધી પહોચવામ માટે રસ્તા, પુલો અને અન્ડર ગ્રાઉન્ડ રસ્તા બનાવવામાં આવશે.

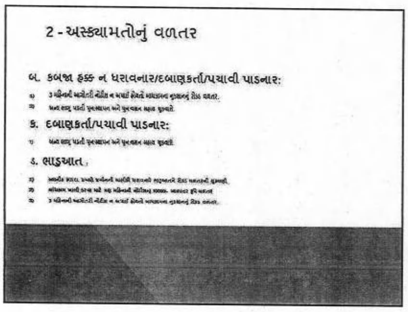

2-6. આ ડ્રાફ્ટ ઇઆઇએ રિપોર્ટ અને તમારી ટિપ્પણીઓ વધુ માહિતી જાહેર
ડ્રાફ્ટ અને અંતિમ ઇઆઇએ રિપોર્ટ નીચેના સ્થળોએ જાહેર જોવા માટે ઉપલબ્ધ હશે:
ડ્રાફ્ટ ESIA
ગુજરાતી ડ્રાફ્ટ ESIA સારાંશ અંતમાં ડિસેમ્બર તમામ પ્રોજેક્ટ અસરગ્રસ્ત ગામોમાં ઓફ Sarpanch કચેરીમાં ઉપલબ્ધ હશે. 2011 10 દિવસ માટે.
ડ્રાફ્ટ ESIA સંપૂર્ણ અહેવાલ ઇંગલિશ ઉપલબ્ધ 10 દિવસ માટે DFCCIL હેડ ઑફિસ, ચીફ પ્રોજેક્ટ વ્યવસ્થાપક (સીપીએમ) અમદાવાદ અને અજમેર, સૂચિત Dfc ગોઠવણી સાથે મુખ્ય સ્ટેશન, 2011 ના અંતમાં ડિસે અને સંબંધિત જિલ્લા કચેરીઓ ખાતે થશે.
ટિપ્પણીઓ પોસ્ટ દ્વારા અથવા ઇમેઇલ દ્વારા DFCCIL હેડ ઓફિસ અથવા સંબંધિત સીપીએમ કચેરીઓ માટે કરી શકાય છે dfc.package3 અંતમાં ડિસે માંથી @ gmail.com પર સબમિટ. 2011 10 દિવસ માટે.
અંતિમ ESIA
અંતિમ ઇઆઇએ રિપોર્ટ સપ્ટેમ્બરના અંતમાં જ સ્થળોએ ઉપલબ્ધ હશે. 2012 (આયોજન).

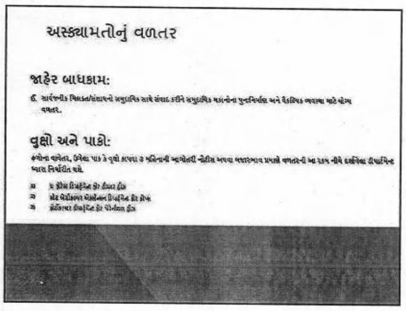

રેલ્વે (એમેન્ડમેન્ટ) એક્ટ, 2008ના મહત્વના વિભાગોના
જોગવાઈઓ અંગે ટુંકી ચર્ચા
ગુજરાતી ભાષામાં રહેશે.

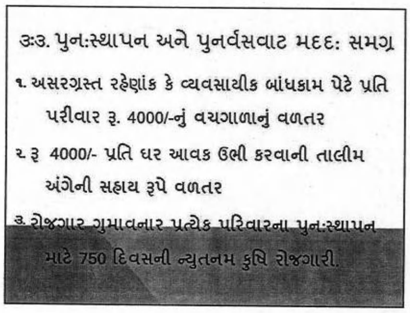

૨:૩ જમીન સંપાદન જાહેરાત (કલમ-20ઈ)

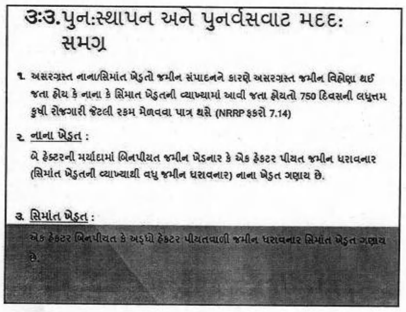

૨:૩ વળતરની રકમની ગણતરી (ભાગ - 20 એફ)

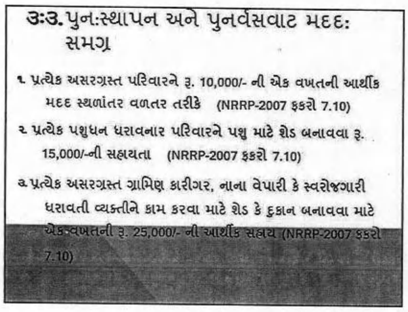

૨:૩. કબજાહકની નિર્ધારણ તારીખ

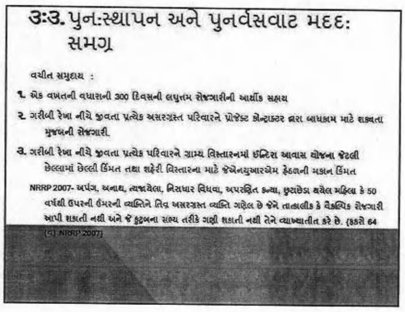

2 - અસ્ક્યામતોનું વળતર
બ. કબજા હક્ક ન ધરાવનાર/દબાણકર્તા/પચાવી પાડનાર:
ક. દબાણકર્તા/પચાવી પાડનાર:
ડ. ભાડુઆત

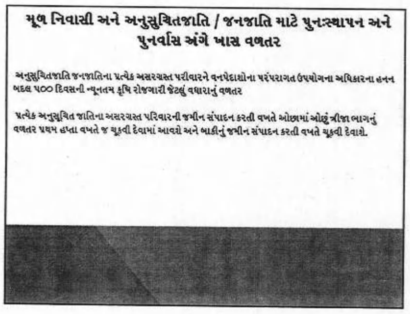

અસ્ક્યામતોનું વળતર
જાહેર બાધકામ:
વૃક્ષો અને પાકો:

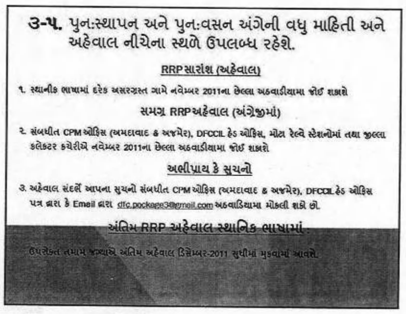

૩:૩. પુન:સ્થાપન અને પુનર્વસવાટ મદદ: સમગ્ર
૧. અસરગ્રસ્ત રહેણાંક કે વ્યવસાયીક બાંધકામ પેટે પ્રતિ પરીવાર રૂ. 4000/-નું વચગાળાનું વળતર
૨ રૂ 4000/- પ્રતિ ઘર આવક ઉભી કરવાની તાલીમ અંગેની સહાય રૂપે વળતર
૩. રોજગાર ગુમાવનાર પ્રત્યેક પરિવારના પુન:સ્થાપન માટે 750 દિવસની ન્યુતનમ કુષિ રોજગારી.


૩:૩.પુન:સ્થાપન અને પુનર્વસવાટ મદદ: સમગ્ર
૧. અસરગ્રસ્ત નાના/સિમાંત ખેડુતો જમીન સંપાદનને કારણે અસરગ્રસ્ત જમીન વિહોણા થઈ જતા હોય કે નાના કે સિંમાત ખેડુતની વ્યાખ્યામાં આવી જતા હોયતો 750 દિવસની લઘુત્તમ કુષી રોજગારી જેટલી રકમ મેળવવા પાત્ર થસે (NRRP ફકરો 7.14)
૨. નાના ખેડુત :
બે હેકટરની મર્યાદામાં બિનપીયત જમીન ખેડનાર કે એક હેકટર પીયત જમીન ધરાવનાર (સિમાંત ખેડુતની વ્યાખ્યાથી વધુ જમીન ધરાવનાર) નાના ખેડુત ગણાય છે.
૩. સિમાંત ખેડુત :
એક હેકટર બિનપીયત કે અડધો હેકટર પીયતવાળી જમીન ધરાવનાર સિમાંત ખેડુત ગણાય છે.


૩:૩.પુન:સ્થાપન અને પુનર્વસવાટ મદદ: સમગ્ર
૧. પ્રત્યેક અસરગ્રસ્ત પરિવારને રૂ. 10,000/- ની એક વખતની આર્થીક મદદ સ્થળાંતર વળતર તરીકે (NRRP-2007 ફકરો 7.10)
૨ પ્રત્યેક પશુધન ધરાવનાર પરિવારને પશુ માટે શેડ બનાવવા રૂ. 15,000/-ની સહાયતા (NRRP-2007 ફકરો 7.10)
૩ પ્રત્યેક અસરગ્રસ્ત ગ્રામિણ કારીગર, નાના વેપારી કે સ્વરોજગારી ધરાવતી વ્યક્તીને કામ કરવા માટે શેડ કે દુકાન બનાવવા માટે એક વખતની રૂ. 25,000/- ની આર્થીક સહાય (NRRP-2007 ફકરો 7.10)


૩:૩.પુન:સ્થાપન અને પુનર્વસવાટ મદદ: સમગ્ર
વચીત સમુદાય :
૧. એક વખતની વધારાની 300 દિવસની લઘુત્તમ રોજગારીની આર્થીક સહાય
૨. ગરીબી રેખા નીચે જીવતા પ્રત્યેક અસરગ્રસ્ત પરિવારને પ્રોજેક્ટ કોન્ટ્રાક્ટર દ્વારા બાધકામ માટે શક્યતા મુજબની રોજગારી.
૩. ગરીબી રેખા નીચે જીવતા પ્રત્યેક પરિવારને ગ્રામ્ય વિસ્તારનમાં ઈન્દિરા આવાસ યોજના જેટલી છેલ્લામાં છેલ્લી કિંમત તથા શહેરી વિસ્તારના માટે જેએનયુઆરએમ હેઠળની મકાન કિંમત
NRRP 2007- અપંગ, અનાથ, ત્યજાયેલા, નિરાધાર વિધવા, અપરણિત કન્યા, છુટાછેડા થયેલ મહિલા કે 50 વર્ષથી ઉપરની ઉંમરની વ્યક્તિને તિવ્ર અસરગ્રસ્ત વ્યક્તિ ગણેલ છે જેને તાત્કાલીક કે વૈકલ્પિક રોજગારી આપી શકાતી નથી અને જે કુટુંબના સભ્ય તરીકે ગણી શકાતી નથી તેને વ્યાખ્યાતીત કરે છે. (ફકરો 64 (ઢ) NRRP 2007)


મૂળ નિવાસી અને અનુસુચિતજાતિ / જનજાતિ માટે પુન:સ્થાપન અને પુનર્વાસ અંગે ખાસ વળતર
અનુસુચિતજાતિ જનજાતિના પ્રત્યેક અસરગ્રસ્ત પરીવારને વનપેદાશોના પરંપરાગત ઉપયોગના અધિકારના હનન બદલ ૫૦૦ દિવસની ન્યૂનતમ કૃષિ રોજગારી જેટલું વધારાનું વળતર
પ્રત્યેક અનુસુચિત જાતિના અસરગ્રસ્ત પરિવારની જમીન સંપાદન કરતી વખતે ઓછામાં ઓછું ત્રીજા ભાગનું વળતર પ્રથમ હપ્તા વખતે જ ચૂકવી દેવામાં આવશે અને બાકીનું જમીન સંપાદન કરતી વખતે ચૂકવી દેવાશે.


૩-૫. પુન:સ્થાપન અને પુન:વસન અંગેની વધુ માહિતી અને અહેવાલ નીચેના સ્થળે ઉપલબ્ધ રહેશે.
RRP સારાંશ (અહેવાલ)
૧. સ્થાનીક ભાષામાં દરેક અસરગ્રસ્ત ગામે નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે
સમગ્ર RRP અહેવાલ (અંગ્રેજીમાં)
૨. સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ, મોટા રેલ્વે સ્ટેશનોમાં તથા જીલ્લા કલેકટર કચેરીએ નવેમ્બર 2011ના છેલ્લા અઠવાડીયામા જોઈ શકાશે
અભીપ્રાય કે સુચનો
૩. અહેવાલ સંદર્ભે આપના સુચનો સંબધીત CPM ઓફિસ (અમદાવાદ & અજમેર), DFCCIL હેડ ઓફિસ પત્ર દ્વારા કે Email દ્વારા dfc.package3@gmail.com અઠવાડિયામા મોકલી શકો છો.
અંતિમ RRP અહેવાલ સ્થાનિક ભાષામાં :
ઉપરોક્ત તમામ જગ્યાએ અંતિમ અહેવાલ ડિસેમ્બર-2011 સુધીમાં મુકવામાં આવશે.

Appendix-9d
Results of PCMs for Draft ESIA and RRP

Summary of PCM

No.	Sub-District	Venue	Date	Language	Number of Participant
CPM Ahmedabad Jurisdiction					
1	Palanpur	Ajamata Temple Hall	Nov. 14, 2011	Gujarati	31
2	Vadgam	Ramapir Mandir	Nov. 15, 2011	Gujarati	102
3	Sidhpur	Hotel Siddharth, Tavadiya	Nov. 16, 2011	Gujarati	44
4	Unjha	Committee Hall of Umiya Mata Mandir	Nov. 17, 2011	Gujarati	37
5	Mehsana	Science Collage, Hagalpur	Nov. 18, 2011	Gujarati	350
6	Ambaliyasan	Oxford School of Management	Nov. 19, 2011	Gujarati	39
7	Julasan	Julasan Community Hall	Nov. 21, 2011	Gujarati	72
8	Kalol	Jainwadi	July 31, 2012	Gujarati	33
Total					**708**
CPM Ajmer Jurisdiction					
1	Palanpur	Agrasan Bhavan	Nov. 22, 2011	Gujarati	109
Grand Total					**817**

Source: NKC

Details of the PCM (Under CPM Ahmedabad Jurisdiction)

1. PCM in Palanpur

District: Banaskantha
Sub-District/Taluka: Palanpur
Date: 14 November 2011
Venue: Ajmata Mandir, Village – Sedrasana
Villages covered: Sadarpur, Sedrasana, Jagana, Jasleni and Palanpur

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants said about their demand of "land for land". They requested DFCCIL to purchase the land elsewhere and provide it to the PAPs. Some of them offered DFCCIL to acquire complete piece of land instead of leaving small piece of land with PAPs after acquisition so that the PAPs can purchase land somewhere else.
- The participants requested that if DFCCIL is not in a position to give the land against acquisition of land, it should pay compensation as per the market rate. The proposed compensation amount is not sufficient enough for the PAPs to purchase land at other place nearer to native village.
- Some of the participants mentioned that the Jantri Rate (Stamp Duty) is always being kept as low and how the Government considers it as the market rate and gave an example of the disparity in rates. He has sold his land @ Rs. 4.1 million per bigha (per acre rate would be Rs. 10 million) whereas the Jantri Rate is Rs. 0.1 million per bigha. One can imagine the difference and how much a farmer is going to lose. It was further suggested not to consider the land registration value for deciding base for compensation. The participants also said that other agencies such as ONGC paid compensation as per market rates.
- Some of the participants mentioned that if DFCCIL is going to acquire our land by paying us the Jantri Rate, the Government should allow us to buy the Government land by paying the Jantri Rate. Even some of them went to the extent of saying that they would pay to the Government a premium over the Jantri Rate.
- Some of the participants suggested to the PAPs take land on rent.
- Some of the participants enquired about the unit of a family in the context of compensation for the land. In some cases the land title is with one person but virtually the land is fragmented and used by 8 to 10 persons. The participants were informed that only plot will be considered as one unit irrespective number of the PAPs having their ownership.
- Most of the participants wanted to know the exact amount of land and width of land to be acquired from the existing railway track etc.
- The participants requested clarification whether the PAPs can construct house close to the railway track or not
- The participants raised the issue of access to the roads, farm land etc. DFCCIL official informed that, DFC has provision for construction of road so that access to fields is secured.
- One participant complained that the Government has fixed Rs. 15,000 for cattle shed. He urged that let the Government construct one and demonstrate.
- One person from Sadarpur informed that he has received the notice for land acquisition but his land is located 500 m away from the railway track.
- The participants informed that, village Chitrasani is in the east of railway line. Majority of land is in west side and housing settlement on the east side. The main occupation of the village is agriculture and animal husbandry. Local people have to cross railway line five to six times in a day. The participants were of the opinion that with proposed DFC, two more railway lines will be

constructed and accessibility will be more difficult. The participants requested to construct an over bridge/underpass on railway line passing through village.
- Some of the participants were concerned whether the railway will provide employment for at least one person from each affected family.

[Environmental Issues]
- The participants raised their concerns regarding loss for the trees
- With one track there is no much of pollution and negative impact on the environment. The participants requested explanation about the DFC plan for two more tracks.

(2) Participants
- Number of the participants: 31 (there were no female participants)
- Village wise number of the participants:
  - Sedrasana – 15
  - Jagana – 11
  - Palanpur – 2
  - Sadarpur – 2
  - Jasleni – 1
  - Not known-1
- Social category of the participants:
  - General – 6
  - OBC – 25

(3) Photographs

Source: NKC

Photo 1-1 PCM in Sedarsana

Source: NKC

Photo 1-2 PCM in Sedarsana

(4) Summary of the Responces by the Feedback Form

Out of 31 persons who attended the meeting, 17 (55%) filled up the feedback form. Out of 17 filled of forms only 16 (94%) responded, while one (6%) did not. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
No suggestions for environmental issues were made by the participants under this section.

[Suggestions for Social Issues]
Under this section out of 17 filled of forms 14 (82%) responded. A total of 1 (7%) said that access to village, society, and farm land will be effected, while 1 (7%) said raised their concern regarding impact to social infrastructure such as water pipeline and electric line. However, 8 (57%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 1 (7%) said that the there is a possibility of loss of income and reduction in livelihood options, 2 (15%) said, to provide employment of one family member and 1 (7%) raised their concern about involuntary

displacement/relocation or disturbance in caste based habitation.

Table 1-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	1	7%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	1	7%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	8	57%
9.	Loss of income and reduction in livelihood options	1	7%
10.	Employment of one family member of project affected family in railways	2	15%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	1	7%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for PAPs	0	0%
Total		14	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 17 filled of forms only 5 (29%) responded. A total of 4 (80%) respondents requested to provide land within village available in public property, one (20%) respondent requested for the construction of RUB or ROB for convenience in vehicle movement.

