

# Environmental Impact Assessment

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July 2017

## PAK: Jalalpur Irrigation Project

Project No. 46528-002

Part 1 of 12 of the Appendices

Prepared by Irrigation Department, Government of Punjab for the Asian Development Bank (ADB).

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**Irrigation Department  
Government of Punjab**

# **DETAILED DESIGN OF JALALPUR IRRIGATION PROJECT**

## *Appendices*

**ENVIRONMENTAL IMPACT ASSESSMENT  
(EIA)**

**MAY 2017**



Detailed Design of Jalalpur Irrigation Project

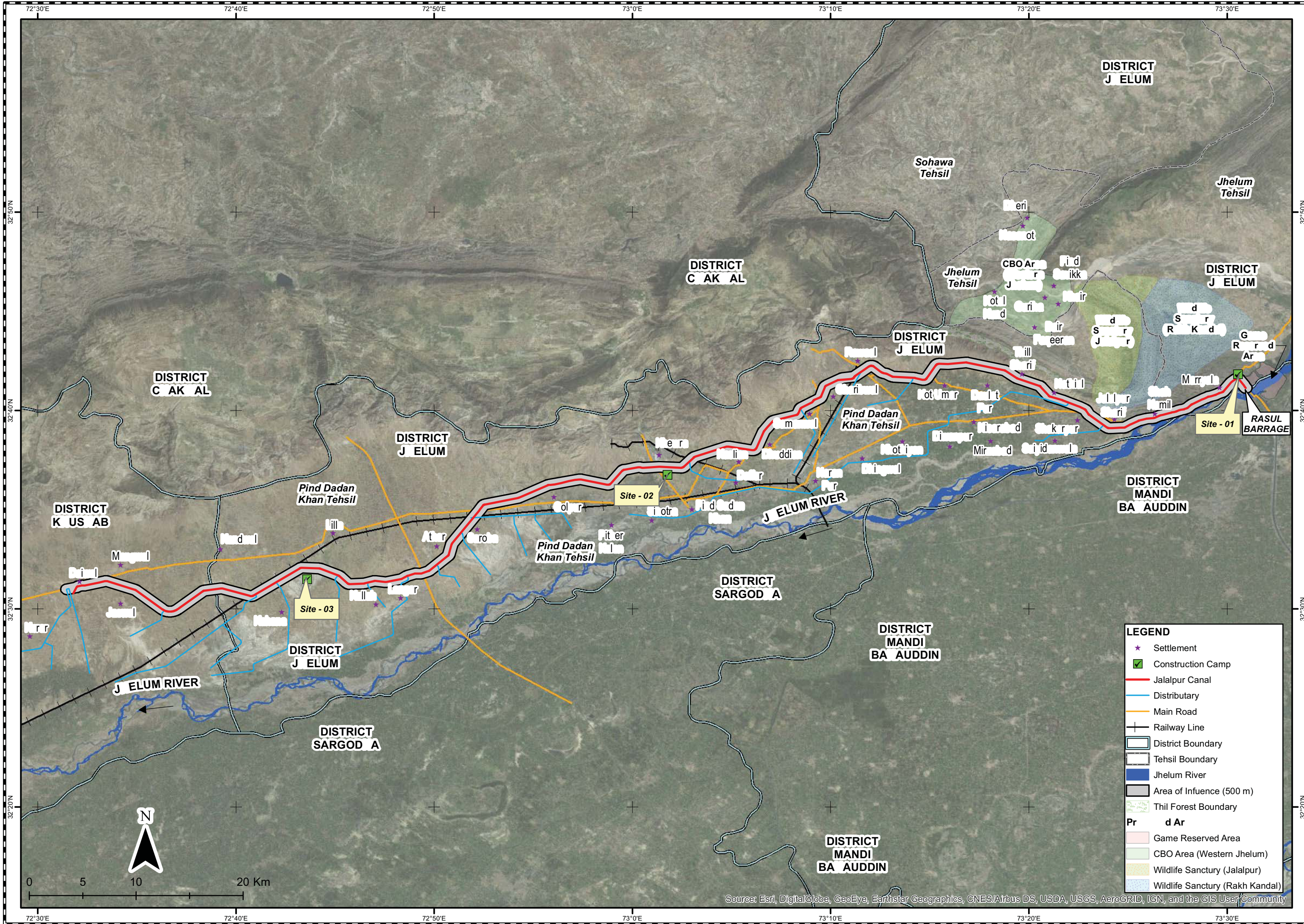
# APPENDICES

EIA

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## **Appendix I: Project Area of Influence Map**