Table 1-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	0	0%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	4	80%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	1	20%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		5	100%

Note: Multiple responses
Source: NKC

2. PCM in Vadgam

District: Banaskantha
Sub-District/Taluka: Vadgam
Venue: Ramapir Mandir, Near Bus Stand, Majadar, Vadgam, Banaskantha
Date: 15 November 2011
Villages covered: Majadar, Malsona, Dharewada, Manpura, Pasvadal, Kotadi, Chhapi, Jasleni and Palanpur

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The major contention was the land acquisition by paying a meagre amount as compensation. Many participants mentioned that who is going to be blamed if farmers who are going to lose land will commit suicide. They also sadi that one such instance has happened and another farmer who saw the notice got a stroke and now is suffering from paralysis.
- Majority of the participants demanded that the Government should give "land against land" and ask DFCCIL to purchase land elsewhere and provide it to the PAPs. If DFCCIL not in a position to give land against acquisition of land then it should pay compensation as per the market rate. Everybody knows the market rate but no one can provide evidence as sale deeds and stamp duty don't provide the real figure/situation.
- The participants mentioned that if DFCCIL will acquire land by paying the Jantri Rate then the Government should allow us to buy the Government Land by paying the Jantri Rate.
- Some of the people complained that DFCCIL has been changing its plans because of the influence of the political leaders. The track was supposed to go in the western side but now it has been changed to eastern side.
- The participants suggested providing alternative livelihood for the PAPs.
- Most of the participants wanted to know the exact amount of land to be acquired.
- The participants raised the issue of compensation - One of the participants informed that, previously land was acquired but he did not get proper compensation. He was not allowed to harvest the grass from the land. Sometimes people have to pay fines and they are not sure whether these fines are really deposited to DFCCIL.
- The participants informed that they have to pay a penalty of Rs.16,000 for cutting a tree long back. They requested to explain the basis for calculation of such penalty, and provision of compensation under the DFC.
- The participants raised the issue of access to road, farm land etc.
- The participants enquired about the rehabilitation package for disable people, rehabilitation package for farmers who are losing major chunk of their land, trees and other infrastructure.
- One of the participant mentioned that he got permission to construct bandh in his own land but he did not get any compensation for the piece of land (40 feet area), which could not be used by him for last 15-16 years. It was informed that, unlike highways, in case of the railway there is no restriction on construction up to 100 m.
- Some of the participants enquired about disbursement of compensation if titleholder is dead.
- Some of the participants enquired about the possibility of entering name of titleholders in 7/12 after release of 20A notification.
- The participants were concerned that after land acquisition farmer getting landless would not be able to purchase land elsewhere. It was clarified that, such the PAPs would certificate from Collectrate office within two years of land acquisition and will be able to purchase agriculture land anywhere in Gujarat.
- The participants raised the issue of access to road, farm land etc. DFCCIL official informed that, the DFC has provision for construction ROB or RUB and road so that access to reach fields is not obstructed.

[Environmental Issues]

- The participants were concerned about increase of the possibilities of disturbances due to vibration.

(2) Participants

- Number of the participants:102 of which one was a female participant from Majadar
- Village wise number of the participants:
  - Majadar – 64, Manpura – 8, Malsona – 9, Dharewada – 8, Chhapi – 4, Palanpur – 2, Pasvadal – 2, Kotadi – 2, Jasleni – 3
- Social category of the participants:
  - General – 27, OBC – 64, SC – 9, BC – 2

(3) Photographs

Source: NKC

Photo 2-1 PCM in Majadhar

Source: NKC

Photo 2-2 PCM in Majadhar

(4) Summary of the Responces by the Feedback Form

Out of 102 persons who attended the meeting, 75 (74%) filled up the feedback form. Out of 75 filled of forms 72 (96%) responded while 3 (4%) did not. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]

Under this section out of 75 filled out the forms only one (100%) responded. He said that due to the DFC there is a possibility of increased noise and vibration which need to be reduced.

Table 2-1 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	0	0%
2.	Loss of tree	0	0%
3.	Increase in air pollution	0	0%
4.	Increase in noise pollution, vibrations etc.	1	100%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		1	100%

Note: Multiple responses
Source: NKC

[Suggestions for Social Issues]
Under this section out of 75 filled out the forms 113 (151%) responded. A total of 65 (57%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 22 (19%) respondents said that the there is a possibility of loss of income and reduction in livelihood options, 12 (11%) respondents said, to provide employment of one family member and 9 (8%) said that there will be possibilities of involuntary displacement/relocation or disturbance in caste based habitation.

Table 2-2 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	1	1%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	2	2%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	65	57%
9.	Loss of income and reduction in livelihood options	22	19%
10.	Employment of one family member of project affected family in railways	12	11%
11.	Loss of agriculture land and production	2	2%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	9	8%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for PAPs	0	0%
Total		113	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 75 filled of forms only 32 (43%) responded. A total of 15 (47%) respondents are not ready to give their land and not in favor of the DFC. While 15 (47%) respondents requested to provide land within village available in public property, and 2 (6%) respondents requested that DFC should ensure participation of the PAPs.

Table 2-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	15	47%
4.	Marginal farmer will become small farmer or landless	0	0
5.	Request for land within village in public property	15	47%

6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples, mosque etc.	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	2	6%
Total		32	100%

Note: Multiple responses
Source: NKC

3. PCM in Sidhpur

District: Patan
Sub-District/Taluka: Sidhpur
Venue: Hotel Siddharth, Tavadiya Cross Road, Sidhpur Highway, Sidhpur, Patan
Date: 16 November 2011
Villages covered: Sidhpur, Kadi, Lalpur and Sujanpur

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants requested to publish information about organization of such important meetings in local newspaper or organize it in each village so that the PAPs can attend meeting and share their concerns.
- The participants requested disclosure of information such as where and how much land is going to be acquired, location for ROB, RUB, railway crossing, changes in the existing stations and yards, and start of construction work.
- Some of the participants requested disclosure of the detailed map of the Project for general community. It was suggested to display map at railway station and other public places clearly marked with the proposed laying of track; land to be acquired; and other constructions to be taken up etc.
- The participants requested clarifications on the acquisition of land in case of detour.
- The participants requested explanation about information in detail about on-going baseline line and census survey in their villages. PAPs informed that, some surveyors come to their houses and marked them, although in the last meeting it was clarified to them that their houses will not be affected by the project. All these created confusion amongst PAPs.
- The participants requested for clarification regarding societies coming within alignment.
- One participant from Khali village informed that his land is located closed to the railway track but in 20A notification this land has not been included. But people from DFCCIL have come to the land for survey and pillars have been posted. He requested for the explanation.
- Participants from Sidhpur complained that the 20A notification has included the survey number with a large chunk of land but the actual acquisition will be very less. According to the participants there are number of discrepancies in the current notification and requested for clarifications.
- Some of the participants suggested that the PCM should be organized in all the project affected villages and all information relating to the project, land acquisition and environmental impact have to be shared with them. These meetings should not be organized as part of the formalities.
- The participants raised their concern about disturbance due to vibration and its impacts on houses nearby.

[Environmental Issues]

- The participants requested to explain potential vibration impacts by constructing additional railway tracks current level of vibration and vibration in next couple of years' time.
- The participants requested to explain in case bore well water get effected after construction.

(2) Participants

- Number of the participants: 44 of which 3 were female participants including one ward councillor of the municipality
- Village wise number of the participants:
  - Sidhpur – 32
  - Khali – 6
  - Lalpur – 2

  - Sujanpur – 4
- Social category of the participants:
  - General – 21, OBC – 17, SC – 5, ST – 1

(3) Photographs

Source: NKC

Photo 3-1 PCM in Sidhpur

Source: NKC

Photo 3-2 PCM in Sidhpur

(4) Summary of the Responces by the Feedback Form

Out of 44 persons who attended the meeting, 27 (61%) filled up the feedback form. Out of 27 filled out the forms 23 (85%) responded while 4 (15%) did not. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
Although during questions answer session the participants asked clarification on impact of vibration due to the DFC but not recorded in the feedback forms.

[Suggestions for Social Issues]
Under this section out of 27 filled of forms 12 (44%) responded. A total of 8 (67%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while one (8%) respondent said that the there is a possibility of loss of income and reduction in livelihood options, 3 (25%) respondents said to provide employment of one family member.

Table 3-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	8	67%
9.	Loss of income and reduction in livelihood options	1	8%
10.	Employment of one family member of project affected family in railways	3	25%
11.	loss of agriculture land and production	0	0%

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		12	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 27 filled of forms only 9 (33%) responded. A total of 3 (34%) respondents are not ready to give their land and not in favor of the DFC. While 2 (22%) respondents requested to provide the land within village available in public property, one (11%) respondent requested that DFCCIL should ensure participation of the PAPs. In addition, 2 (22%) respondents requested for information on reason for change in alignment, total land under acquisition, height of track, and map related to land acquisition.

Table 3-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	1	11%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	3	34%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	2	22%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	2	22%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	1	11%
Total		9	100%

Note: Multiple responses
Source: NKC

4. PCM in Unjha

District: Mehsana
Sub-District/Taluka: Unjha
Date: 17 November 2011
Venue: Committee Hall of Umiya Mata Mandir
Villages covered: Unjha (municipality), Makupur, Kamli, Bhandu, Jetal Vasna, and Ithor

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants suggested organizing PCMs with adequate publicity so that the PAPs could attend and share their concerns with the DFCCIL officials. The notice for PCM should be given in the local newspapers. Some of the participants complained that in the previous PCM in Mehsana they had mentioned about the issue of poor publicity of the PCM. They have suggested for notification in the newspapers. The participants complained that DFCCIL has not considered their suggestions.
- DFCCIL should provide clear information on land to be acquired and who are the persons going to lose their land. Project related information should be available locally at the local railway station, panchayat and Nagarpalika.
- Some people wanted clarification on the land to be acquired in the western side too if the corridor is going to be made in the eastern side of the alignment.
- There were a lot of discussions on the recent 20A notification for Unjha. There are discrepancies in the land records of Prant Office/Revenue Records and the Town Planning Records of Unjha Nagar Palika. The notification has been issued without consulting the Town Planning Records of Nagar Palika. The Officers of Nagar Palika wanted DFCCIL to share information with them. Participant from Unjha mentioned that the issue was raised in PCM in Mehsana and he had shared the map and other information relating to the Town Planning Record but the 20A notification came out without addressing the issue. This would lead to more confusion and conflict.
- Some of the participants also questioned the relevance of the socio-economic baseline survey as it is yet to be clear who is going to be a PAP. According to participants 20A notification is wrong then how one can derive who is a PAP?
- There is RUB in Bhandu village and people have been using it for long. Now there is a board, which displays that this road is not for common people. It was suggested to make provision for RUB.
- There was another request from Bhandu village that the current plan for land acquisition in the village need to be changed to save the temple etc.
- There was a complaint from Kamli village that the railway level crossing has been closed and necessary action has to be taken in this regard.
- There was also a long discussion on the issue of NOC for construction beyond 30 m and the issues associated with it.
- The participants referred that now there is new RRA which is different than RRA 2008 and suggested to refer the latest RRA for disbursement of compensation.
- The participants enquired about compensation provision for remaining area after land acquisition.
- The participants enquired about compensation provision for people coming below poverty line (BPL) category.

[Environmental Issues]

- There was a discussion about increase of vibration impact due to the construction of DFC tracks.

(2) Participants

- Number of the participants: 37 (there were no female participants)
- Village wise number of the participants:

  - Unjha – 25
  - Maktupur – 6
  - Kamli – 2
  - Ithor – 2
  - Bhandu – 1
  - Jetal Vasna - 1
- Social category of the participants:
  - General – 35
  - OBC – 2
  - SC and ST- None

(3) Photographs

Source: NKC

Photo 4-1 PCM in Unjha

Source: NKC

Photo 4-2 PCM in Unjha

(4) Summary of the Responces by the Feedback Form

Out of 37 persons who attended the meeting, 16 (43%) filled up the feedback form. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
Under this section out of 16 filled of forms only 1 (6%) responded. A total of one (100%) respondent said that, due to the DFC, there is a possibility of impact on mature trees.

Table 4-1 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	1	100%
2.	Loss of tree	0	0%
3.	Increase in air pollution	0	0%
4.	Increase in noise pollution, vibrations etc.	0	0%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		1	100%

Note: Multiple responses
Source: NKC

[Suggestions for Social Issues]
Under this section out of 16 filled of forms 13 (81%) responded. A total of 5 (38%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 2 (15%) respondents said that the there will be impact social infrastructure such as water pipeline and electric line. In addition, 4 (31%) respondents said that access to village, society and farm land will be affected.

Table 4-2 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	4	31%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	2	15%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	5	38%
9.	Loss of income and reduction in livelihood options	1	8%
10.	Employment of one family member of project affected family in railways	1	8%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		13	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 16 filled of forms only 12 (75%) responded. A total of 5 (42%) respondents requested construction of under bridge or over bridge which help easy access in village and convenience in vehicle movement, 6 (50%) respondents requested for information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition. While one (8%) respondent requested to provide land within village available in public property.

Table 4-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	0	0%
4.	Marginal farmer will become small farmer or landless	0	0
5.	Request for land within village in public property	1	8%

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	5	42%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	6	50%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples, mosque etc.	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		12	100%

Note: Multiple responses
Source: NKC

5. PCM in Mehsana

District: Mehsana
Sub-District: Mehsana
Date: 18 November 2011
Venue: Urban Bank Science College, Mehsana
Villages Covered: Moti Dau, Hebova, Punasan, Shobhasan, Kukas, Hedua Hanumant, Mehsana, Ramosana, Taleti, Nani Dau and Palodara

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- One common issue raised by many participants is that why DFCCIL decided to take the corridor in the eastern side of the current alignment. Many of them described it to be politically influenced/ motivated. The participants were very straight forward in asking for a disclosure of information on pros and cons of laying down the corridor in the east as well as in the west. According to some participants in the eastern part the PAPs are poor and the loss would be quite significant.
- Some of the participants raised the issue of compensation based on the market rate for land to be acquired. They also cited the prevailing market rate in different areas and compensation to be provided if Jantri Rate is applied.
- Some of the participants questioned the 20A notification for land acquisition. In some cases the plot close to the current alignment is not notified whereas another plot behind this one has been notified. This raises suspicion in the people on the activities of DFCCIL.
- Some of the participants also challenged the DFCCIL officials for their generic statements. While the DFCCIL officials in the meeting said that the houses/flats will not be affected by the corridor project in Mehsana, other officials, who have done the survey have marked some areas from which it is evident that some buildings would be affected. So whom to be believed?
- There were a lot of objections from Nani Dau village. The participants informed that, Taleti village is located 2.5 km from Nani Dau in the north. DFCCIL railway track will shifts from east to west, and goes till Fatepura and Nanapur villages and then enters in Nanidau and from middle of Nanidau it takes turn to east again and then goes straight along the railway line. According to villagers major portion of village is coming under the DFC. Further, the participants informed that, total 999 bigha land is available within village, which will be wasted. The participants suggested constructing DFC on east side of existing railway track parallel to it without taking turn in the village. The participants mentioned that they would not allow railway line to pass through their village. They requested DFCCIL to change the alignment. They clearly mentioned that they don't believe DFCCIL as for decades they have been requesting the railway authority to keep the level crossing near their village open for 24 hours (the level crossing is being closed in the evening till the next morning and the villagers face great difficulties in communication). This has not happened yet. Even the local MP has written to the Railway Ministry but so far no action has been taken.
- The participants informed that, railway gate in Nani Dau is closed for 12 hours at night. It is difficult to visit hospital in case of any emergency and get timely treatment.
- The participants raised their concern that the compensation amount proposed is not sufficient enough to purchase land and do construction of house elsewhere. They were of the opinion that "development of country means development of people, if poor section of people suffers than what is the meaning of such development".
- The participants enquired about total land available on Delhi - Ahmedabad rail route.
- Some of the people said that if DFCCIL will not listen to their requests they will start mass mobilization and movement.
- Many participants wanted to know about the areas to be acquired and list of the PAPs etc.
- The participants enquired about the provision to get compensation amongst family members.

[Environmental Issues]
- There was no discussion related to environmental issues.

(2) Participants
- Number of the participants: 350 of which 3 were female participants
- Village-wise number of the participants:
  Mehsana – 106, Nani Dau – 80, Moti Dau – 01, Taleti – 13, Hebova – 4, Palodara – 2, Punasan – 4, Shobhasan – 4, Mevad – 10 (Although this village was invited to the PCM on 19 November 2012, some peoples from this village came to this meeting)
  *Note: As per the registration document there were no participants from Kukas, Hedua Hanumant and Ramosana. There may be some participants from these villages who went out without registering themselves as the crowd was quite big and people wanted to rush into the meeting room.
- Social category of the participants: Not available

(3) Photographs


Source: NKC

Photo 5-1 PCM in Mehsana


Source: NKC

Photo 5-2 PCM in Mehsana

(5) Summary of the Responces by the Feedback Form

Out of 350 persons who attended the meeting, 242 (69%) filled up the feedback form. Out of 242 filled up forms 235 (97%) responded and 7 (3%) did not. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
Under this section out of 242 filled of forms only one (0.4%) responded. A total of one (100%) respondent said that, due to the DFC there is a possibility of impact on mature trees.

Table 5-1 Classification of Responses for Environmental Issues

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
1.	Impact to mature trees	1	100%
2.	Loss of tree	0	0%
3.	Increase in air pollution	0	0%
4.	Increase in noise pollution, vibrations etc.	0	0%
5.	Increase in water pollution	0	0%
6.	Change of landscape	0	0%
7.	Change in direction of ground water	0	0%

Sl. No.	Type of Responses for Environmental Issues	No. of Responses	Percentage
8.	Impact to horticulture	0	0%
9.	Plantation of tree equivalent to number of tree cut	0	0%
10.	Impact on biodiversity	0	0%
Total		1	100%

Note: Multiple responses
Source: NKC

[Suggestions for Social Issues]
Under this section out of 242 filled of forms 190 (79%) responded. A total of 109 (57%) respondents said that PAPs should get compensation by market rate against loss of land and structures, while 2 (1%) respondents said that the there will be impact social infrastructure such as water pipeline, electric line etc. In addition, 23 (12%) respondents said that there will be possibility of loss of income and reduction in livelihood options. While 56 (30%) respondents suggested to provide employment of one family member of project affected family.

Table 5-2 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	2	1%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	109	57%
9.	Loss of income and reduction in livelihood options	23	12%
10.	Employment of one family member of project affected family in railways	56	30%
11.	loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		190	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 242 filled of forms only 198 (81%) responded. A total of 159 (80%) respondents requested for changes in the proposed alignment required (parallel)/ not in village/retain previous alignment, 12 (6%) respondents not ready to give the land to DFCCIL, 7 (4%) respondents requested information on reasons of change in the alignment, total land under acquisition, height of track is required, map related to land acquisition. While 16 (8%) respondents requested to provide land within village available in public property.

Table 5-3 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	159	80%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	12	6%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	16	8%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	2	1%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	2	1%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	7	4%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		198	100%

Note: Multiple responses
Source: NKC

6. PCM in Ambaliyasan

District: Mehsana
Sub-District/Taluka: Ambaliyasan
Date: 19 November 2011
Venue: Oxford School of Management, Near Shanku Water Park, Mehsana-Ahmedabad Highway
Villages covered: Navi Sedhavi, Jornang, Ambaliyasan, Chaluva, Dholasan, Geeratpur, Ditasan, Jagudan and Mevad

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- Majority of the participants had one submission that DFCCIL should change its plan and take the DFC parallel to the existing line. This will save the farmers of the target villages (Mevad, Amblyasan etc.), who are poor and don't have alternatives for livelihoods.
- Many of them blamed for favoring rich and politicians. They requested DFCCIL to make the detour/diversion/ turning near Mevad, Nani Dau so that the DFC will not destroy the livelihoods of the poor farmers.
- Some of the participants mentioned that DFCCIL is not telling us the truth. They are not sharing the information, maps of the Project etc.
- Some of the participants of Amblyasan and Mevad wanted to know whether the buildings and shops of their villages will be destroyed because of DFC.
- The participants raised the issue of compensation based on the market rate for land to be acquired. They questioned the plan and intention of DFCCIL to acquire the land in through away price.
- The compensation given as per Jantri Rate to the farmers is not sufficient enough to buy the land elsewhere. One participant mentioned that with the compensation against 20 bigha land he would not be in a position to buy one bigha land in his village.
- Some participants requested DFCCIL to arrange land, which the PAPs will buy by paying the Jantri Rate
- The women participants mentioned that the people of the area depend heavily on agriculture. Our country claims to be a land of farmers but what the Government is doing. It will create havoc for the farmers. The farmers will lose land and livelihoods. They will be socially ostracized. Once you lose land then no one will give their daughters in marriage to these families. So the Government should not do anything to make the farmers lose their land. DFCCIL should change its plan and take the DFC parallel to the existing line.
- Some of the participants argued that the DFCCIL Officials always pass on the blame to the technical and engineering aspects. Because of the technical aspects there would be diversion/ turning etc. One participant mentioned that we have promising engineers in our country and our engineers have already addressed critical issues and have shown solutions to similar kind of problems. Why can't the Government find out some solutions to it and construct the DFC in such a way that less land will be acquired.
- Some of the participants threatened that farmers would commit suicide if the Government is not going to listen to their requests/ demands.
- Some of the participants informed that PCM scheduled is not convenient due to agriculture season. It was requested to organize such important meeting as per convenience of the PAPs.
- Some of the participant enquired about DFCCIL provision to provide ROB or RUB within village.

[Environmental Issues]

- There was no discussion related to environmental issues.

(2) Participants

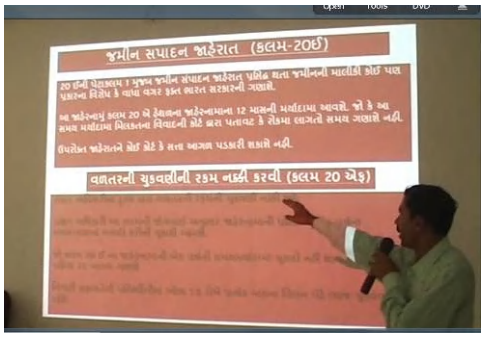
- Number of the participants:39 of which 7 were female participants
- Village-wise number of the participants:
  - Ambaliyasan -9
  - Navi Sedhavi - 2
  - Dholasan - 3
  - Mevad - 24
  - Dholasan- 1

  (There were no participants from Jornang, Chaluva, Geeratpur, Ditasan and Jagudan)
- Social category of the participants: Not available

(3) Photographs

Source: NKC

Photo 6-1 PCM in Ambaliyasan



Source: NKC

Photo 6-2 PCM in Ambaliyasan

(4) Summary of the Responces by the Feedback Form

Out of 39 persons who attended the meeting, 39 (100%) filled up the feedback form. Out of 39 filled up the forms 36 (92%) and 3 (8%) did not. The respondents, who filled up the form, did not reply all the questions. It was observed that, all the participants filled in the feedback form and submitted. The participants felt that this would be sent to the Central Government. Even 5 media persons too filled up the forms. During analysis of the feedback form the responses of 5 media persons are also included.

[Suggestions for Environmental Issues]
Under this section no suggestions were given by the participants.

[Suggestions for Social Issues]
Under this section out of 39 filled up the forms 33 (85%) responded. A total of 12 (36%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 4 (12%) respondents said that there will be possibility of loss of income and reduction in livelihood options. While 17 (52%) respondents suggested to provide employment of one family member of project affected family.

Table 6-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	12	36%
9.	Loss of income and reduction in livelihood options	4	12%
10.	Employment of one family member of project affected family in railways	17	52%
11.	Loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		33	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]

Under this section out of 39 filled of forms only 42 (108%) responded. A total of 25 (59%) respondents requested for changes in the proposed alignment required (parallel)/ not in village/retain previous alignment, 12 (29%) respondents not ready to give land to DFC. While 4 (10%) respondents requested to provide land within village available in public property.

Table 6-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	25	59%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	12	29%
4.	Marginal farmer will become small farmer or landless		
5.	Request for land within village in public property	4	10%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	1	2%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		42	100%

Note: Multiple responses
Source: NKC

7. PCM in Julasan

District: Mehsana
Sub-District/Taluka: Julasan
Date: 21 November 2011
Venue: Community Hall (Maniklal Smruti), Julasan village, Taluka – Kadi, District - Mehsana
Villages Covered: Julasan, Ghumasan, Dangarva, Anandpura, Tankiya, Kaial, Wamaj and Vansajara

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The key issue discussed in the meeting was the low compensation for the land to be acquired. There were a number of questions relating to the existing Jantri Rate and how the farmers are going to lose.
- The participants from Ghumasan village mentioned that they will not give land if Jantri Rate is referred as the basis for payment of compensation. One of them mentioned that ONGC has already taken land from the village and now DFCCIL – then what the farmers will do? Some of the participants requested DFCCIL to provide the land against the land to be acquired as compensation.
- The participant wanted more clarification on the payment of ex-gratia for losing the land.
- The participants wanted to get information from the DFCCIL officers on the amount of land each one is going to lose.
- Some others mentioned that their land is located closed to the railway line but their survey number is given in the current 20A notification.
- Another major issue flagged by number of participants including 2 women is the problem relating to accessibility such as a) the railway level crossing is not open for 24 hours, b) the RUB near the school in Julasan is silted up, c) there are three Nalas/RUBs between Julasan and Ghumasan but the farmers can't take their tractors through these RUBs. The participants requested that at least one RUB is constructed through which farmers can take their tractors.

[Environmental Issues]

- There was no discussion related to environmental issues.

(2) Participants

- Number of the participants: 72 of which 9 were female participants
- Village wise number of the participants:
  - Julasan – 56
  - Ghumasan – 7
  - Dangarva – 6
  - Tankiya – 2
  - Palodara – 1 (this village was not included for this PCM)

  (There were no participants from Anandpura, Kaial, Wamaj and Vansajara)
- Social category of the participants:
  - Gen – 42
  - OBC – 26
  - BC – 04
  - SC and ST - Nil

(3) Photographs

Source: NKC

Photo 7-1 PCM in Julasan

Photo 7-2 PCM in Julasan

(5) Summary of the Responces by the Feedback Form

Out of 72 persons who attended the meeting, 54 (75%) filled up the feedback form. Out of 54 filled up forms 52 (96%) and 2 (4%) did not. The respondents, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
Under this section no suggestions were given by the participants.

[Suggestions for Social Issues]
Under this section out of 54 filled out the forms 62 (115%) responded. 33 (53%) respondents said that the access to village, society, and farm land will be affected .A total of 16 (26%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 2 (3%) said that there will be a possibility of loss of income and reduction in livelihood options. 11 (18%) respondents suggested to provide employment of one family member of project affected family.

Table 7-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	33	53%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	16	26%
9.	Loss of income and reduction in livelihood options	2	3%
10.	Employment of one family member of project affected family in railways	11	18%
11.	Loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		62	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]

Under this section out of 54 filled of forms only 30 (56%) responded. A total of 21 (70%) respondents requested for construction of under bridge or over bride which help access in village and convenience in vehicle movement, while 9 (30%) respondents requested to provide the land within village available in public property.

Table 7-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	0	0%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	9	30%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	21	70%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		30	100%

Note: Multiple responses
Source: NKC

8. PCM in Kalol

District: Gandhinagar
Sub-District/Taluka: Kalol
Date: 31 July 2012
Venue: Jainwadi, Kalol, District – Gandhinagar
Villages Covered: Ramnagar, Piyaz, Borisana, Kalol, Pratapura, Chattral, Ola, Isand, Vadaswami, Pansar,

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The participants requested to explain whether the proposed DFC alignment is on parallel or detour.
- The participants complained that, when DFCCIL have decided that compensation amount will be paid as per Jantri Rate then why the PAPs are now invited for consultation? Some of the participants said that the value of the land is Rs. 1.71 Crores and DFCCIL will only pay Rs. 50 lacs. If it is real public consultation, DFCCIL needs to pay the market price for the land.
- The participants requested to give two copies of statement made by DFCCIL officials regarding compensation amount with their signature.
- The participants requested that JICA representatives should visit and discuss with the PAPs directly.
- The participants informed that, they have presented their concerns to all important persons including Rahul Gandhi and informed him that, our land value is very high, so DFC line should be parallel to minimize land acquisition. Further the participants informed that, the market value of land on Wamaj Road is Rs.60 lakhs per bigha, on Mahesana highway, market value of land is about Rs.1.7 Crore, in Chhatral, and Isand many factories are coming up so their land value is about Rs. 44 lakh per bigha. In addition to this, Pansar village comes under Gujarat Industrial Development Corporation (GIDC) and the market value of land is Rs. 60 lakhs per bigha. PAPs suggested taking average of market price in these villages for deciding compensation amount.
- The participants informed that at present it is monsoon time and requested to provide time to PAPs so that they can do harvesting of their crop.
- Some of the participants informed that, a major portion of their land is within alignment and raised their concern that with the proposed compensation amount the PAPs would not be able to purchase half the size of land acquired within 50 km.
- The participants informed that if DFCCIL want to acquire land then additional payment of Rs. 5-7 crores is not a big amount for any big project like DFC.
- The participants informed that, on both sides of their villages (east and west), many factories are constructed which land value has gone up. They requested to provide land at current market price.
- The participants informed that, land from Viramgaon to Mahesana is less fertile. If DFCCIL construct the parallel railway track along this belt, then DFCCIL will be required to pay less compensation.
- The participants requested to inform to JICA and Ministry of Railways that farmers are not ready to give their land as per Jantri Rate.
- The participants complained that the alignment is planned as per convenience of the HQs without consideration of the field situation. They also raised their concern that they were not consulted before finalization of the alignment.

[Environmental Issues]

- There were no questions and discussions related to environmental issues.

(2) Participants

- Number of the participants: 33 (there were no female participants)

(3) Photographs

Source: NKC

Photo 8-1 PCM in Kalol

Source: NKC

Photo 8-2 PCM in Kalol

Source: NKC

Photo 8-3 PCM in Julasan

(4) Summary of the Responces by the Feedback Form

Out of 33 participants, 12 (36%) respondents filled up the feedback form. In general, it was observed that the participants were not ready to fill the feedback form. The participants informed that, Kisan Virodh Sangh (Union) formed by the PAPs of affected 10 villages of Gandhinagar District is not ready to cooperate with the proposed alignment and compensation amount as per Jantri Rate. Thus, Kisan Virodh Sangh has already given written application to competent authority and other concerned officials.
The participants were also not cooperative for filling out the feedback forms. However few participants from Pansar, Ramnagar, Vadaswami and Pratapura have submitted the feedback forms. One representative from each village filled out the form except Pansar village.

[Suggestions/Comments for Environmental Issues]
Under this section no suggestions were given by the participants.

[Suggestions/Comments for Social Issues]
Under this section out of 12 filled out forms 12 (100%) responses were received. 8 (67%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 3 (25%) respondents said that there will be impact on social infrastructure such as water supply and road where one (8%) respondent raised his concern about loss of agriculture land and production.

Table 8-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	3	25%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	8	67%
9.	Loss of income and reduction in livelihood options	0	0%
10.	Employment of one family member of project affected family in railways	0	0%
11.	Loss of agriculture land and production	1	8%
12.	Involuntary displacement/ relocation	0	0%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%
16.	Pension provision for the PAPs	0	0%
Total		12	100%

Note: Multiple responses
Source: NKC

[Suggestions/Comments for Other Issues]

Under this section out of 12 filled of forms by respondent only 2 (17%) responded. A total of 2 (100%) respondents are not ready to give their land. Some responses listed below could be categorized as social issues; however, they are summarised as other issues as per the categories in the feedback form.

Table 8-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	0	0%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	2	100%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	0	0%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in going for open field defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and	0	0%

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
	mosque.		
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		2	100%

Note: Multiple responses
Source: NKC

Details of the PCM (Under CPM Ajimer Jurisdiction)

1. PCM in Palanpur

District: Banaskhantha
Sub-District/Taluka: Palanpur
Date: 22 November 2011
Venue: Agrasen Bhavan, Iqbalgarh, District – Mehsana
Villages Covered: Sadarpur, Karjoda, Chitraseni, Jaspuriya, Jethi, Iqbalgarh, Hebatpur and Surajpura. Later on one more village i.e. Rajpuriya was also invited.

(1) Summary of Minutes: Queries asked by the participants during the question / answer session are as follows;

[Socio-Economic Issues]

- The major discontentment of people from the villages is the acquisition of land by DFCCIL. The participants informed that all do not understand the Government technical language of 20A and 20E. Many of them mentioned that they don't want to give the land to DFCCIL without proper compensation amount as per market rate and not Jantri Rate.
- Some of them mentioned that land can be given if DFCCIL gives them land as compensation against acquisition of the land.
- Some people objected to participate in the meeting. They mentioned that there was a PCM in September 2011 and many of them had given their representations but no action was taken. They had asked for information from DFCCIL but so far they have not got any information.
- The local farmers should have been consulted before the project was planned. Now land is going to be acquired and DFCCIL is coming to the people for public consultations.
- Some of the participants demanded that the graveyards should not be disturbed – the kabaristhan of Iqbalgarh and the samsan of Jaspuriya are going to be affected.
- Some participants raised the problem of accessibility because of the DFC.
- One from Iqbalgarh complained that after getting the notification – 20A his father passed away. He requested DFCCIL for additional compensation and job to one of the member of his family.
- The participants were of the onion that, passenger trains are only beneficial for common public but freight corridor will only benefit industrialists. Thus it is suggested to take land from the industrialists instead of poor farmers.

[Environmental Issues]

- One from Chitraseni complained that his house is located 500 m away from the existing track; still he could feel the strong vibration. Once the DFC is established then problem will become more acute.

(2) Participants

- Number of the participants: 109 of which three were female participants
- Village-wise number of the participants:
  - Iqbalgarh – 51, Jethi – 6, Karjoda – 8, Chitraseni – 4, Jaspuriya – 5, Hebatpur – 4, Surajpura – 2.
  - There were 29 participants from Surajpura, Karjoda, Jaspuriya, Chitraseni and other villages, but they refused to register their names.
- Social category of the participants:
  - General – 21, OBC – 47, BC – 3, SC – 6, ST – 3

  (Social category of 29 persons who did not register could not be identified)

(3) Photographs

Source: NKC

Photo 9-1 PCM in Iqbalgarh

Source: NKC

Photo 9-2 PCM in Iqbalgarh

(4) Analysis of the Feedback Form

Out of 109 persons who attended the meeting, 47 (43%) filled up the feedback form. Out of 47 filled up forms 42 (89%) responded and 5 (11%) did not. The persons, who filled up the feedback form, did not reply all the questions.

[Suggestions for Environmental Issues]
Under this section no suggestions were given by the participants.

[Suggestions for Social Issues]
Under this section out of 47 filled up forms 17 (36%) responded. A total of 13 (76%) respondents said that the PAPs should get compensation by market rate against loss of land and structures, while 3 (18%) respondents requested for employment of one family member of each project affected family in DFCCIL. While one (6%) respondent raised his concerns about involuntary displacement/ relocation and disturbance in caste base habitation.

Table 9-1 Classification of Responses for Social Issues

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
1.	Access to village, society and farm land will be affected	0	0%
2.	Access to community centers, religious sites, cultural activity places will be affected	0	0%
3.	Access to market places will be affected	0	0%
4.	Access to school will be affected	0	0%
5.	Access to health care centers will be affected	0	0%
6.	Impact to social infrastructure (water pipeline, electric line, etc.)	0	0%
7.	Access to relatives and friends leaving in neighborhoods will be difficult	0	0%
8.	Compensation by market rate against loss of land and structures	13	76%
9.	Loss of income and reduction in livelihood options	0	0%
10.	Employment of one family member of project affected family in railways	3	18%
11.	Loss of agriculture land and production	0	0%
12.	Involuntary displacement/ relocation and disturbance in caste base habitation	1	6%
13.	Compensation amount is less to purchase land nearby	0	0%
14.	Railway stations should be far off from the resident area	0	0%
15.	Frequent closing of level crossing	0	0%

Sl. No.	Type of Responses for Social Issues	No. of Responses	Percentage
16.	Pension provision for the PAPs	0	0%
Total		17	100%

Note: Multiple responses
Source: NKC

[Suggestions for Other Issues]
Under this section out of 47 filled of forms only 33 (70%) responded. A total of 3 (9%) respondents requested for changes in the proposed alignment required (parallel)/ not in village/retain previous alignment, 14 (42%) respondents requested to provide the land within village available in public property, while 16 (49%) respondents are not ready to give their land for the DFC project.

Table 9-2 Classification of Responses for Other Issues

Sl. No.	Type of Responses for Other Issues	No. of Responses	Percentage
1.	Changes in the proposed alignment required (parallel)/ not in village/retain previous alignment	3	9%
2.	Risk of infectious diseases/health problems	0	0%
3.	Not ready to give land and DFC not required	16	49%
4.	Marginal farmer will become small farmer or landless	0	0%
5.	Request for land within village in public property	14	42%
6.	Construction of under bridge or over bride helps access in village and convenience in vehicle movement	0	0%
7.	Railways is already having excess land from respective survey then there is a need to first utilize the available land only	0	0%
8.	Death/accident/movement of animal (cow, buffalo etc.) during crossing of railway track	0	0%
9.	Information on reason for change in alignment, total land under acquisition, height of track is required, map related to land acquisition	0	0%
10.	Inconvenience to children/senior citizens need to be reduced	0	0%
11.	Children will have difficulty in open defecation	0	0%
12.	Loss to structures of cultural and religious importance such as temples and mosque	0	0%
13.	Increase in incidences like alcoholism, girl/women teasing, etc.	0	0%
14.	Increase in employment generation	0	0%
15.	Passenger trains are more beneficial than freight corridor	0	0%
16.	PAPs participation in DFC should be ensured	0	0%
Total		33	100%

Note: Multiple responses
Source: NKC

Appendix-10a

Summaries of Draft ESIA (English)

GOVERNMENT OF INDIA
DEDICATED FREIGHT CORRIDOR CORPORATION INDIA LTD.