**LEGEND**

- ★ Settlement
- ☑ Construction Camp
- Jalalpur Canal
- Distributary
- Main Road
- Railway Line
- ▭ District Boundary
- ▭ Tehsil Boundary
- Jhelum River
- ▭ Area of Influence (500 m)
- ▭ Thil Forest Boundary

**Pr d Ar**

- ▭ Game Reserved Area
- ▭ CBO Area (Western Jhelum)
- ▭ Wildlife Sanctuary (Jalalpur)
- ▭ Wildlife Sanctuary (Rakh Kandal)

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## **Appendix II: Checklists used During EIA**

**ENVIRONMENTAL IMPACT ASSESSMENT**

**CHECKLIST FOR IDENTIFICATION OF BASELINE CONDITIONS AND IMPACTS**

**1. Type of area**

- Mountainous
- Arid
- Semi-arid
- Forest
- Dense forest
- Populated
- Densely populated
- Any other \_\_\_\_\_ (specify)

**2. Physical Environment**

**a. geological conditions**

- is the geology of the area rocky \_\_\_\_\_
- is the origin of rocks sedimentary/igneous/metamorphic
- any other \_\_\_\_\_ (specify)

**b. seismology**

- is there any record of earthquakes in the past 50 years
- presence of faults/fractures
- any other details \_\_\_\_\_ (specify)

**c. topography & soils**

- are the soils mixtures of sand /silt/clay/gravel/clayey silt \_\_\_\_\_
- any other \_\_\_\_\_ (specify)

Proposed site	Soil description	Variation in moisture content

**Other features which comprise topography**

- Filters
- Drains
- Hills
- Crops
- Farms
- Any other \_\_\_\_\_ (specify)



**d. Climate**

temperature	Winds	Relative humidity	precipitation	Snow fall	evapotranspiration

Does the project area has any previous records of flooding \_\_\_\_\_

**e. Surface and Ground water**

- is groundwater potable \_\_\_\_\_
- if yes then was it tested according to the NEQS \_\_\_\_\_
- If surface water available, what is its quality? \_\_\_\_\_

Sample	Date of collection	Time of collection	Location

**f .Air Quality**

- is the area visually pollution free \_\_\_\_\_
- did the instruments show any pollution \_\_\_\_\_
- are the source of these pollutants traffic(cars,trucks,tractors) or any other \_\_\_\_\_ (specify)

**g .Liquid effluents**

- are there any liquid effluents due to industries/household \_\_\_\_\_
- if any other reason \_\_\_\_\_ (specify)

**h. Solid Waste**

- is solid waste management of the area poor/nominal/good\_\_\_\_\_
- is poor management due to lack of awareness among people/authority is not responsible enough \_\_\_\_\_

**i. Noise**

- Any sources of noise like traffic/industry or other \_\_\_\_\_(specify)

**j. Buffer Zone**

- are there any protected areas \_\_\_\_\_

**ECOLOGICAL ENVIRONMENT**

**a. Land Utilization**

- Land usage may be categorized as irrigated/cropping/grazing/forestry \_\_\_\_\_

- Any other \_\_\_\_\_ (specify)

**b. Fisheries**

- Migration of fishes /disturbance in their behaviour \_\_\_\_\_
- Any other factor in relation to them \_\_\_\_\_ (specify)

**c. Flora & Fauna**

- Aquatic ecosystems \_\_\_\_\_
- Prevailing crops vegetables, fruits, trees \_\_\_\_\_
- Is there presence of any endangered or rare species of animals/plants  
\_\_\_\_\_

**d. Agriculture**

- Prevailing crops \_\_\_\_\_
- Crops mostly cultivated \_\_\_\_\_
- Cultivated area \_\_\_\_\_

**e. Cumulative Effects**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3. SOCIO-ECONOMIC ENVIRONMENT**

**1. Human & Economic Development**

**a. Industries**

- Does the project area has any industries big / small \_\_\_\_\_
- Are there some home industries in the area \_\_\_\_\_

**b. Infrastructure facilities**

Infrastructure facilities available to the people:

- Roads
- Bridges
- Sanitation
- Water Supply
- If any other \_\_\_\_\_ (Specify)

**c. Mode of Transportation**

- Do the people of the area use conservative/modern modes of transportation:  
\_\_\_\_\_ (Specify)

**d. Landuse**

- Landuse by the people in the form of average farm size/tennorial category \_\_\_\_\_

If any other \_\_\_\_\_ (Specify)

**e. Power Sources & Transmission**

- Is there any grid station/ sub-station present in the project area \_\_\_\_\_
- Is electric supply available to every commercial/residential area \_\_\_\_\_
- Do people use conservative sources \_\_\_\_\_

**f. Agricultural Development**

- Is the majority of population related to agriculture directly or indirectly \_
- What type of crops are mostly cultivated \_\_\_\_\_ (Specify)

During Wet Season	During Dry Season

- Are there any records of drought \_\_\_\_\_

**2. Quality of Life Values/Socioeconomic Values**

**a. Income**

- Are most of people living below/above poverty line \_\_\_\_\_
- Does the population comprises of KatchaAbadi/Pucca Abadi \_\_\_\_\_

**b. Employment and Occupation**

- What are sources of employment other than agriculture/farming \_\_\_\_\_

**c. Education**

- Is literacy level of the area low/medium/high \_\_\_\_\_

**d. Religion**

- Is the religion of majority population Islam \_\_\_\_\_
- Any other \_\_\_\_\_ (Specify)

**e. Gender Ratio**

- Is population of women more than men \_\_\_\_\_
- Is population of men more than women \_\_\_\_\_
- Ratio of population of men to population of women in the area \_\_\_\_\_
- Population density of the area \_\_\_\_\_

No. of People	Acre of Land	No. of people/acre of land

**f. Role of Women**

**g. Public Health**

- Are sanitation, water supply facilities available \_\_\_\_\_
- Any hospitals, dispensaries available in the area \_\_\_\_\_
- Any social health workers available \_\_\_\_\_

**h. Recreational Resources & Development**

- Parks/Swings get together areas / festivals arrangements \_\_\_\_\_
- If any other \_\_\_\_\_ (Specify)

**i. Aesthetic Values**

- Any sources of visual pollution \_\_\_\_\_
- Sources which add to the visual beauty \_\_\_\_\_
- If any other \_\_\_\_\_ (Specify)

**i. Archeological or Historical Treasures**

- Does the area any archeological or historical monuments \_\_\_\_\_
- If yes, \_\_\_\_\_ (Specify)

**j. Cultural Values**

- Is the culture of area modernized/conservative or a blend of both \_\_\_\_\_

**IMPACT PREDICTION**

**IMPACTS DURING CONSTRUCTION STAGE**

**a. Air Quality**

- Will the construction activity cause nuisance like smoke/odour/dust/NO<sub>x</sub>/CO/ \_\_\_\_\_

- If any other \_\_\_\_\_ (Specify)

**b. Noise**

- Will the people of area be disturbed due to the Noise/Vibration (unwanted sound) produced due to construction activities which may also include demolishing of some infrastructure \_\_\_\_\_

**c. Soil Pollution**

- Is there going to be some soil pollution due to effluents/ other materials used as construction materials \_\_\_\_\_

**d. Surface Water and Drainage**

- Are new plantings proposed \_\_\_\_\_
- Will these be indigenous \_\_\_\_\_
- Is there any need of utility pipes be laid \_\_\_\_\_

**e. Construction Camp**

- If a construction needed \_\_\_\_\_
- Where will the labour come from \_\_\_\_\_

**f. Agriculture**

- Is the agriculture land acquired \_\_\_\_\_
- What will be done with the crops already present in the construction area \_\_\_\_\_

**g. Flora & Fauna**

- Any loss of vegetation \_\_\_\_\_
- Loss of sensitive/ endangered species \_\_\_\_\_
- Los of habitat \_\_\_\_\_
- Migration of Species from area \_\_\_\_\_
- Loss of Wildlife \_\_\_\_\_
- Damage to burrowing animals \_\_\_\_\_

**h. Socio-economic**

- Villages to be displaced \_\_\_\_\_
- No of persons to be affected \_\_\_\_\_
- Buildings and other infrastructure to be affected \_\_\_\_\_
- Any conflicts due to construction activity \_\_\_\_\_
- Conflicts resolution \_\_\_\_\_
- Impact on Women due to construction activity (Women privacy ) \_\_\_\_\_
- Damage to sites of social & archeological importance \_\_\_\_\_
- Damage to any infrastructure \_\_\_\_\_