DRAFT

Summary of Environment and Social Impact Assessment (ESIA) For the Dedicated Freight Corridor (Western: Wamaj - Iqbalgarh Section)

November 2011

This summary explains main features of the draft environmental and social impact assessment (ESIA) study carried out for the Dedicated Freight Corridor (Western: Wamaj – Iqbalgarh Section). This summary for Draft ESIA is distributed to the public as an information dissemination process under the project by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL) as project implementing agency.

The Project Background

The Ministry of Railways (MoR) through the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a Special Purpose Vehicle (SPV), is implementing Computerized Multi Modal High Axle Load Dedicated Freight Corridor (DFC) Project between Delhi-Mumbai under the Western DFC. Considering the ever increasing freight traffic movement between the metros and their respective hinterlands, the DFC Project through adoption of improved technologies will result in a paradigm shift of freight transportation from road to the low carbon intensive mode rail transport and inherent improvement in energy efficiency of freight rail for transportation of bulk goods.

The Western DFC is designed to carry a total freight line of 37.7 million tonnes in fiscal year 2013-2014, which would increase to 140.4 million tonnes in 2033-34. Creation of rail infrastructure on such a scale, unprecedented in independent India, is also expected to drive the establishment of industrial corridors, logistic parks and other economic and trade centres along its alignment and will support India's growing economy as the second fastest in the world.

The Western DFC has two broad streams of traffic, one, between the terminal nodes at either end, Jawaharlal Nehru Port Trust (JNPT) in Mumbai and Dadri in Uttar Pradesh including Tuglakabad (TKD) in Delhi, and the other, the traffic entering from branch line feeder routes at the various junction points en route. Implementation of the DFC Project will result in reducing the carbon intensity of India's transport sector.

The Project Area

The Western Corridor has been divided into 2 phases, in which Phase 1 covers section between Vadodara and Rewari.

The Wamaj - Iqbalgarh section of Phase 1 runs from Gandhinagar to Banaskantha districts in Gujarat. The corridor passes through four districts namely Gandhinagar, Patan, Mehsana and Banaskantha. Total length of the Wamaj – Iqbalgarh section is approximately 140 km. The figure shows the location of the proposed alignment of the Wamaj – Iqbalgarh section.

Some basic information on key parameters pertaining to the natural and social environment along the Wamaj-Iqbalgarh section is shown in Table 1.

Figure 1: Proposed Alignment of Wamaj – Iqbalgarh Section

Table 1: General Features along the Wamaj-Iqbalgarh Section

Items	Wamaj-Iqbalgarh Section
Affected States (No. of Affected Villages by District)	4 districts of Gujarat State– Banaskantha, Patan, Mehsana, Gandhi Nagar Total Villages - 68
Recorded Forest Area and Protected Area	No recorded forest in the alignment 2.4 km of Balaram Ambaji Wildlife Sanctuary would be affected.
Important Rivers	4 major rivers – Khari, Saraswati, Umardashi and Balaram

Source: DFC and Field Survey

Salient Features of Alignment & Relevant Facilities

The project is planned as double line corridor with electrification and advanced signalling system to allow freight trains with an axle load of 25 tonnes and speed up to 100 km/h. The Road over Bridges (ROBs) and Road under Bridges (RUBs) are planned at road crossings to avoid any detention to either road or rail traffic. The major part of the alignment will have well landscaped out embankments.

Total length of the section is 139.894 km, out of it parallel section is 114.899 km and length of the detour section is 24.995 km. The details of parallel and detour section in the four affected districts of Gujarat are shown in Table 2.

Table 2: Details of Parallel and Detour Section in the Alignment

S. No.	District	Length of Parallel Section (km)	Length of Detour Section (km)
1	Banaskantha	45.949	0
2	Patan	11.518	0
3	Mahesana	55.600	12.817
4	Gandhinagar	1.832	12.178
Total		**114.899**	**24.995**

Source: DFC

The Right-of-Way (RoW) width of detour alignment is from 65.0 m – 90.5 m and of parallel alignment is 16.0 m – 74.5 m. The Wamaj – Iqbalgarh section will have junction stations, crossing stations, important bridges, RUBs and ROBs.

Environmental and Social Impact Assessment (ESIA) Study for the Project

Considering the scale, nature and extent of activities envisaged as part of the DFC Project, a detailed Environmental and Social Impact Assessment (ESIA) Study has been conducted on the proposed alignment in order to ensure that all potential environmental and social issues or concerns associated with various project components are addressed and integrated into the project's planning and design at an early stage in order to formulate the DFC Project in a more sustainable and effective manner.

In this connection, MOR/DFCCIL has conducted ESIA study for the DFC Phase 1 (Wamaj – Iqbalgarh section) of the Western Corridor following "JBIC Guidelines for Confirmation of Environmental and Social Considerations (2002)". The ESIA study consists of scoping, pollution control study, natural environmental study, social environmental study, public consultation, impacts identification and assessment, preparation of mitigation measures, preparation of Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP).

Procedure of ESIA Study

The process of ESIA study constitutes a systematic approach to evaluate a project comprehensively in the context of the natural, social environment of the project area. Basically, ESIA follows the steps mentioned in the following flow, i.e. 1) data collection from desk study, 2) preliminary site reconnaissance, 3) scoping for preliminary identification of potential impacts due to project implementation, 4) Public Consultation Meetings (PCMs) for sharing initial findings of potential impacts and receiving feedbacks on the proposed study scope, 5) detailed site survey on the preliminary identified impacts at scoping, 6) assessment of potential impacts, 7) examination of mitigation measures of the potential impacts, 8) preparation of ESMP and ESMoP, 9) preparation of Draft ESIA report, 10) PCMs for sharing study results and proposed mitigation measures, and 11) preparation of Final ESIA report by incorporating received comments and suggestions.

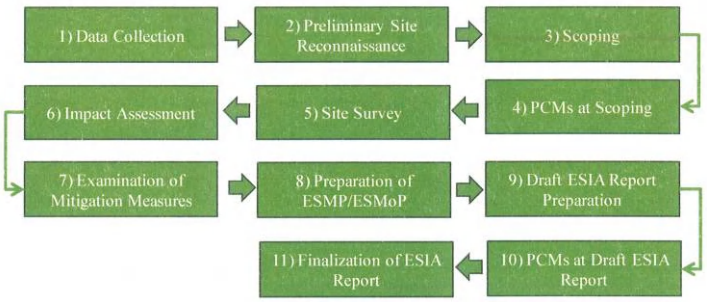


Figure 2: ESIA Study Flow

Following the above-mentioned ESIA procedure, in order to decide the ESIA study scope, potential impacts were identified with the secondary data and findings of the preliminary site reconnaissance in Scoping stage of Figure 2, and the major impacts are outlined in Table 3.

Table 3: Preliminary Identified Impacts

	Categories	Preliminary Identified Impacts	Items to be Covered at Detailed Site Survey
1	Natural Environment	A part of the proposed alignment will pass the Balaram Ambaji Wildlife Sanctuary. In addition, tree cutting along the proposed alignment will be required for the project implementation.	- Confirmation of species in the wildlife sanctuary - Tree census for confirmation of number of trees to be cut
2	Pollution Control	- Some sensitive receptors and residential area close to the proposed alignment may be impacted by noise & vibration during construction and operation phases. - There is a possibility of water pollution in the channel/river due to wastewater inflow from: i) construction activities and worker's camp during the construction phase, and ii) operation of trains and stations during the operation phase.	- Site measurement of noise & vibration at sensitive areas and/or populated areas - Conducting surface water sampling at important rivers in the study area as the baseline information to know the existing water quality
3	Social Environment	The Project might be expected to improve cargo transportation in a region as well as to increase job	- Confirmation of socio-economic condition of Project Affected Persons (PAPs) by questionnaire

		opportunities. Meanwhile, some impacts related to land acquisition may be caused.	survey (i.e. Baseline Survey and Census for the Rehabilitation & Resettlement Plan) * Social impacts will be analysed with the comments and feedbacks through the PCMs.

Methodology of Field Survey

Field survey for pollution control, natural environment and social environment was conducted based on the initially identified impacts. Methodology of and location of the field survey are outlined in Table 4.

Table 4: Methodology and Location of Field Survey

Survey Item	Survey Methodology	Location
Natural Environment		
Fauna & Flora	- Visual check of fauna and flora condition at the Balaram Ambaj Wildlife Sanctuary in two seasons, pre-monsoon season and monsoon season. - Conducting interview with academic persons on the fauna and flora situation in the survey area.	- Along the proposed DFC alignment in the Balaram Ambaj Wildlife Sanctuary where the exact location was selected based on interviews with the State forest authorities and other relevant maps.
Pollution Control		
Noise & Vibration	[Noise] - Measuring noise level applying international standards since railway noise measuring methods were not established in India [Vibration] - Measuring vibration level applying international standards since railway vibration measuring methods were not established in India	[Noise] 2 points at 3 stations: Palanpur, Sidhpur, and Mehsana stations considering population density and sensitivity such as facilities requiring silent [Vibration] Same as noise survey.
Water Quality	- Sampling surface water from important rivers in the study area. - Analyzing sample at selected parameters.	3 locations (i.e. upstream, proposed alignment and downstream) in the Balaram river. * There was no water flow in other 3 important rivers in the study area.
Social Environment		
Baseline Survey & Census	- Collecting socio-economic information from each project affected person through questionnaire.	68 villages in 4 districts (Gandhinagar, Mehsana, Patan and Banaskantha)

Impact Assessment and Proposed Mitigation Measures

Based on the ESIA survey results and subsequent analysis, various potential environmental and social impacts of the DFC project have been identified. Specific mitigation measures are proposed to

minimize all such impacts in planning/design, construction and operation phases. Such measures for major items of the environmental and social impacts are summarised below.

Table 5: Potential Impacts and Proposed Mitigation Measures for the Project (Wamaj to Iqbalgarh Section)

Impact Item	Stage	Potential Impacts	Proposed Mitigation Measures
Natural Environment			
Biodiversity	Construction & Operation	Increasing risks of; i) distraction/loss of habitat and wildlife, and ii) disturbance of wildlife movement.	- Compensatory plantation with local species - Green Belt Development - Preparation of culverts and underpasses to facilitate wildlife movement
Pollution Control			
Noise & Vibration	Construction	Increasing noise & vibration levels due to operation of construction equipments	- Advance notice of construction activities to neighbors - Installing noise barriers at residential areas and sensitive areas if necessary - Ensuring correct track geometry by advanced measurement
	Operation	Increasing noise & vibration levels due to train operation	
Water Quality	Construction	Deterioration of water quality such as turbidity by the earth work.	- Prevention of direct contamination in river water - Appropriate maintenance of stockpiled soil and loose materials - Preparation of emergency mitigations such as floating oil booms
Air Quality	Construction	Generating dust from earthmoving and construction work.	- Plantation along the DFC line - Sprinkling of water - Using low emission construction equipments and vehicles
Social Environment			
Land Acquisition	Before Construction	Land acquisition of private land and involuntary resettlement	- Providing compensation for the affected land and structures as per the policy to be established in the Resettlement and Rehabilitation Plan (RRP)
Local Economy/ Livelihood	Before Construction & Construction	- Affecting sources of income at some extent due to land acquisition. - Increasing local business opportunities due to construction activities	- Awarding appropriate rehabilitation programs - Providing job opportunities related to the Project to local people and PAPs to the extent possible
Social Infrastructure	Construction	Disturbed accessibility to local social infrastructure such as religious places and water pipelines for domestic water supply and irrigation system to some extent	- Securing a temporary passage to local infrastructure and religious places during construction
	Operation		- Securing access to local infrastructure including religious places by providing a road, bridge and/or underpass - Arrangement of cross drainage works such as bridges and culverts

Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan (ESMP) envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts caused by the project activities during planning/design, construction and operation phases. ESMP has been prepared based on the above-mentioned mitigation measures addressing the following issues. The comprehensive plan is available in the full ESIA report.

1. The following specific ESMP is proposed in the Draft Final ESIA Report:
   - Greenbelt Development Plan
   - Management and Rehabilitation Plan for Quarry / Borrow Areas
   - Noise and Vibration Management and Control
   - Solid Waste Management Plan
   - Plan for Storage, Handling & Emergency Response for Hazardous Chemicals
   - Drainage Management Plan
   - Management for Land Acquisition and Resettlement (Details will be addressed in RRP Report)
   - Plan for Sanitation and Housekeeping at the Construction Labour Camps
   - Occupational Health and Safety Management

2. Phase-wise Environmental Management Measures are proposed for the following environmental and social issues:

   a) Planning/Design Phase

      Land acquisition, diversion of forest land, preservation of trees, borrow areas, quarry areas, construction water, sites for other construction materials, site identification for placement of construction machineries and disposal of unsuitable materials, construction camp, arrangement for temporary yard, orientation of implementation agency and contractors

   b) Construction Phase

      Site clearance, procurement of construction materials, construction work (drainage, siltation, slope protection, etc.), water pollution, air pollution, nose and vibration, safety, labor camp management, contractor's demobilization (cleanup operation, restoration and rehabilitation)

   c) Operation Phase

      Monitoring of operation performance of various mitigation measures, and environment and social conditions

Environmental and Social Monitoring Plan (ESMoP)

The purpose of the Environmental and Social Monitoring Plan (ESMoP) is to ensure the effective implementation of ESMP in order to achieve overall objective of the project in a more sustainable and effective manner. The ESMoP monitors the results and effectiveness mitigation measures and suggests additional measures, if any, to enhance the project benefits. The ESMoP consists of performance indicators and environmental monitoring programme, and is summarised below:

1. Performance Indicators

- Planning/Design Phase: land acquisition, dumping locations, construction workers' camps, borrow areas, quarry sites
- Construction Phase: ambient air quality, noise & vibration levels, water quality (river water), waste water quality, vegetation cover,
- Operation Phase: survival rate of trees, rehabilitation of borrow areas, provision of noise barriers for sensitive receptors

2. Environmental Monitoring Programme

This includes parameters to be monitored; monitoring methods; location of the monitoring sites; frequency and duration of monitoring; institutional responsibilities for implementation and supervision; and estimated cost. Major specific parameters that will to be monitored are shown below. The social parameters will be discussed in the RRP separately.

- Ambient air quality, Noise and vibration levels, Water quality, Loss of trees and vegetation

Public Consultation Meetings (PCMs)

The Public Consultation Meetings (PCMs) primarily aim at providing a platform for the project affected persons and different stakeholders to express their views on possible impacts. The PCMs for ESIA were held at two different stages in order to receive opinions and feedback of the public and to disseminate information on the project and ESIA study. The PCMs were conducted district-wise in all four districts.

- The first stage of the PCM for ESIA was conducted in the month of September, 2011 (and supplemental PCM for two villages in Mehsana in October, 2011) at the time of environmental scoping in the initial stage of the ESIA study. Information on the Project and scope of the ESIA study was disseminated to the public, and comments and opinions were collected to be incorporated in the study scope of the ESIA.

- The second stage of the PCM for ESIA is being conducted in the month of November 2011 to disseminate information about findings of draft ESIA study and probable mitigation measures to the public that are directly or indirectly affected by the DFC project and to receive their feedbacks and opinions and incorporate their comments and requests on the environment and social mitigation measures and management and monitoring plans in the Final ESIA Report.

Some opinions and issues raised in the first and second stage PCMs were – land compensation and employment opportunities, displacement and land acquisition, clarification on aspects related to alignment such as discrepancy in land records, width of ROW, and provision of accessibility of service roads to farmers, drainage, access to resources and community facilities; and potential impact related to noise & vibration due to train operation. The first and second stage PCMs were attended by PAPs, representative from gram sabha and gram panchayat, Nagar Palika, district administration, district competent authority, Prant officers, and forest officers.

Information Dissemination in ESIA Process

The ESIA study findings are disseminated to the PAPs and relevant stakeholders so that preventative measures can be taken for the successful completion of the project. The information disclosure is implemented at two stages for the ESIA.

- The first stage of information dissemination is conducted when the draft ESIA is prepared. The draft ESIA (main report and appendices) in English is delivered and placed at DFCCIL Head Office, CPM Ahmedabad office & CPM Ajmer office, major existing railway stations and district authorities along the DFC route for Wamaj-Iqbalgarh section. Additionally, the summary of the draft ESIA (this report) is prepared in English and Gujarati and is delivered to all the project affected villages along the DFC route.

- The second stage of information dissemination is to be implemented at final ESIA stage. The final ESIA (main report and appendices) in English is to be delivered and placed at DFCCIL Head Office, CPM Ahmedabad office, CPM Ajmer office, major existing railway stations and district authorities along the DFC route. Additionally, the summary of the final ESIA is to be prepared in English and Gujarati and is to be delivered to all the project affected villages along the DFC route.

Availability of Draft ESIA Report and Submission of Comments

- Draft ESIA Report is available for public viewing in the following locations: DFCCIL Head Office, CPM Ahmedabad office, CPM Ajmer office, major stations along the proposed DFC alignment, and respective District Offices from late November, 2011 onwards.
- Summary of Draft ESIA in English and Gujarati is also available in Sarpanch offices of all the project affected villages along the DFC route from late November, 2011 onwards.
- Comments can be submitted to the DFCCIL Head Office or respective CPM offices either by post or fax or through email at **dfc.package3@gmail.com** in the information disclosure period in late November 2011/early December, 2011 as specified in the public notice/covering letter.

Address of the CPM Offices of the DFCCIL

- **Dedicated Freight Corridor Corporation of India Limited (DFCCIL)**
  (Under Ministry of Railways), Fifth Floor, Pragati Maidan, Metro Station Building Complex, New Delhi – 110 001
  (Tel: 91-11-23454700; Fax: 91-11-23454701)
- **CPM Office Ahmedabad**
  1st Floor, Old DRM Office Bldg., Kalupur, Ahmedabad-380002, Gujarat
  (Tel: (0)79-22175107, Fax: (0)79-22163101)
- **CPM Office Ajmer:**
  42 A/3, Civil Lines, Ajmer-305001, Rajasthan
  (Tel & Fax: (0)145-2630360)

Summaries of Draft ESIA (Gujarati)

ભારત સરકાર
સમર્પિત માલવાહક રેલમાર્ગ ઇંડિયા લિમિટેડ (ડીએફસીસીઆઈએલ)

મુસદ્દો

સમર્પિત માલવાહક રેલમાર્ગ માટે પર્યાવરણીય અને સામાજિક અસરોના મૂલ્યાંકન(ઈએસઆઈએ)નો સારાંશ
(પશ્ચિમ: વામજ – ઈકબાલગઢ વિભાગ)

નવેમ્બર – 2011

આ સારાંશમાં સમર્પિત માલવાહક રેલમાર્ગ/ડીએફસી (વામજ – ઈકબાલગઢ વિભાગ) પ્રોજેક્ટના પર્યાવરણીય અને સામાજિક અસરોના મૂલ્યાંકન (ઈએસઆઈએ) ના મુસદ્દાની લાક્ષણિકતા બતાવવામાં આવેલ છે. ઈએસઆઈએના મુસદ્દાનો સારાંશ, પ્રોજેક્ટ અમલીકરણ એજન્સી તરીકે સમર્પિત માલવાહક રેલમાર્ગ ઇંડિયા લિમિટેડ (ડીએફસીસીઆઈએલ) દ્વારા, પ્રોજેક્ટ હેઠળ, જાહેર જનતાને જાણકારી આપવાની પ્રક્રિયાના ભાગરૂપે વહેંચવામાં આવેલ છે.

Final ESIA Report
For Dedicated Freight Corridor (Western: Wamaj to Iqbalgarh Section) *September 2012*

પ્રોજેક્ટની પૃષ્ઠ ભૂમિ

રેલ મંત્રાલય (એમઓઆર), પશ્ચિમ ડીએફસી હેઠળ દિલ્હી-મુંબઈ વચ્ચે સમર્પિત માલવાહક રેલમાર્ગ ઇંડિયા લિમિટેડ (ડીએફસીસીઆઈએલ) દ્વારા, એક ખાસ વાહન(એસપીવી), કમ્પ્યુટરાઈઝડ મલ્ટી મોડલ હાઈ એક્સલ લોડ સમર્પિત માલવાહક રેલમાર્ગ (ડીએફસી) પ્રોજેક્ટનો અમલ કરી રહેલ છે. મોટા શહેરો અને તેમના હિંટર્લેંડ વચ્ચે સતત વધી રહેલ માલવાહક ટ્રાફિક અવરજવરને ધ્યાનમાં રાખીને, ડીએફસી પ્રોજેક્ટ સુધારેલ ટેકનોલોજીનો ઉપયોગ કરીને માર્ગથી ઓછા પ્રદૂષણવાળા રેલમાર્ગ પરિવહન અને જથ્થાબંધ માલસામાનની હેરફેર માટે માલવાહક રેલમાર્ગની કાર્યશક્તિ ક્ષમતામાં સહજ સુધારણા તરફ માલવાહક પરિવહનના ઉદાહરણ પરિવર્તનમાં પરિણમશે.

પશ્ચિમ ડીએફસીને નાણાંકીય વર્ષ 2013-2014માં 377 લાખ ટનના માલસામાનની હેરફેર કરી શકે તે રીતે તૈયાર કરવામાં આવેલ છે, જે વર્ષ 2033-34માં વધીને 1404 લાખ થઈ શકશે. આટલા વિશાળ ધોરણે રેલમાર્ગના માળખાની રચના કરવી, એ સ્વતંત્ર ભારતમાં અભૂતપૂર્વ કાર્ય છે, અને તેનાથી રેલમાર્ગના આસપાસના વિસ્તારોમાં ઔદ્યોગિક ક્ષેત્રો, લોજિસ્ટિક પાર્કસ, અન્ય આર્થિક અને વ્યાપારી કેન્દ્રોની પણ સ્થાપના થશે તેવી અપેક્ષા છે, અને ભારતના વિકસી રહેલા અર્થતંત્રને વિશ્વમાં ઝડપથી વિકસી રહેલા દેશોમાં બીજા ક્રમે આધાર મળશે.

પશ્ચિમ ડીએફસીમાં પરિવહનના બે મુખ્ય પ્રવાહ છે, એક, ટર્મિનલ નોડ્સ વચ્ચે કોઈપણ એક છેડા પર, મુંબઈમાં જવાહરલાલ નહેરુ પોર્ટ ટ્રસ્ટ(જેએનપીટી) અને ઉત્તરપ્રદેશમાં દાદરી જેમાં દિલ્હીના તુગલકાબાદનો સમાવેશ થાય છે, અને બીજો, વિવિધ જંકશન પર બ્રાન્ચ લાઈન ફીડર રસ્તાઓમાંથી દાખલ થતા પરિવહનનો સમાવેશ થાય છે. ડીએફસી પ્રોજેક્ટના અમલીકરણથી ભારતના પરિવહન ક્ષેત્રમાં પ્રદૂષણમાં ઘટાડો થશે.

પ્રોજેક્ટ વિસ્તાર


આકૃતિ 1: વામજ-ઈકબાલગઢ વિભાગનો યોજિત માર્ગ

પશ્ચિમ રેલમાર્ગ બે તબક્કામાં વહેંચાયેલ છે, જેમાં તબક્કો-1 વડોદરા અને રેવારી વચ્ચેનો ભાગ આવરે છે.

તબક્કા-1નો વામજ-ઈકબાલગઢ વિભાગ ગુજરાત રાજ્યમાં ગાંધીનગરથી બનાસકાંઠા જિલ્લા સુધી પથરાયેલ છે. આ રેલમાર્ગ ચાર જિલ્લા ગાંધીનગર, પાટણ, મહેસાણા અને બનાસકાંઠામાંથી પસાર થાય છે. વામજ-ઈકબાલગઢ વિભાગની કુલ લંબાઈ 140 કિ.મી. છે. આકૃતિ વામજ-ઈકબાલગઢ વિભાગના યોજિત માર્ગનું સ્થળ દર્શાવે છે.

કોઠા-1માં વામજ-ઈકબાલગઢ વિભાગ સાથેના કુદરતી અને સામાજિક પર્યાવરણને લગતી કેટલીક મૂળભૂત જાણકારીના ચાવીરૂપ ધોરણો બતાવવામાં આવ્યા છે.

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કોઠો-1 : વામજ - ઇકબાલગઢ વિભાગના સામાન્ય લક્ષણો

સામગ્રી	વામજ-ઈકબાલગઢ વિભાગ
અસર પામતા રાજ્યો (જિલ્લા દીઠ અસર પામતા ગામોની સંખ્યા)	ગુજરાતનાં ચાર જિલ્લા બનાસકાંઠા, પાટણ, મહેસાણા અને ગાંધીનગર. કુલ ગ્રામ – 68
નોંધાયેલ વન વિસ્તાર અને આરક્ષિત વિસ્તારો	આ માર્ગમાં કોઈ નોંધાયેલ વન વિસ્તાર નથી. બાલારામ અંબાજી અભયારણ્યનો 2.4 કિ.મી.ને અસર થશે.
અગત્યની નદીઓ	4 મુખ્ય નદીઓ – ખારી, સરસ્વતી, ઉમરદાશી અને બાલારામ.

સ્રોત : ડીએફસીસીઆઈએલ અને ફીલ્ડ સર્વે

રેલમાર્ગની મુખ્ય લાક્ષણિકતા અને સંબંધિત સગવડો

આ પ્રોજેક્ટ હેઠળ વીજળીકરણ અને આધુનિક સિગ્નલીંગ પદ્ધતિ સાથેના દ્વિમાર્ગી રેલમાર્ગનું આયોજન કરવામાં આવેલ છે તેમાં વીજળીકરણ અને અદ્યતન સિગ્નલ સિસ્ટમ મુકવામાં આવશે જેથી 25 ટનની અને 100 કિ.મી.ની ઝડપવાળી માલગાડીઓ પસાર થઈ શકે. માર્ગ ઉપરના પુલો (આરઓબીએસ) અને માર્ગ નીચેના પુલ (આરયુબીએસ)નું ફલના બધા માર્ગો પર આયોજન થઈ શકે અને રેલ કે માર્ગ પરિવહનમાં કોઈ બાધા ન આવે. રેલમાર્ગને અડીને આવેલી જમીનમાં મોટા ભાગમાં સારી રીતે સજ્જ કરાયેલા પાળા/કટબંધો તૈયાર કરવામાં આવશે.

આ વિભાગની કુલ લંબાઈ 139.894 કિ.મી. છે, તેમાંથી 114.899 કિ.મી. સમાંતર લંબાઈ છે અને ડિટૂર વિભાગ 24.995 કિ.મી. છે. કોઠા-2માં અસર પામતા જિલ્લાઓમાં સમાંતર અને ડિટૂર વિભાગની વિગતો આપવામાં આવેલ છે.

કોઠા-2 : માર્ગમાં સમાંતર અને ડિટૂર વિભાગની વિગતો.

અનુક્રમ.	જિલ્લા	વિભાગની સમાંતર લંબાઈ (કિ.મી)	વિભાગની ડિટૂર લંબાઈ (કિ.મી.)
1.	બનાસકાંઠા	45.349	0
2.	પાટણ	11.518	0
3.	મહેસાણા	55.600	12.817
4.	ગાંધીનગર	1.832	12.178
	કુલ	114.899	24.995

સ્રોત : ડીએફસીસીઆઈએલ

રાઈટ ઓફ વે (આરઓડબલ્યુ)ની પહોળાઈ ડિટૂર માર્ગમાં 65.0 – 90.5 મીટર અને સમાંતર માર્ગમાં 16.0 – 74.5 મીટર રહેશે. વામજ-ઈકબાલગઢ વિભાગમાં જંકશન સ્ટેશનો, ક્રોસિંગ સ્ટેશનો, અગત્યના પુલ, આરયુબીએસ અને આરઓબીએસ રહેશે.

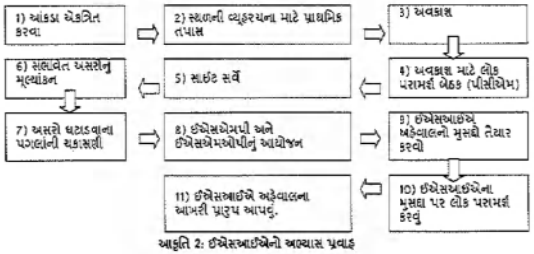
પ્રોજેક્ટનો પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અભ્યાસ

સમર્પિત માલવાહક રેલમાર્ગ (ડીએફસી) પ્રોજેક્ટનું પ્રમાણ, પ્રકૃતિ અને તેમાં થનાર પ્રવૃત્તિઓને વિચારણામાં લઈ સૂચિત રેલમાર્ગના વિસ્તાર માટે એક વિગતવાર પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) તૈયાર કરવામાં આવેલ છે. આ અભ્યાસમાં પ્રોજેક્ટ વિસ્તારના બધા પર્યાવરણીય, સામાજિક પ્રશ્નો અને પ્રોજેક્ટના વિવિધ પાસાઓને સ્પર્શતા મુદ્દાઓ આવરી લેવામાં આવેલ છે અને તેમનો પ્રોજેક્ટના આયોજન અને ડિઝાઇનમાં પ્રાથમિક તબક્કે જ સમાવેશ કરી લેવામાં આવેલ છે. જેથી ડીએફસી પ્રોજેક્ટ વધુ ટકાઉ અને અસરકારક રીતે તૈયાર થાય.

આ સંદર્ભમાં, પશ્ચિમ રેલ્વેના ડીએફસી તબક્કા-1ના (વામજ - ઇકબાલગઢ વિભાગ) માટે એમઓઆરડીએફસીસીઆઈએલ એ જેબીઆઈસી પર્યાવરણીય અને સામાજિક નીતિઓ બાબતો(2002) માટેની માર્ગદર્શિકા અનુસરીને ઈએસઆઈએ અભ્યાસ તૈયાર કરેલ છે. પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન (ઈએસઆઈએ) અભ્યાસમાં અવકાશ, પદ્ધતિ નિયંત્રણ, કુદરતી પર્યાવરણ અભ્યાસ, સામાજિક પર્યાવરણ અભ્યાસ, લોક પરામર્શ, અથડામણ ઓળખ અને ઇંડ, શમન માત્રાઓનું આયોજન, પર્યાવરણીય અને સામાજિક વ્યવસ્થા આયોજન (ઈએસએમપી) અને પર્યાવરણીય અને સામાજિક દેખરેખ આયોજન (ઈએસએમઓપી) તૈયાર કરવાનો સમાવેશ કરવામાં આવેલ છે.

ઈએસઆઈએની કાર્યપદ્ધતિ

ઈએસઆઈએની ક્રમગીરી, પ્રોજેક્ટમાં વ્યાપક રીતે, કુદરતી, સામાજિક, નિયમન અને પ્રોજેક્ટ વિસ્તારનો કુદરતી, સામાજિક પર્યાવરણનો વ્યવસ્થિત રીતે સમાવેશ કરીને કરવામાં આવેલ છે. ઈએસઆઈએમાં નીચે બતાવેલ તબક્કા/પાસા આવરી લેવામાં આવેલ છે. એટલે કે (1) ડેસ્ક અભ્યાસ પરથી માહિતી એકત્રિત કરવી, (2) પ્રાથમિક તૈયાર વ્યૂહરચના માટેની તપાસ, (3) પ્રોજેક્ટના અમલના કારણે થનાર સંભવિત અસરોની પ્રાથમિક ઓળખ, (4) સંભવિત અસરો શોધી કાઢવા, આયોજમાટે લોક પરામર્શ, (5) પ્રોજેક્ટ સ્થાનો વિગતવાર અભ્યાસ જેથી સંભવિત અસરોને પ્રાથમિક રીતે ઓળખી શકાય, (6) સંભવિત અસરોનું મૂલ્યાંકન, (7) સંભવિત અસરોના ઉપાયના પગલાંઓની અકાસણી, (8) પર્યાવરણીય અને સામાજિક વ્યવસ્થા આયોજન (ઈએસએમપી) અને પર્યાવરણીય અને સામાજિક દેખરેખ આયોજન (ઈએસએમઓપી) તૈયાર કરવા, (9) પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ)નો મુસદ્દો તૈયાર કરવો, (10) અભ્યાસના પરિણામોની, માહિતીની આપેલ અને જાણકારી આપવામાટે લોક પરામર્શ બેઠકોનું આયોજન અને (11) આખરી પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અહેવાલ તૈયાર કરવો.



આકૃતિ 2: ઈએસઆઈએનો અભ્યાસ પ્રવાહ

ઉપરની ઈએસઆઈએ કાર્યપદ્ધતિ મુજબ, ઈએસઆઈએ અભ્યાસનો વ્યાપ નક્કી કરવા માટે, સંભવિત અસરો, સેકન્ડરી ડાટાની મદદથી શોધવામાં આવી અને પ્રાથમિક તબક્કેપ્રોજેક્ટ સ્થાળની સમસ્યાઓની માહિતી મેળવવામાં આવી. આકૃતિ-2 માં બતાવ્યા મુજબ પ્રોજેક્ટનો વ્યાપ અને મુખ્ય અસરો નીચે કોઠા-3માં બતાવવામાં આવેલ છે.

કોઠો-3 : પ્રાથમિક રીતે ઓળખવામાં આવેલ સંભવિત અસરો

	કક્ષા	સંભવિત અસર	સ્થળના વિગતવાર સર્વે વખતે આવરી લેવાના મુદ્દા
1.	કુદરતી પર્યાવરણ	સૂચિત રેલમાર્ગનો એક ભાગ બાલારામ અંબાજી અભયારણ્યમાંથી પસાર થશે. ઉપરાંત પ્રોજેક્ટના અમલ વખતે માર્ગમાં આવતા વૃક્ષો પણ કાપવાના રહેશે.	- અભયારણ્યમાં આવેલ વનસ્પતિઓની જાતોની જાણકારી મેળવવી - કાપવાના થતા વૃક્ષોની ગણતરી કરવી
2.	પ્રદૂષણ નિયંત્રણ	- સૂચિત રેલમાર્ગની નજીકના વિસ્તારના લોકોને અવાજ અને ધ્રુજારીની અસર નિર્માણ સમય દરમ્યાન અને ત્યારબાદ વાસ્તવિક ઉપયોગ વખત થશે. - નકામું પાણી કેનાલ/ નદીમાં વહાવવાથી કેનાલ/ નદીના પાણી દૂષિત થવાની સંભાવના છે. (i) બાંધકામના તબક્કામાં બાંધકામ પ્રવૃત્તિઓ અને કામદારોના કેમ્પના કારણે અને (ii) પ્રોજેક્ટના વાસ્તવિક અમલના તબક્કે રેલ ચાલવાથી અને સ્ટેશનોના કારણે.	- ઘોંઘાટ અને ધ્રુજારીનું માપ, સંવેદનશીલ વિસ્તારો અથવા વસ્તીવાળા વિસ્તારમાં કઢાવવું. - અભ્યાસના વિસ્તારમાં પાણીની ક્ષલની ગુણવત્તા જાણવા માટે અગત્યની નદીઓના પાણીની સપાટીના નમૂનાઓ ચકાસવામાં આવશે.
3.	સામાજિક પર્યાવરણ	આ વિસ્તારમાં પ્રોજેક્ટના કારણે પરિવહન વ્યવસ્થાનો વિકાસ થશે તેમજ રોજગારની તકો વધશે. તે દરમ્યાન, જમીન સંપાદનના કારણે કેટલીક અસરો થવાની સંભાવના છે.	- પ્રશ્નોત્તરીના સર્વે દ્વારા પ્રોજેક્ટથી અસરગ્રસ્ત વ્યક્તિઓ (પીએપી)ની સામાજિક – આર્થિક સ્થિતિની જાણકારી મેળવવી (એટલેકે પાયાના સર્વે અને વસ્તી ગણતરી, જે પુનઃ સ્થાપન અને પુર્નવસનના આયોજનમાં ઉપયોગી થાય) - સ્થળ નિરીક્ષણ દ્વારા અભ્યાસના વિસ્તારમાં જમીનના ઉપયોગની ચોક્કસ માહિતી મેળવવી.

<u>પ્રોજેક્ટના સ્થળ અભ્યાસની કાર્યપદ્ધતિ</u>

લોક પરામર્શ બેઠકો દરમ્યાન મળતા પ્રતિભાવોમાંથી સામાજિક અસરોનું વિશ્લેષણ/ છણાવટ કરવામાં આવશે. પ્રદૂષણ નિયંત્રણ માટે વિસ્તારનો/ સ્થળનો સર્વે, કુદરતી પર્યાવરણ અને સામાજિક પર્યાવરણનો સર્વે શરૂઆતમાં જાણવા મળેલ અસરોના આધારે કરવામાં આવેલ છે. કોઠા-4 માં વિસ્તારો/ સ્થળોના સર્વેના સ્થળો અને કાર્યપદ્ધતિ બતાવવામાં આવેલ છે.