- Does on access or haul road needed to be constructed \_\_\_\_\_
- What will happen to excess construction material or rubble \_\_\_\_\_
- How construction material will reach the site \_\_\_\_\_
- Are any measures taken for health and safety of the population of the area \_\_\_\_\_

**OPERATION STAGE**

**a. Air Quality**

- During operation stage will the ambient air be affected due to traffic generation or any other cause \_\_\_\_\_ (Specify)

**b. Noise**

- Is the sound generated during operation a noise factor \_\_\_\_\_

**c. Solid Waste**

- Is there any solid waste generated during operation stage \_\_\_\_\_
- If yes then how are they disposed off \_\_\_\_\_

**d. Fisheries**

- Disturbance of fish life due to the project operation \_\_\_\_\_

**e. Agriculture**

- Due to operation the people of lower riparian may be deprived of water rights, any type of conflicts arising due to this reason including water theft \_\_\_\_\_
- Any damage to crops during operation \_\_\_\_\_

**f. Flora and Fauna**

- Any loss of habitat \_\_\_\_\_
- Any damage to endangered species \_\_\_\_\_
- Any loss of biodiversity \_\_\_\_\_
- Damage to burrowing animal \_\_\_\_\_
- Damage to roosting & breeding sites \_\_\_\_\_
- Loss of vegetation \_\_\_\_\_
- Felling of trees & shrubs \_\_\_\_\_
- Loss of wildlife due to hunting & poaching \_\_\_\_\_

**g. Socio-economic**

- Are there basic health units with better services \_\_\_\_\_
- Is there any proper drainage & sanitation system \_\_\_\_\_
- Provision of basic facilities like education, safety and local employment \_\_\_\_\_

- Any assurance that operational activities will not bring about any disturbance to the privacy of women \_\_\_\_\_
- What inputs are needed including raw material water/energy resources \_\_\_\_\_
- Where will they come from \_\_\_\_\_
- What products are created and where will they go \_\_\_\_\_
- What routine maintenance & repair activities are needed (material, labour, transport) \_\_\_\_\_

## **Appendix III: Laboratory Results of Summer Ambient Air Monitoring, Noise Monitoring, Surface Water and Ground Water**



**APPENDIX-4**  
**LABORATORY TEST RESULTS**

- 4.1: Ambient Air Monitoring**
- 4.2: Noise Monitoring**
- 4.3: Surface Water and Ground Water**