કોઠો-4 : પ્રોજેક્ટના સ્થળ અભ્યાસની કાર્યપદ્ધતિ

અભ્યાસના મુદ્દા	અભ્યાસની કાર્યપદ્ધતિ	સ્થળ
જૈવિક વિવિધતા		
પ્રાણી અને વનસ્પતિ સૃષ્ટિ	- બાલારામ_અંબાજી અભયારણ્યમાં આવેલ પ્રાણી અને વનસ્પતિ સૃષ્ટિની બે ઋતુઓમાં જોઈને ચકાસણી કરવી, વરસાદ પહેલા અને વરસાદ પછીની ઋતુમાં - અભ્યાસ વિસ્તારમાં, શિક્ષણ સાથે જોડાયેલા લોકો સાથે આ વિસ્તારની પ્રાણી અને વનસ્પતિ સૃષ્ટિમાટે ઈન્ટર્વ્યુ રાખવા	- સૂચિત સમર્પિત માલવાહક રેલમાર્ગ/ડીએફસી માર્ગ પર બાલારામ અંબાજી અભયારણ્યમાં રાજ્યના વન અધિકારીઓ સાથે બેઠક રાખીને અને નકશા આધારે પસંદ કરવામાં આવેલા સ્થળોમાં
પ્રદૂષણ નિયંત્રણ		
ઘોંઘાટ અને ધ્રુજારી	[ઘોંઘાટ] - ભારતમાં રેલના ઘોંઘાટનું માપ કાઢવાની કોઈ કાર્યપદ્ધતિ સ્થાપિત ન હોઈ, આંતરરાષ્ટ્રીય પદ્ધતિ મુજબ ઘોંઘાટનું માપ કાઢવામાં આવશે. [ધ્રુજારી] - ભારતમાં રેલના ઘોંઘાટનું માપ કાઢવાની કોઈ કાર્યપદ્ધતિ સ્થાપિત ન હોઈ, આંતરરાષ્ટ્રીય પદ્ધતિ મુજબ ઘોંઘાટનું માપ કરવામાં આવશે.	[ઘોંઘાટ] - ત્રણ સ્ટેશનો પર બે પોઇન્ટ પર પાલનપુર, સિદ્ધપુર અને મહેસાણા સ્ટેશનો, જેમાં ઘનતા અને સંવેદનશીલતાનો વિચાર કરવામાં આવશે. જેમકે, ઘોંઘાટ ઓછો કરવા શું સગવડોની જરૂર છે.? [ધ્રુજારી] - ઘોંઘાટ માટેના સર્વેની જેમ કરવામાં આવશે.
પાણીની ગુણવત્તા	- અભ્યાસ વિસ્તારમાં આવેલ અગત્યની નદીઓની સપાટી પરના પાણીના નમૂના લેવા - વિવિધ ધોરણો અનુસાર પાણીના નમૂના ચકાસવા-	3 સ્થળોએ (એટલે કે, નદીના ઉપર વાસમાં, મધ્યમાં અને નીચે તરફના વહેણના) ફક્ત બાલારામ નદીમાં. •અન્ય 3 અગત્યની નદીઓમાં અભ્યાસના વિસ્તારમાં સપાટીનું પાણી ઉપલબ્ધ નથી.
સામાજિક પર્યાવરણ		
પાયાનો સર્વે અને વસ્તી ગણતરી	- પ્રોજેક્ટથી અસર પામનાર પાસેથી વ્યક્તિગત રીતે સામાજિક આર્થિક અસરોની જાણકારી પ્રશ્નોત્તરી દ્વારા એકત્રિત કરીને	4 જિલ્લા(ગાંધીનગર, પાટણ, મહેસાણા અને બનાસકાંઠા) ના 68 ગામોમાં

<u>સંભવિત અસરોનું મૂલ્યાંકન અને તે હળવી કરવાના સૂચિત પગલાં/ઉપાયો</u>

પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) સર્વેના પરિણામોના આધારે અને ત્યાર પછીના પૃથ્થકરણના આધારે વિવિધ પર્યાવરણીય અને સામાજિક સંભાવ્ય અસરો સમર્પિત રેલમાર્ગ/ડીએફસી પ્રોજેક્ટના

અમલના કારણે થવાની સંભાવના છે. તે તારવવામાં આવેલ છે. આ બધી અસરો ઓછી કરવા કે હળવી કરવાના સૂચિત પગલાં, જે આયોજન/ડિઝાઈન, નિર્માણ તબક્કામાં અને વાસ્તવિક અમલના તબક્કે લેવામાં આવશે. તેવા મુદ્દાઓ/સમસ્યાઓ, તબક્કાઓ અને સૂચિત ઉપાયો નીચેના કોઠામાં બતાવવામાં આવેલ છે.

કોઠો ૬: મુખ્ય સંભાવ્ય પર્યાવરણ અને સામાજિક અસરો અને તેને હળવા કરવામાટેના સૂચિત ઉપાયો

પારમિતિ	પ્રોજેક્ટનો તબક્કો	સંભાવ્ય અસરો	તે હળવા કરવામાટેના સૂચિત ઉપાયો
કુદરતી પર્યાવરણ			
જૈવિક વિવિધતા	બાંધકામ અને ક્રિયા	૧. જંગલો અને જંગલી પ્રાણીઓને ખલેલ/ નુકસાન અને જંગલી પ્રાણીઓની ગતિવિધિમાં અડચણના જોખમમાં વધારો થાય	- સ્થાનિક જાતોના વૃક્ષો વાવીને જંગલોને થતું નુકસાન ઓછું કરવામાં આવશે. - વૃક્ષોના લીલા પટ્ટા (ગ્રીન બેલ્ટ) તૈયાર કરવામાં આવશે. - નાળા અને ગરનાળા તૈયાર કરવામાં આવશે, જેથી જંગલી પ્રાણીઓની ગતિવિધિ સરળ બને.
પ્રદૂષણ નિયંત્રણ			
ધોંધાટ અને ધ્રુજારી	બાંધકામ	બાંધકામોના સાધનોના કલનથલનથી ધોંધાટ અને ધ્રુજારીના સ્તરમાં વધારો	- પાડોશીઓને બાંધકામ બાબતે અગાઉથી જાણ કરવી. - રહેઠાણના અને સંવેદનશીલ વિસ્તારોમાં, અવાજ રોકવાના સાધનો ગોઠવવામાં આવશે. - અગાઉથી માપણી લઇ, સાચા જીમિતિક ટ્રેક તૈયાર કરવાની જાતરી રાખવી.
	ક્રિયા	રેલ ચાલવાથી ધોંધાટ અને ધ્રુજારીના સ્તરમાં વધારો	
પાણીની ગુણવત્તા	બાંધકામ	માટીકામના કારણે પાતળામાં માટીનું પ્રમાણ વધે	- નદીના પાણીને સીધી રીતે દૂષિત થતું અટકાવવું - માટીના ઢગલા અને છૂટક સામગ્રીની યોગ્ય રીતે જાળવણી કરવી. - ટાકીદની પરિસ્થિતિ સમયના ઉપાયોની તૈયારી કરવી. જેમકે તરતા લાકડાની આડ
વાતાવરણની ગુણવત્તા	બાંધકામ	બાંધકામ અને ખોદકામને કારણે વાતાવરણમાં ધૂળનું પ્રમાણ વધશે.	- સમર્પિત માલવાહક રેલમાર્ગ પ્રોજેક્ટ (ડીએફસી)ના માર્ગ પર વૃક્ષો ઉગાડવામાં આવશે. - પાણી છાંટીને - ઓછું પ્રદૂષણ કરે તેવા સાધનો અને વાહનોનો ઉપયોગ કરીને
સામાજિક પર્યાવરણ			
જમીન સંપાદન	બાંધકામ પહેલા	ખાનગી જમીનોનું સંપાદન અને ઇચ્છા વિનાનું પુનઃસ્થાપન	- પુનઃસ્થાપન અને પુનર્વસન આયોજન (આરઆરપી)માં નક્કી કરવામાં આવનાર નીતિ મુજબ અસરગ્રસ્તોને જમીન/બાંધકામ માટે યોગ્ય વળતર આપવું

પારમિતિ	પ્રોજેક્ટનો તબક્કો	સંભાવ્ય અસરો	તે હળવા કરવામાટેના સૂચિત ઉપાયો
સ્થાનિક અર્થ વ્યવસ્થા / રોજગાર	બાંધકામ પહેલા અને બાંધકામ	- જમીન સંપાદનના કારણે આવકના સ્રોત પર અસર - સ્થાનિક વ્યાપાર પ્રવૃત્તિમાં નિર્માણ કામના કારણે વધારો	- પુનઃસ્થાપનમાટે યોગ્ય કાર્યક્રમો આપવા. - પ્રોજેક્ટથી અસરગ્રસ્ત લોકોને અને સ્થાનિક લોકોને પ્રોજેક્ટ સંબંધિત રોજગારની તકો શક્ય તેટલા અંશે પૂરી પાડવી.
સામાજિક માળખું	બાંધકામ	સ્થાનિક સામાજિક માળખા સુધી પહોંચવામાં રુકાવટ અને ધાર્મિક સ્થાનો સુધી પહોંચવામાં રુકાવટ	- બાંધકામની કામગીરી દરમ્યાન સ્થાનિક માળખાકીય સુવિધાઓ અને ધાર્મિક સ્થાનો સુધી પહોંચવામાટે રસ્તા બનાવવામાં આવશે. - યોગ્ય સુવિધાઓ જેવી કે, પુલ અને નાળાએ ઉપર નાના પુલ બનાવવામાં આવશે. જેથી આવા સ્થાનો સુધી પહોંચી શકાય.
	ક્રિયા		

પર્યાવરણ અને સામાજિક વ્યવસ્થાપન આયોજન (ઇએસએમપી)

પર્યાવરણીય અને સામાજિક વ્યવસ્થાપન આયોજન (ઇએસએમપી)નો હેતુ, પ્રોજેક્ટની વિવિધ પ્રવૃત્તિઓના કારણે સર્જાતી વિપરીત અસરો હળવી કરવાના ઉપાયોના યોગ્ય અમલ, આયોજન/ડિઝાઈન, નિર્માણ તબક્કામાં અને વાસ્તવિક અમલના તબક્કે નીચેની સમસ્યાઓમાટે ઉપર બતાવેલા સુધારાત્મક પગલાંના આધારે સામાજિક વ્યવસ્થાપન આયોજન (ઇએસએમપી) તૈયાર કરવામાં આવેલ છે. ઇએસઆઈએના સંપૂર્ણ અહેવાલમાં સમગ્ર અહેવાલ ઉપલબ્ધ છે.

1. નીચે જણાવેલ નિશ્ચિત મુદ્દાઓને આખરી ઇએસઆઈએ અહેવાલના મુસદ્દામાં સામેલ કરવામાં આવ્યા છે.
   - લીલા પટ્ટાના વિકાસનું આયોજન
   - ખાઇ/અને ઉંડીના લીધેલા વિસ્તારોનું વ્યવસ્થાપન અને પુનર્ગઠન
   - ધોંધાટ અને ધ્રુજારી વ્યવસ્થાપન અને નિયંત્રણ
   - ઘન કચરાનું વ્યવસ્થાપન આયોજન (solid waste management plan)
   - જોખમી રસાયણોનો સંગ્રહ, હેરફેર, ટાકીદની સ્થિતિમાં લેવાના પગલાંનું આયોજન
   - ગટર વ્યવસ્થા આયોજન
   - જમીન સંપાદન અને પુનઃસ્થાપન (ફક્ત રૂપરેખા, વિગતો આરઆરપી અહેવાલમાં)
   - મજૂરો માટેના કેમ્પના બાંધકામમાં સ્વચ્છતા અને વ્યવસ્થાનું આયોજન
   - વ્યવસાયિક આરોગ્ય અને સલામતી વ્યવસ્થા.
2. નીચેની બાબતોના પર્યાવરણીય અને સામાજિક સમસ્યાઓ હળવી કરવામાટે લેવાના તબક્કાવાર પગલાં નીચે બતાવેલ છે.

   અ) આયોજન/ડિઝાઈન તબક્કો (Planning/Design Phase)

જમીન સંપાદન, વનની જમીનનો અન્ય હેતુમાટે ઉપયોગ, વૃક્ષોની જાણવણી, ઉછીના લીધેલા વિસ્તાર, ખાણ વિસ્તાર, નિર્માણની પ્રવૃત્તિમાટે પાણી, અન્ય બાંધકામ સામગ્રીના સ્થળ, બાંધકામ મશીનરી મુકવામાટેના સ્થળોની પસંદગી અને નકામી સામગ્રીનો નિકાલ, બાંધકામના કેમ્પ, ફંગામી ચાર્જમાટે વ્યવસ્થા કરવી, અમલ કરનાર એજન્સીઓ અને કોન્ટ્રાક્ટરો નક્કી કરવા.

બ) બાંધકામ તબક્કો (Construction Phase)
સ્થળની ચિંતા, બાંધકામ સામગ્રી પ્રાપ્ત કરવી, બાંધકામ (ગટર, કાદવ, ઢાળ પર રક્ષણ દીવાલ), જળ પ્રદૂષણ, હવાનું પ્રદૂષણ, ઘોંઘાટ, સલામતી, મજૂર કેમ્પની વ્યવસ્થા, કોન્ટ્રાક્ટરોની ફેરફેર (કામ બંધ કરતી વખતેની સામગ્રી, પુનઃ કામ શરૂ કરવું અને પુનઃ સ્થાપન)

ક) ક્રિયા તબક્કો (Operation Phase)
સમસ્યાઓ હળવી કરવાના વિવિધ ઉપાયોની કામગીરી પર દેખરેખ રાખવી, પર્યાવરણ અને સામાજિક અસરો પર દેખરેખ

પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન (ઈએસએમઓપી)

પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન(ઈએસએમઓપી)નો હેતુ પર્યાવરણ અને સામાજિક વ્યવસ્થાપન આયોજન(ઈએસએમપી) નો અસરકારક અમલ છે. જેથી પ્રોજેક્ટનો ઉદ્દેશ સમગ્ર રીતે ટકાઉ અને અસરકારક રીતે પ્રાપ્ત કરી શકાય. પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન(ઈએસએમઓપી)સમસ્યાઓ હલ કરવાના ઉપાયોના અસરકારક અમલીકરણના પરિણામો પર દેખરેખ રાખે છે. અને જરૂર જણાય વધારાના ઉપાયો સૂચવે છે, જેથી લક્ષિત વસ્તીને પ્રોજેક્ટના લાભ વધુ પ્રમાણમાં મળેછે. પર્યાવરણ અને સામાજિક નિરીક્ષણ આયોજન(ઈએસએમઓપી)માં કામગીરીના ધોરણે અને પર્યાવરણની દેખરેખ કાર્યક્રમનો સમાવેશ થાય છે, જે નીચે મુજબ છે.

1. કામગીરી ધોરણો
   - આયોજન/ડિઝાઈન તબક્કો : જમીન સંપાદન કચરો એકત્ર કરવાના સ્થળો, બાંધકામ મજૂરોના કેમ્પ, ઉછીના વિસ્તારો, ખાણ વિસ્તાર.
   - બાંધકામ તબક્કો : આસપાસના વાતાવરણની હવાની ગુણવત્તા, ઘોંઘાટ અને ધુજારીના સ્તર, પાણીની ગુણવત્તા (નદીનું પાણી), ભ્રિન ઉપયોગી પાણીની ગુણવત્તા, આવરી લેવામાં આવેલ ફરિયાળા વિસ્તાર.
   - કામગીરીનો તબક્કો : વૃક્ષોનો બચાવનો દર, ઉછીના લીધેલા વિસ્તારોનું પુનઃસ્થાપન, સંવેદનશીલ રીસેપ્ટર્સ માટે નોઈઝ બેરીયરની ગોગવાઇ

2. પર્યાવરણ દેખરેખ કાર્યક્રમ
   આમાં દેખરેખના ધોરણોનો સમાવેશ થાય છે. દેખરેખની પદ્ધતિ; દેખરેખમાટેના સ્થળો; દેખરેખમાટેનો સમયગાળો અને આવર્તન. (frequency), દેખરેખમાટેની સંસ્થાકીય જવાબદારી અને અંદાજિત ખર્ચ. પર્યાવરણીય દેખરેખમાટે ઉપયોગમાં લેવામાં આવનાર ધોરણો જેમની દેખરેખ રાખવામાં આવશે તેવા કેટલા મુખ્ય ધોરણો/ માપદંડ નીચે બતાવવામાં આવેલ છે. સામાજિક ધોરણોની વર્ચા આરઆરપીમાં અલગ રીતે કરવામાં આવશે.
   - આસપાસની(ambiant) હવાની ગુણવત્તા, ઘોંઘાટનું સ્તર, પાણીની ગુણવત્તા, વૃક્ષો અને વનસ્પતિનું નુકસાન.

લોક પરામર્શ બેઠકો (પીસીએમ)

લોક પરામર્શ બેઠકો (પીસીએમ)નો પ્રાથમિક હેતુ, પ્રોજેક્ટના કારણે અસર પામતા લોકો અને વિવિધ હિત ધરાવનારોને તેમના મંતવ્યો વ્યક્ત કરવાનો અને સૂચિત પ્રોજેક્ટની સંભાવી અસરો પર તેમના અભિપ્રાયો વ્યક્ત કરવામાટે મંચ પૂરો પાડવાનો છે. ઈએસઆઈએમાટે બે તબક્કાએ પીસીએમ રાખવામાં આવી હતી; જેથી જનતાના અભિપ્રાયો અને વિચારો જાણી શકાય, અને તેમને પ્રોજેક્ટના ઈએસઆઈએ અભ્યાસની જાણકારી આપી શકાય. ચારેય જિલ્લાઓમાં જિલ્લા દીઠ લોક પરામર્શ બેઠકો રાખવામાં આવેલ.

- પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન (ઈએસઆઈએ) નો પીસીએમનો પ્રથમ તબક્કો સપ્ટેમ્બર, 2011માં રાખવામાં આવ્યો હતો (અને પૂરક પીસીએમ મહેસાણાના બે ગામો માટે ઓક્ટોબર, 2011માં), પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન (ઈએસઆઈએ)ના પ્રાથમિક તબક્કામાં પર્યાવરણીય અવકાશના સમયે રાખવામાં આવ્યો હતો. લોકોને પ્રોજેક્ટની અને પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અભ્યાસના અવકાશની જાણકારી આપવામાં આવી હતી અને તેમની ટિપ્પણી અને અભિપ્રાય પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન (ઈએસઆઈએ) અભ્યાસમાં સામેલ કરવામાટે એકત્ર કરવામાં આવ્યા હતા.
- પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન (ઈએસઆઈએ)ની પીસીએમનો બીજો તબક્કો નવેમ્બર, 2011માં રાખવામાં આવ્યો છે. આ બેઠક ઈએસઆઈએના અહેવાલના મુસદ્દાની અને ઉપાયો માટેના સક્ષમ પગલાની સમર્પિત રેલમાર્ગ(ડીએફસી) પ્રોજેક્ટથી રીતે, કે આડકતરી રીતે અસર પામતા લોકોને જાણકારી આપવા માટે હતી અને તેમની ટિપ્પણી, અભિપ્રાય અને રજૂઆતો પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અભ્યાસના આખર અહેવાલમાં સામેલ કરવામાટે એકત્ર કરવામાં આવશે.

લોક પરામર્શ બેઠકો (પીસીએમ)ની પ્રથમ અને બીજા તબક્કાની બેઠકમાં રજુ કરવામાં આવેલી કેટલીક સમસ્યાઓ અને અભિપ્રાય આ મુજબ હતા – જમીનનું વળતર અને રોજગાર/નોકરીની તકો, જમીન સંપાદન અને વિસ્થાપન, જમીનના રેકર્ડમાં રહેલ વિસંગતતાઓ સબંધિત જમીનના રેકર્ડમાં રહેલ વિસંગતતાઓ સબંધિત પાસાઓ, આરઓડબલ્યુની પહોળાઈ, ખેડૂતોને પસાર થવામાટે સર્વિસ રોડ પૂરા પાડવા, ગટર વ્યવસ્થા, સામુદાયિક સગવડો અને સ્રોતોની ઉપલબ્ધતા, અને સામાજિક-સાંસ્કૃતિક પાસાઓ. ટ્રેનોની અવરજવરના કારણે થનાર ઘોંઘાટ અને ધુજારીના કારણે પડનાર સંભવિત અસર : પીસીએમની પ્રથમ અને બીજા તબક્કાની બેઠકોમાં પ્રોજેક્ટથી અસરગ્રસ્ત લોકો (પીએપીએસ) ગ્રામ સભાના પ્રતિનિધિ, જિલ્લા પરિષદના ચૂંટાયેલા સભ્યો, જિલ્લા વહિવટદારો, મહેસૂલ વિભાગ, વન વિભાગ અધિકારીઓ હાજર રહ્યા હતા.

ઈએસઆઈએ કાર્યપદ્ધતિમાં માહિતી પ્રસાર

ઈએસઆઈએ અભ્યાસના પરિણામોની જાણકારી પ્રોજેક્ટથી અસર પામનાર લોકોને પીએપીએસને અને હિત ધરાવનારાઓને આપવામાં આવે છે, જેથી પ્રોજેક્ટ સરળ રીતે પૂરો થાય તેમાટેના જરૂરી પગલાં લઈ શકાય. પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ)ના બે તબક્કા પર માહિતી/જાણકારી પૂરી પડવામાં આવે છે.

- પ્રથમ ક્યારે ઈએસઆઈએનો મુસદ્દો તૈયાર કરવામાં આવે ત્યારે. પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ)ના પૂરા અહેવાલનો મુસદ્દો (જેમાં પરિશિષ્ટ પણ સામેલ હોય)

અંગ્રેજીમાં દરેક ડીએફસીસીઆઈએલની કચેરી પર મોકલવામાં આવ્યો અને ત્યાં કચેરીમાં લોકોના જોવામાટે મૂકવામાં આવ્યો. વધુમાં પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અભ્યાસનો મુસદ્દો સ્થાનિક ભાષામાં એટલે કે, ગુજરાતીમાં તૈયાર કરવામાં આવેલ અને પ્રોજેક્ટના ડીએફસીના માર્ગમાં આવેલા બધાજ અસરગ્રસ્ત ગામોને મોકલવામાં આવેલ છે.

- જાણકારી આપવાના બીજા તબક્કાનો અમલ ઈએસઆઈએના આખરી તબક્કામાં અકરવામાં આવશે. પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) નો પૂરો આખરી અહેવાલ (જેમાં પરિશિષ્ટ પણ સામેલ હોય)તે અંગ્રેજીમાં ડીએફસીસીઆઈએલની મુખ્ય કચેરી પર, ચીફ પ્રોજેક્ટ મેનેજર, અમદાવાદની કચેરી અને ચીફ પ્રોજેક્ટ મેનેજર, અજમેરની કચેરી હાલના મુખ્ય રેલવે સ્ટેશનો પર અને જિલ્લા અધિકારીઓને જે સમર્પિત રેલ માર્ગ (ડીએફસી)ના રૂટ પર આવતા હોય તેમને મોકલવામાં આવશે. વધુમાં આખરી પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ)ના અહેવાલનો ટૂંક સાર અંગ્રેજી અને ગુજરાતીમાં તૈયાર કરવામાં આવશે અને સમર્પિત રેલ માર્ગ (ડીએફસી) વામજ-ઇકબાલગઢ વિભાગના રૂટ પર આવતા બધાજ અસરગ્રસ્ત ગામોને મોકલવામાં આવશે.

ઈએસઆઈએ અહેવાલના મુસદ્દાની ઉપલબ્ધતા અને તેના પર મંતવ્યો આપવા

- પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અહેવાલનો મુસદ્દો સમીક્ષા માટે નીચે બતાવેલ સ્થળોએ ઉપલબ્ધ રહેશે. ડીએફસીસીઆઈએલ મુખ્ય કચેરી, ચીફ પ્રોજેક્ટ મેનેજર, અમદાવાદની કચેરી અને ચીફ પ્રોજેક્ટ મેનેજર, અજમેરની કચેરી, સબંધિત મુખ્ય પ્રોજેક્ટ મેનેજર (સીપીએમ), સૂચિત ડીએફસીના રૂટ પર આવતા મુખ્ય રેલ્વે સ્ટેશનો અને સબંધિત જિલ્લા કચેરીઓ પર નવેમ્બર માસના અંતથી 2011થી ઉપલબ્ધ રહેશે.
- પર્યાવરણીય અને સામાજિક અસરોનું મૂલ્યાંકન(ઈએસઆઈએ) અહેવાલના મુસદ્દાનો સંક્ષિપ્ત સાર, ગુજરાતી ભાષામાં પ્રોજેક્ટથી અસરગ્રસ્ત બધાજ ગામોના સરપંચની કચેરીમાં નવેમ્બર માસના અંતથી 2011થી ઉપલબ્ધ રહેશે.
- ડીએફસીસીઆઈએલના મુખ્ય મથક અથવા સબંધિત મુખ્ય પ્રોજેક્ટ મેનેજર(સીપીએમ) કચેરીને પોતાના મંતવ્યો ટપાલ દ્વારા, ફેક્સ દ્વારા અથવા ઈ-મેઇલ dfc.package3@gmail.com, થી નવેમ્બર 2011 માસના અંત/ડિસેમ્બર 2011 માસની શરુઆતમાં પહોંચાડી શકાશે.

ડીએફસીસીઆઈએલના સીપીએમની કચેરીઓના સરનામાં

- <u>સમર્પિત માલવાહક રેલમાર્ગ ઇંડિયા લિમિટેડ (ડીએફસીસીઆઈએલ)</u>
  (રેલ મંત્રાલય હેઠળ), પાંચમો માળ, પ્રગતિ મેદાન, મેટ્રો સ્ટેશન બિલ્ડીંગ કોમ્પ્લેક્ષ, નવી દિલ્હી-110001.
  (ટેલીફોન નં. 91-11-23454700,ફેક્સ : 91-11-23454701)
- <u>સીપીએમ ઓફિસ, અમદાવાદ.</u>
  પહેલો માળ, ડીઆરએમની જૂની ઓફિસ, કાલુપુર, અમદાવાદ-380002, ગુજરાત.
  (ટેલીફોન નં. (0)79-22175107, ફેક્સ : (0)79-22163101)
- <u>સીપીએમ ઓફિસ અજમેર.</u>
  42 એ/3, સિવલ લાઇન્સ, અજમેર-305001, રાજસ્થાન.
  (ટેલીફોન અને ફેક્સ : (0) 145-2630360)

Appendix-10b
Materials Used for Information Dissemination of Draft ESIA Report

[Letter to Government Officials in English]

FOR DISTRIBUTION OF DRAFT ESIA AND SUMMARY REPORT
for DISTRICT COLLECTORATE OFFICE

District Collector
Mehsana District
District Administration Office
Mehsana, Gujarat

New Delhi, dated 2nd Dec., 2011

Sub: Distribution of the draft Environment and Social Impact Assessment (ESIA) Report and Summary of ESIA for Development of Dedicated Freight Corridor (DFC) Project (Western: Wamaj – Iqbalgarh Section)

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) under Ministry of Railways, Government of India is the executing agency for the development of DFC. DFCCIL conducted Environmental and Social Impact Assessment (ESIA) between Wamaj to Iqbalgar Section at the western corridor from June to November, 2011, and prepared a draft ESIA report and its summary.

The project will be funded by Japan International Cooperation Agency (JICA). The study has been carried out as per "JICA Guidelines for Environmental and Social Considerations", whose requirements include disclosure of draft ESIA report. The objectives of disclosure are as follows:

1) Disseminate information on DFC Project in terms of the environmental and social impacts induced by DFC Project as well as general plan on the management, monitoring and mitigation measures of the environment of the study area.
2) Collection of comments and opinions from the public on environment and social issues on DFC project and further, it will be reflected in final ESIA report.

The distribution of draft ESIA reports and the summary will be started from 4th December, 2011 and completed by 7th December, 2011.

The Summary of the draft ESIA report in vernacular languages as well as English version will also be distributed to all affected village offices between Wamaj and Iqbalgar, and a full set of draft ESIA reports will be available in two CPM offices of DFCCIL, major stations along the proposed DFC alignment, and concerned districts offices. The list of CPM offices, district offices, major stations and project affected villages is enclosed in the Appendix A.

Comments from people will be received only at CPM offices of DFCCIL through direct delivery, fax or post upto 17th December, 2011. Draft ESIA reports will be collected back by a representative of DFCCIL by 23rd December, 2011.

In order to smooth implementation for disclosure of draft ESIA reports, all concerned district collectorate offices are requested to accept these reports, and take necessary action for public viewing.

The representative of Nippon Koei Consortium (NKC) who provides technical assistance on ESIA to DFCCIL would contact to your office shortly for distribution of reports.

Considering the high priority assigned to this project by Govt. of India and urgent need to complete the study in time, all necessary assistance may be rendered to NKC in order to facilitate disclosure of reports without any delay including receipt of draft ESIA reports by your office and making arrangement for public view.

Suitable action in this regard may please be taken.

Signed by (DFCCIL)

Attachment:

- List of Places for the Information Dissemination of the Draft ESIA Report and its Summary

Attachment of Letter

List of Places for the Information Dissemination of the Draft ESIA Report and its Summary for DFC Phase 1 (Western: Wamaj – Iqbalgarh Section)

1. Distribution of Full Set of the Draft EIA Report

Full set of draft ESIA report is distributed to each of the following.

Distribution of ESIA report

ESIA Report	CPM Office	Major Station	District Office
Draft ESIA report -Main report -Appendix -Summary	CPM-Ahmedabad	1) Pansar 2) Mehsana 3) Unjha 4) Sidhpur 5) Palanpur	1) Gandhinagar 2) Mehsana 3) Patan 4) Banaskantha
	CPM-Amjer	6) Chitrasani	4) Banaskantha

2. List of Villages where the Summary of the Draft EIA Report Distributed

Gujarat State

Total Sl. No.	District	Sub-district	No. per Sub-district	Name of Village
1	Gandhinagar	Kalol	1	Vansjara (K)
2			2	Ramnagar
3			3	Piyaj
4			4	Borisana
5			5	Kalol
6			6	Pratapura
7			7	Chhatral
8			8	Ola
9			9	Isand
10			10	Vadavswami
11			11	Pansar
12	Mehsana	Kadi	1	Wamaj
13			2	Julasan
14			3	Ghumasan
15			4	Dangarava
16			5	Anadpura
17			6	Tankiya
18			7	Kaiyal
19			8	Mevad
20		Mehsana	1	Navi Sedhavi
21			2	Jornang
22			3	Ambliyasan
23			4	Chaluva
24			5	Dholasan
25			6	Geeratpur
26			7	Ditasan
27			8	Jagudan
28			9	Hebova
29			10	Punasan
30			11	Shobhasan
31			12	Kukas

Total Sl. No.	District	Sub-district	No. per Sub-district	Name of Village
32			13	Hedua Hanumant
33			14	Mehsana
34			15	Ramosana
35			16	Taleti
36			17	Palodara
37			18	Nani Daue
38			19	Moti Dau
39		Visnagar	1	Bhand
40			2	Jethal Vasnau
41		Unjha	1	Aithor
42			2	Unjha
43			3	Maktupur
44			4	Kamali
45	Patan	Patan	1	Khali
46			2	Lalpur
47			3	Sidhpur
48			4	Sujanpur
49	Banaskantha	Vadgam	1	Dharewada
50			2	Manpura
51			3	Pasvadal
52			4	Kotadi
53			5	Chhapi
54			6	Majadar
55			7	Malosana
56		Palanpur	1	Jaselani
57			2	Sedarsana
58			3	Jagana
59			4	Palanpur
60			5	Sadapur
61			6	Karjoda
62			7	Surajpura
63			8	Hebatpur
64			9	Chitrasani
65			10	Jaspuriya
66			11	Rajpuriya
67			12	Jethi
68			13	Iqbalgarh

[Letter to Government Officials in Gujarati]

DFCC
डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

પ્રતિ,
કલેક્ટરશ્રી,
પાટણ,

તા. ૫/૧૨/૧૨

વિષય :- વામજથી ઈકબાલગઢ વિભાગ (પ્રથમ તબક્કા) વચ્ચેના માલવહન સમર્પિત રેલવે માર્ગના વિકાસ માટે થયેલ સૂચિત- પર્યાવરણ અને સામાજિક અસરોનો અભ્યાસ અને સાર-અહેવાલ વિતરીત કરવા માટે

ભારત સરકારના રેલ્વે મંત્રાલય અંતર્ગત ડેડીકેટેડ ફ્રેઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લિમીટેડ એ ડી.એફ.સી. પ્રોજેકટના અમલીકરણ માટે નિયુક્ત કરેલ છે. ડી.એફ.સી.સી.આઈ.એલ. દ્વારા વામજથી ઈકબાલગઢ વિભાગ (પ્રથમ તબક્કા) વચ્ચેના માલવહન સમર્પિત રેલવે માર્ગ ફેઝ-૨ માટે, પર્યાવરણીય અને સામાજિક અસરના અભ્યાસ માટે જૂન, ૨૦૧૧ થી હાથ ધરવામાં આવેલ છે. જેનો સૂચિત ઈ.એસ.એ. અહેવાલ અને સમરી રિપોર્ટ તૈયાર કરવામાં આવ્યો છે.

આ અભ્યાસ કરવા માટે જાપાન ઈન્ટરનેશનલ કોઓપરેશન એજન્સી (JICA) ની આર્થિક મદદ મળી છે. આ અભ્યાસ જાયકાની ગાઈડ લાઈનમાં દર્શાવ્યા પ્રમાણે લોકોની જાણકરી માટે પર્યાવરણીય અને સામાજિક અસરોનો અભ્યાસ કરવાની જરૂરીયાત હોવાથી તૈયાર કરવામાં આવ્યો છે. આ ઘોષણા કરવાના હેતુઓ નીચે પ્રમાણે છે :

૧. ડી.એફ.સી. પ્રયોજનાની પર્યાવરણીય અને સામાજિક અસરોની જાણકરી પહોંચાડવી જેમાં અભ્યાસ વિસ્તારના પર્યાવરણ વ્યવસ્થાપન, દેખરેખ તથા અસર નિવારણ પગલાંનો પણ સમાવેશ થાય છે.

૨. લોકો પાસેથી ડી.એફ.સી. પ્રોજેકટ સંબંધીત પર્યાવરણ અને સામાજિક અભ્યાસના મુદ્દાઓ અંગે અભિપ્રાય તથા સૂચનો મેળવવા અને વધુમાં તેનો અંતિમ ઈ.એસ.આઈ.એ. અહેવાલમાં સમાવેશ કરવો.

૪થી ડિસેમ્બર, ૨૦૧૧ થી સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ તથાતેના સારનું વિતરણ કરવામાં આવશે અને ૭મી ડિસેમ્બર, ૨૦૧૧ સુધીમાં તે કામ પુરુ કરવામાં આવશે.

વામજથી ઈકબાલગઢ વચ્ચેના તમામ અસરગ્રસ્ત ગામોના કાર્યાલય અંગ્રેજી તથા સ્થાનિક ભાષામાં સૂચિત ઈ.એસ.આઈ.એ. અહેવાલનો સાર વહેંચવામાં આવશે જ્યારે આ અહેવાલ તેના સંપૂર્ણ સ્વરૂપમાં ડી.એફ.સી.સી.આઈ.એલ. ના સી.પી.એમ. કાર્યાલયે, ડી.એફ.સી.એલાઈમેન્ટના મુખ્ય સ્ટેશનોએ અને સંબંધિત જિલ્લા કલેક્ટરશ્રીઓ પાસે ઉપલબ્ધ હશે. સી.પી.એમ. કાર્યાલયો, જિલ્લો કાર્યાલયો, મહત્ત્વના સ્ટેશનો અને પ્રોજેકટથી અસર પામનાર ગામોની યાદી આ સાથે પુરવણી-એ, આપેલ છે.

ESI Report

લોકોના સૂચનો માત્ર ડી.એફ.સી.સી.આઈ.એલ.સી.પી.એમ.ના કાર્યાલયો ખાતે રૂબરૂ ફેકસ કે ટપાલ દ્વારા ૧૭, ડિસેમ્બર-૨૦૧૧ સુધી સ્વીકારવામાં આવશે. ડિસેમ્બરના અંત સુધીમાં ડી.એફ.સી.સી.આઈ.એલ. દ્વારા સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ પરત ભેગા કરવામાં આવશે.

7/12/11
ઈન્ચર્જ કલાર્ક
કલેક્ટર કચેરી
પાટણ.

સૂચિત ઈ.એસ.આઈ.એ.અહેવાલની જાણકારી સરળતાથી મળે તે માટે દરેક પંચાયત કાર્યાલયોને અને જિલ્લા કલેક્ટર કાર્યાલયોને વિનંતી કરવામાં આવે છે કે તેઓ આ અહેવાલ સ્વીકારે અને લોકો જોઈ શકે તે માટે જરૂરી પગલાં લે.

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DFCC
ડેડીકેટેડ ફ્રેટ કોરીડોર કૉર્પોરેશન

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

ડી.એફ.સી.સી.આઈ.એલ. ના પ્રતિનિધિ ટૂંક સમયમાં અહેવાલના વિતરણ સંબંધે તમારો સંપર્ક કરશે.

ભારત સરકાર દ્વારા આ યોજના ઉચ્ચ અગ્રિમતા અપાયેલ છે તે ધ્યાને લઈને આ અભ્યાસ સમયસર પૂરો થવો જરૂરી છે. આ માટે જાયકા સર્વે ટીમ તથા સ્થાનિક નિષ્ણાંત સેવા પૂરી પાડતી સંસ્થા પાસેથી કોઈપણ પ્રકારના વિલંબ વગર સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ મેળવી લોકો જોઈ શકે તે પ્રકારે આ દિશામાં યોગ્ય પગલાં લેવા વિનંતી છે.

મુખ્યપરિયોજના અધિકારી, DFCCIL
Chief Project Manager
Dedicated Freight Corridor
Corporation of India Limited
Ahmedabad.

બિડાણ :-

- સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ અને સાર રિપોર્ટ જોવા માટેના સ્થળની યાદી
- ડી.એફ.સી.એલાઈમેન્ટથી અસર પામનાર ગામોના નામો

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[Letter to Village Sarpanch in Gujarati]

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

સૂચિત પર્યાવરણ અને સામાજિક અસરોનો અભ્યાસ અને સાર-અહેવાલ

ગ્રામ પંચાયત કાર્યાલયને વિતરીત કરવા માટે

પ્રતિ,
સરપંચશ્રી / તલાટી કમ મંત્રી
કેવડ.....ગ્રામ, પંચાયત,

તા. ૫/૧૨/૧૨

વિષય :- વામજથી ઈકબાલગઢ વિભાગ (પ્રથમ તબક્કા) વચ્ચેના માલવહન સમર્પિત રેલવે માર્ગના વિકાસ માટે થયેલ સૂચિત- પર્યાવરણ અને સામાજિક અસરોનો અભ્યાસ અને સાર-અહેવાલ વિતરીત કરવા માટે

ભારત સરકારના રેલ્વે મંત્રાલય અંતર્ગત રેડીકેટેડ ફ્રેઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા લિમીટેડ એ ડી.એફ.સી. પ્રોજેકટના અમલીકરણ માટે નિયુક્ત કરેલ છે. ડી.એફ.સી.સી.આઈ.એલ. દ્વારા વામજથી ઈકબાલગઢ વિભાગ (પ્રથમ તબક્કા) વચ્ચેના માલવહન સમર્પિત રેલવે માર્ગ ફેઝ-૨ માટે, પર્યાવરણીય અને સામાજિક અસરના અભ્યાસ માટે જૂન, ૨૦૧૧ થી હાથ ધરવામાં આવેલ છે. જેનો સૂચિત ઈ.એસ.એ. અહેવાલ અને સમરી રિપોર્ટ તૈયાર કરવામાં આવ્યો છે.