## **4.1: Ambient Air Monitoring**



## **3. RESULTS & DISCUSSION**

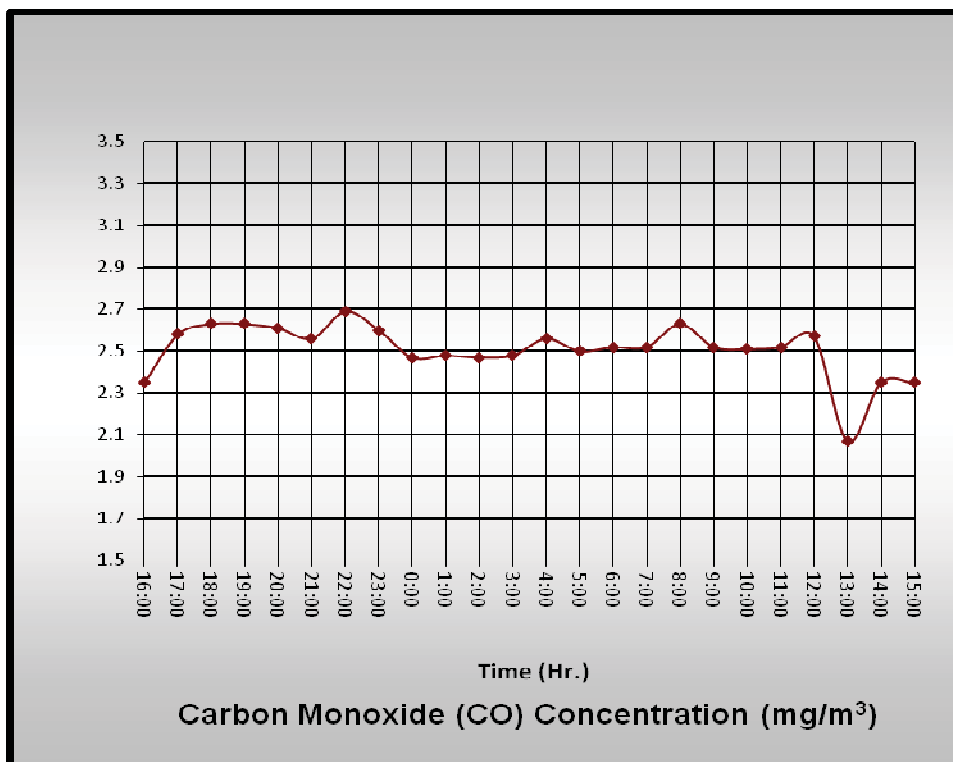
### 3. Results and Discussion

SGS Pakistan (Pvt.) Ltd. Conducted a monitoring at client’s advised sampling point. Scope of this monitoring covered monitoring of ambient air quality and weather conditions. The monitoring results are given as **Annexure I to II**.

The results of ambient air quality monitored for 24 hrs are given in **Annexure-II** of the report. National Environmental Quality Standards (NEQS) for Ambient given in **Annexure-III** used for comparison.

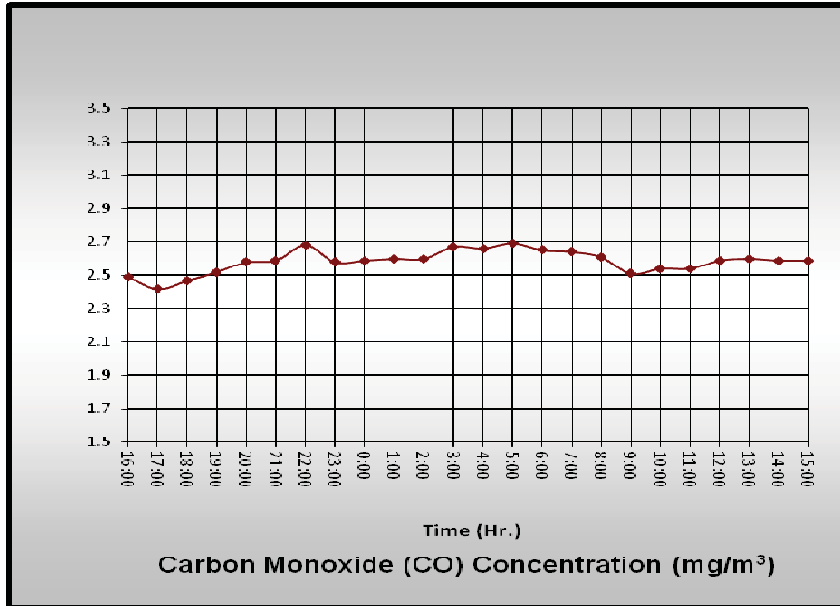
The average concentration of carbon monoxide (CO) for 08 hrs according to the National Environmental Quality Standards (NEQS) for Ambient Air should not exceed from 5.0 mg/m<sup>3</sup>. The average value obtained at monitoring site was 2.51 mg/m<sup>3</sup> at Jalal Pur Village, 2.58 mg/m<sup>3</sup> at Village Aduwal, 2.54 mg/m<sup>3</sup> at Village Meirey and 2.59 mg/m<sup>3</sup> Village Kurar.

**Graph 01** shows prevailing concentrations of CO in mg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Jalal Pur Village.