આ અભ્યાસ કરવા માટે જાપાન ઈન્ટરનેશનલ કોઓપરેશન એજન્સી (JICA) ની આર્થિક મદદ મળી છે. આ અભ્યાસ જાયકાની ગાઈડ લાઈનમાં દર્શાવ્યા પ્રમાણે લોકોની જાણકરી માટે પર્યાવરણીય અને સામાજિક અસરોનો અભ્યાસ કરવાની જરૂરીયાત હોવાથી તૈયાર કરવામાં આવ્યો છે. આ ઘોષણા કરવાના હેતુઓ નીચે પ્રમાણે છે :

૧. ડી.એફ.સી. પ્રયોજનાની પર્યાવરણીય અને સામાજિક અસરોની જાણકરી પહોંચાડવી જેમાં અભ્યાસ વિસ્તારના પર્યાવરણ વ્યવસ્થાપન, દેખરેખ તથા અસર નિવારણ પગલાંનો પણ સમાવેશ થાય છે.

૨. લોકો પાસેથી ડી.એફ.સી. પ્રોજેકટ સંબંધીત પર્યાવરણ અને સામાજિક અભ્યાસના મુદ્દાઓ અંગે અભિપ્રાય તથા સૂચનો મેળવવા અને વધુમાં તેનો અંતિમ ઈ.એસ.આઈ.એ. અહેવાલમાં સમાવેશ કરવો.

૪થી ડિસેમ્બર, ૨૦૧૧ થી સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ તથાતેના સારનું વિતરણ કરવામાં આવશે અને ૭મી ડિસેમ્બર, ૨૦૧૧ સુધીમાં તે કામ પુરુ કરવામાં આવશે.

વામજથી ઈકબાલગઢ વચ્ચેના તમામ અસરગ્રસ્ત ગામોના કાર્યાલય અંગ્રેજી તથા સ્થાનિક ભાષામાં સૂચિત ઈ.એસ.આઈ.એ. અહેવાલનો સાર વહેંચવામાં આવશે જયારે આ અહેવાલ તેના સંપૂર્ણ સ્વરૂપમાં ડી.એફ.સી.સી.આઈ.એલ. ના સી.પી.એમ. કાર્યાલયે, ડી.એફ.સી.એલાઈમેન્ટના મુખ્ય સ્ટેશનોએ અને સંબંધિન જિલ્લા કલેક્ટરશ્રીઓ પાસે ઉપલબ્ધ હશે. સી.પી.એમ. કાર્યાલયો, જિલ્લો કાર્યાલયો, મહત્વના સ્ટેશનો અને પ્રોજેકટથી અસર પામનાર ગામોની યાદી આ સાથે પુરવણી-એ, આપેલ છે.

લોકોના સૂચનો માત્ર ડી.એફ.સી.સી.આઈ.એલ.સી.પી.એમ.ના કાર્યાલયો ખાતે રૂબરૂ ફેકસ કે ટપાલ દ્વારા ૧૭, ડિસેમ્બર-૨૦૧૧ સુધી સ્વીકારવામાં આવશે. ડિસેમ્બરના અંત સુધીમાં ડી.એફ.સી.સી.આઈ.એલ. દ્વારા સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ પરત ભેગા કરવામાં આવશે.

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DFCC
डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन

સૂચિત ઈ.એસ.આઈ.એ.અહેવાલની જાણકારી સરળતાથી મળે તે માટે દરેક પંચાયત કાર્યાલયોને અને જિલ્લા કલેક્ટર કાર્યાલયોને વિનંતી કરવામાં આવે છે કે તેઓ આ અહેવાલ સ્વીકારે અને લોકો જોઈ શકે તે માટે જરૂરી પગલાં લે.

ડી.એફ.સી.સી.આઈ.એલ. ના પ્રતિનિધિ ટૂંક સમયમાં અહેવાલના વિતરણ સંબંધે તમારો સંપર્ક કરશે.

ભારત સરકાર દ્વારા આ યોજના ઉચ્ચ અગ્રિમતા અપાયેલ છે તે ધ્યાને લઈને આ અભ્યાસ સમયસર પૂરો થવો જરૂરી છે. આ માટે જાયકા સર્વે ટીમ તથા સ્થાનિક નિષ્ણાંત સેવા પૂરી પાડતી સંસ્થા પાસેથી કોઈપણ પ્રકારના વિલંબ વગર સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ મેળવી લોકો જોઈ શકે તે પ્રકારે આ દિશામાં યોગ્ય પગલાં લેવા વિનંતી છે.

સહી/-
મુખ્ય પ્રોજેક્ટ મેનેજર, DFCC
Chief Project Manager
Dedicated Freight Corridor
Corporation of India Limited
Ahmedabad.

બિડાણ :-
- સૂચિત ઈ.એસ.આઈ.એ. અહેવાલ અને સાર રિપોર્ટ જોવા માટેના સ્થળની યાદી
- ડી.એફ.સી.એલાઈમેન્ટથી અસર પામનાર ગામોના નામો

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[Public Notice in English]

PUBLIC NOTICE

DFCCIL (Dedicated Freight Corridor Corporation of India) under Ministry of Railway hereby informs that disclosure of draft ESIA (Environmental and Social Impact Assessment) reports of proposed DFC (Dedicated Freight Corridor) Project between Wamaj and Iqbalgarh in Western Corridor will start from 8th December, 2011 and will be completed by 17th December, 2011.

Summary of the draft ESIA reports in vernacular language and in English will be distributed to all the affected village offices between Wamaj and Iqbalgarh in Western Corridor, and a full set of the draft ESIA reports will be available in the CPM offices of DFCCIL, major stations along the proposed DFC alignment and districts offices as mentioned below.
Comments from the public will be received only at CPM offices of DFCCIL through direct delivery, fax or post. Interested persons can also send comments to the following email address: dfc.package3@gmail.com.

Comments/opinions will be received up to 17th December, 2011.

Draft ESIA report is available and Comments are received

At the Following CPM Offices of the DFCCIL

- **Dedicated Freight Corridor Corporation of India Limited (DFCCIL)**
  (Under Ministry of Railways), Fifth Floor, Pragati Maidan, Metro Station Building Complex, New Delhi – 110 001
  (Tel: 91-11-23454700; Fax: 91-11-23454701)
- **CPM Office Ahmedabad**
  1st Floor, Old DRM Office Bldg., Kalupur, Ahmedabad-380002, Gujarat
  (Tel: (0)79-22175107, Fax: (0)79-22163101)
- **CPM Office Ajmer:**
  42 A/3, Civil Lines, Ajmer-305001, Rajasthan
  (Tel & Fax: (0)145-2630360)

Draft EIA report is available

At the Following Major Stations

- Gandhinagar District
  Pansar
- Mehsana District
  Mehsaa, Unjha
- Patan District
  Sidhpur
- Banaskantha District
  Palanpur, Chitrasani

At the Following District Collectorate Offices in Gujarat State

- Gandhinagar
- Mehsana
- Patan
- Banskantha

Signature by DFCCIL

[Public Notice in Gujarati]

ડેડીકેટેડ ફ્રેટ કોરીડોર કોર્પોરેશન ઓફ ઇન્ડિયા લિ.
(भारत सरकार का उपक्रम)
Dedicated Freight Corridor Corporation of India Ltd.
(A Government of India Enterprise)

જાહેર નોટીસ

ભારત સરકારના રેલવે મંત્રાલય ડેડીકેટેડ ફ્રેઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયા (DFCCIL) દ્વારા જણાવવામાં આવે છે કે વામજથી ઈકબાલગઢ વિભાગ (પ્રથમ તબક્કા) વચ્ચેના સુચિત માલવહન સમર્પિત રેલવે માર્ગ માટે કરવામાં આવેલ પર્યાવરણ તથા સામાજિક અસરોના અભ્યાસની ઘોષણા તા.૮મી ડિસેમ્બર, ૨૦૧૧ થી શરૂ થશે અને તા.૧૭ મી ડિસેમ્બર, ૨૦૧૧ ના રોજ પુરી થશે.

સુચિત ઈ.સ.આઈ.એ. અહેવાલનો સાર સ્થાનિક ભાષામાં વામજથી ઈકબાલગઢ વચ્ચેના અસરગ્રસ્ત ગામોની ગ્રામ પંચાયતમાં વર્ણવાશે, સુચિત ઈ.એસ.આઈ.એ. અહેવાલ તેના પુર્ણ સ્વરૂપે ડેડીકેટેડ ફ્રેઈટ કોરીડોર કોર્પોરેશન ઓફ ઈન્ડિયાના સી.પી.એમ. કાર્યાલય, ડી.એફ.સી. એલાઈનમેન્ટ પર આવતા મુખ્ય સ્ટેશનો અને નીચે દર્શાવેલ જિલ્લા કાર્યાલય ખાતે ઉપલબ્ધ રહશે.

લોકો પાસેથી માત્ર સી.પી.એમ. કાર્યાલય ખાતે ફ્રુબરૂ ટપાલ કે ફેક્સ દ્વારા સુચનો અભિપ્રાયો સ્વીકારવામાં આવશે. રસ ધરાવતાં લોકો પોતાના અભિપ્રાયો નીચેના ઈ-મેઈલ સરનામે પણ મોકલી શકે છે.
dfc.phase2gmail.com

અભિપ્રાય તથા સુચનો તા.૧૭મી ડિસેમ્બર, ૨૦૧૧ સુધી સ્વીકારવામાં આવશે.

DFCCIL ના સી.પી.એમ. કાર્યાલયોએ :-

DFCCIL ની મુખ્ય કચેરી :- પ્રગતિ મૈદાન, પમો માળ, મેટ્રો સ્ટેશન બિલ્ડીંગ, નવી દિલ્હી-૧૧૦૦૦૧ (ટેલી.૯૧-૧૧-૨૩૮૫૪૭૦૦, ફેક્સ : ૯૧-૧૧-૨૩૮૫૪૭૦૧)

સીપીએમ ઓફિસ અમદાવાદ :- ૧લો માળ, જુની ડિઆરએમ ઓફિસ બિલ્ડીંગ, સાબરમતી,અમદાવાદ-૩૮૦૦૦૨, ગુજરાત (ટેલી : ઓફિસ-૦૭૯-૨૨૧૭૫૧૦૭, ફેક્સ-ઓફિસ-૦૭૯-૨૨૧૬૩૧૦૧)

સીપીએમ ઓફિસ અજમેર :- ૪૨, એ/૩, સિવિલ લાઈન, અજમેર-૩૦૫૦૦૧. રાજસ્થાન (ટેલીફોન અને ફેક્સ : ઓફિસ -૧૪૫-૨૬૩૦૩૬૦)

સુચિત ઈ.એસ.આઈ.એ અહેવાલ ઉપલબ્ધ છે.

નીચેના મહાનગર સ્ટેશનો :- (ગુજરાત)

ગાંધીનગર જિલ્લો	:	પાનસર
મહેસાણા જિલ્લો	:	મહેસાણા અને ઉંઝા
પાટણ જિલ્લો	:	રાધનપુર
બનાસકાંઠા જિલ્લો	:	પાલનપુર, થરાદરોડ

નીચેના જિલ્લા કલેક્ટર કાર્યાલયોએ :-
ગાંધીનગર, પાટણ, મહેસાણા અને બનાસકાંઠા

મુખ્ય પરિયોજના પ્રબંધક, DFCCIL
Chief Project Manager
Dedicated Freight Corridor Corporation of India Limited
Ahmedabad.

First Floor, Old DRM Office Building, Kalupur, Ahmedabad-380 002. Tel. : 079-22175107 Fax : 079-22163101
Registered Office : 101 A, Rail Bhavan, New Delhi-110 001. Web : www.dfcc.in

Appendix-10c
Distribution List of Draft ESIA Report

1. Distribution of Main Report and Summary

A set of Draft ESIA report (Main and Appendix) and its summary were distributed as per the following:

Distribution Place			(A) Main report	(B) Summary			
				Total	English	Gujarati	Delivered date
DFCCIL	1	Head Office	1	2	1	1	09/12/11
1 Head Office &	2	CPM-Ahmedabad	1	20	5	15	05/12/11
4 CPM/AGM	3	CPM-Ajmer	1	20	5	15	05/12/11
Office	**Sub Total**		**3**	**42**	**11**	**31**	
Main Station	1	Pansar	1	20	5	15	06/12/11
Total: 6 Main	2	Mehsana	1	20	5	15	07/12/11
Stations	3	Unjha	1	20	5	15	07/12/11
(Stations 1-5 are	4	Sidhpur	1	20	5	15	07/12/11
under CPM-	5	Palanpur	1	20	5	15	07/12/11
Ahmedabad and	6	Chitraseni	1	20	5	15	07/12/11
Station 6 is under CPM- Ajmer)	**Sub Total**		**6**	**120**	**30**	**90**	
District	1	Banaskantha	1	20	5	15	07/12/11
	2	Patan	1	20	5	15	07/12/11
Total: 4 Districts	3	Mehsana	1	20	5	15	07/12/11
	4	Gandhinagar	1	20	5	15	07/12/11
	Sub Total		**4**	**80**	**20**	**60**	
Competent	1	Banaskantha	0	15	5	10	07/12/11
Authorities	2	Patan	0	15	5	10	07/12/11
	3	Mehsana	0	15	5	10	07/12/11
Total: 4 Districts	4	Gandhinagar	0	15	5	10	07/12/11
	Sub Total		**0**	**60**	**20**	**40**	
Affected Village*	Affected village under CPM - Ahmedabad			1,200	300	900	See Next Table
Total – 68	Affected village under CPM - Ajmer			160	40	120	See Next Table
	Sub Total			**1,360**	**340**	**1,020**	
Total			**13**	**1,662**	**421**	**1,241**	

Note: * 20 sets of the Summary were distributed to each village: 5 in English and 15 in Gujarati.

2. Delivery Status of Distribution of Main Report

The final status of delivery of Draft ESIA report (Main and Appendix) in 2 CPM offices, District Collectorate Offices and main stations is as per the following:

ESIA Report	CPM Office	Delivery date	Major Sta.	Delivery date	District Office	Delivery date
Draft ESIA report	CPM-Ahmedabad	05/12/11	1. Pansar	06/12/11	Banaskantha	07/12/11
			2. Mehsana	07/12/11	Patan	07/12/11
-Main report			3. Unjha	07/12/11	Mehsana	07/12/11
-Appendix			4. Sidhpur	07/12/11	Gandhinagar	07/12/11
-Summary			5. Palanpur	07/12/11		
	CPM-Ajmer	05/12/11	6. Chitraseni	07/12/11		

3. Delivery Status of Distribution of Summary of Draft ESIA

The final status of delivery of Summary of Draft ESIA report to Sarpanches of all project affected villages is as per the following:

Total Sl. No.	District	Sub-district	No. per Sub-district	Name of Village	Delivery date
1.	Gandhinagar	Kalol	1.	Vansajara	08/12/11
2.			2.	Ramnagar	08/12/11
3.			3.	Piyaj	08/12/11
4.			4.	Borisana	08/12/11
5.			5.	Kalol	08/12/11
6.			6.	Pratapura	08/12/11
7.			7.	Chhatral	08/12/11
8.			8.	Ola	08/12/11
9.			9.	Isand	08/12/11
10			10.	Vadavswami	08/12/11
11			11.	Panasar	08/12/11
Total District			**11**		**11**
12	Mehsana	Unjha	1.	Unjha	07/12/11
13			2.	Maktupur	07/12/11
14			3.	Kamli	07/12/11
15			4.	Ithor	07/12/11
16		Visnagar	1.	Bhandu	07/12/11
17			2.	Jetal Vasna	07/12/11
18		Mehsana	1.	Mehsana	07/12/11
19			2.	Nani Dau	07/12/11
20			3.	Moti Dau	07/12/11
21			4.	Taleti	07/12/11
22			5.	Hebuva	07/12/11
23			6.	Palodara	07/12/11
24			7.	Punasan	07/12/11
25			8.	Shobasan	07/12/11
26			9.	Jornang	07/12/11
27			10.	Ambliyasan	07/12/11
28			11.	Navi Sedhavi	07/12/11
29			12.	Dholasan	07/12/11
30			13.	Chaluva	07/12/11
31			14.	Geeratpur	07/12/11
32			15.	Ditasan	07/12/11
33			16.	Jagudan	07/12/11
34			17.	Kukas	07/12/11
35			18.	Ramosana	07/12/11
36			19.	Hedua Hanumant	07/12/11
37		Kadi	1.	Julasan	07/12/11
38			2.	Ghumasan	07/12/11
39			3.	Dangarva	07/12/11
40			4.	Tankiya	07/12/11
41			5.	Anandpura	07/12/11
42			6.	Kaial	07/12/11
43			7.	Wamaj	07/12/11
44			8.	Mevad	07/12/11
Total District			**33**		**33**
45	Patan	Sidhpur	1.	Sidhpur	09/12/11
46		Sidhpur	2.	Khali	09/12/11
47		Sidhpur	3.	Lalpur	09/12/11
48		Sidhpur	4.	Sujanpur	09/12/11
Total District			**4**		**4**
49	Banaskhantha	Palanpur	1.	Sedrasana	09/12/11
50			2.	Jagana	09/12/11
51			3.	Palanpur	09/12/11
52			4.	Jasleni	09/12/11

Total Sl. No.	District	Sub-district	No. per Sub-district	Name of Village	Delivery date
53			5.	Sadarpur	09/12/11
54			6.	Surajpura	09/12/11
55			7.	Chitraseni	09/12/11
56			8.	Karjoda	09/12/11
57			9.	Jaspuriya	09/12/11
58			10.	Hebatpur	09/12/11
59			11.	Rajpuriya	09/12/11
60		Amirgarh	1.	Jethi	09/12/11
61			2.	Iqbalgarh	09/12/11
62		Vadgam	1.	Majadar	09/12/11
63			2.	Manpura	09/12/11
64			3.	Malosana	09/12/11
65			4.	Dharewada	09/12/11
66			5.	Chhapi	09/12/11
67			6.	Pasvadal	09/12/11
68			7.	Kotadi	09/12/11
Total District			**20**		**20**
Total State			**68**		**68**

Source:NKC