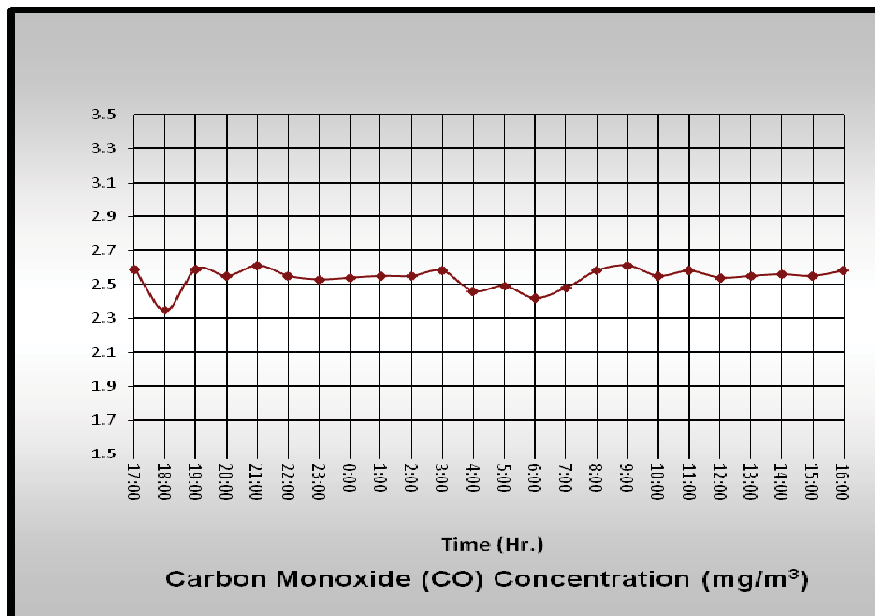
**Graph 01:** CO Concentration during 24 Hrs. Monitoring at Jalal Pur Village

**Graph 02** shows prevailing concentrations of CO in mg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Aduwal Village.



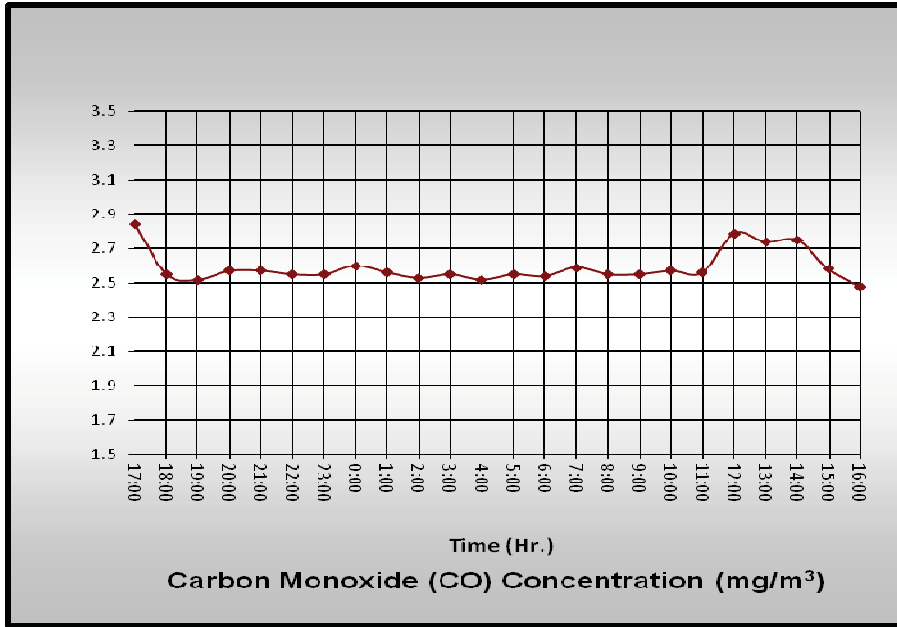
**Graph 01:** CO Concentration during 24 Hrs. Monitoring at Aduwal Village

**Graph 03** shows prevailing concentrations of CO in mg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Meirey Village.



**Graph 03:** CO Concentration during 24 Hrs. Monitoring at Meirey Village

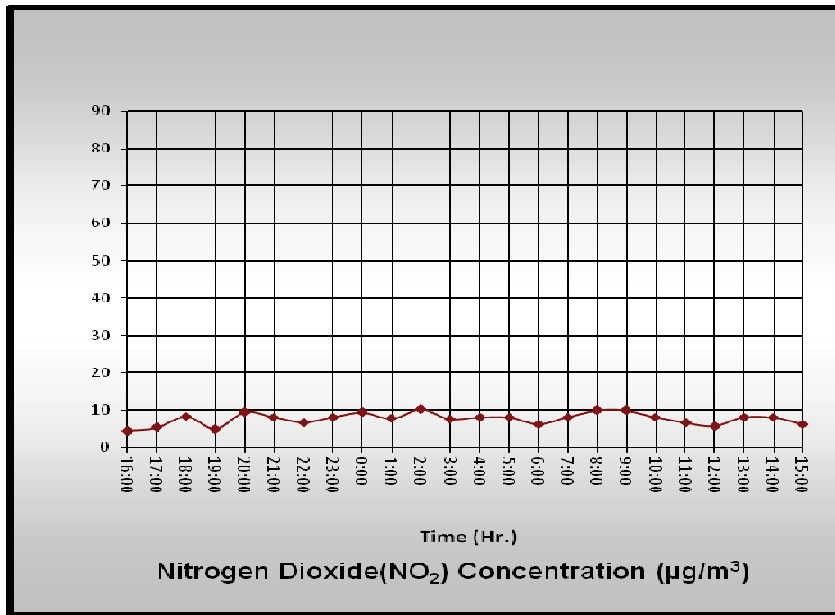
**Graph 04** shows prevailing concentrations of CO in mg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Kurar Village.



**Graph 04:** CO Concentration during 24 Hrs. Monitoring at Kurar Village

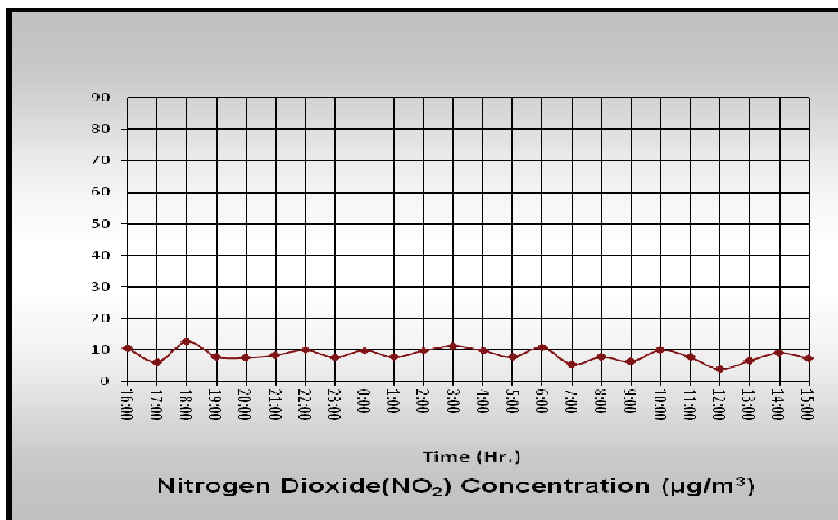
Average 24 hrs arithmetic mean mentioned in Environmental Quality Standards (NEQS) for Ambient Air for Nitrogen Dioxide (NO<sub>2</sub>) is 80 µg/m<sup>3</sup>. The average value obtained at monitoring site was 7.68 µg/m<sup>3</sup> at Jalal Pur Village, 8.47 µg/m<sup>3</sup> at Village Aduwal, 7.21 µg/m<sup>3</sup> at Village Meirey and 7.64 µg/m<sup>3</sup> Village Kurar.

**Graph 05** shows prevailing concentrations of NO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Jalal Pur Sharif.



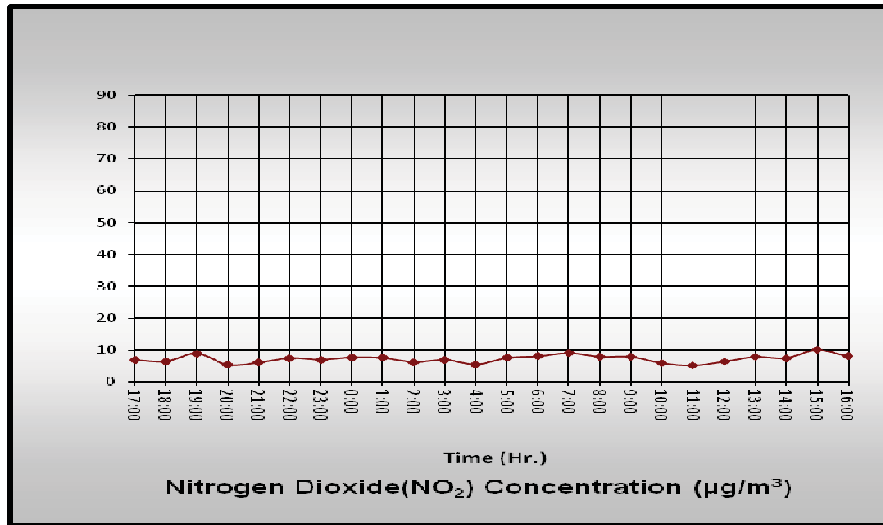
**Graph 05:** NO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Jalal Pur Village.

**Graph 06** shows prevailing concentrations of NO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Aduwal Village.



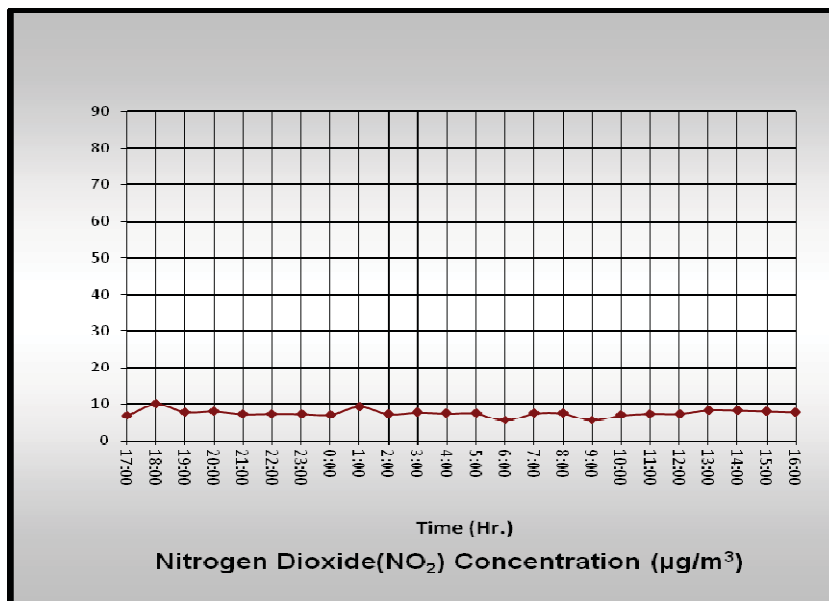
**Graph 06:** NO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Aduwal Village.

**Graph 07** shows prevailing concentrations of NO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Meirey Village.



**Graph 07:** NO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Meirey Village.

**Graph 08** shows prevailing concentrations of NO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Kurar Village.

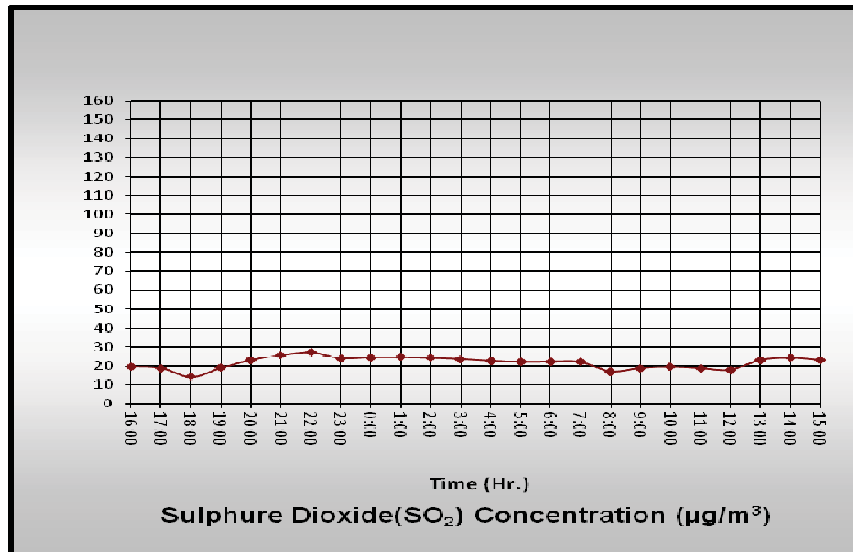


**Graph 08:** NO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Kurar Village.

According to standard the 24 hrs concentration of Sulphur Dioxide (SO<sub>2</sub>) in ambient air should not exceed from 120 µg/m<sup>3</sup> while the average value obtained at monitoring site was 21.74 µg/m<sup>3</sup> at Jalal Pur Village, 10.98 µg/m<sup>3</sup> at Village Aduwal, 19.72 µg/m<sup>3</sup> at Village Meirey and 26.08 µg/m<sup>3</sup> Village Kurar.

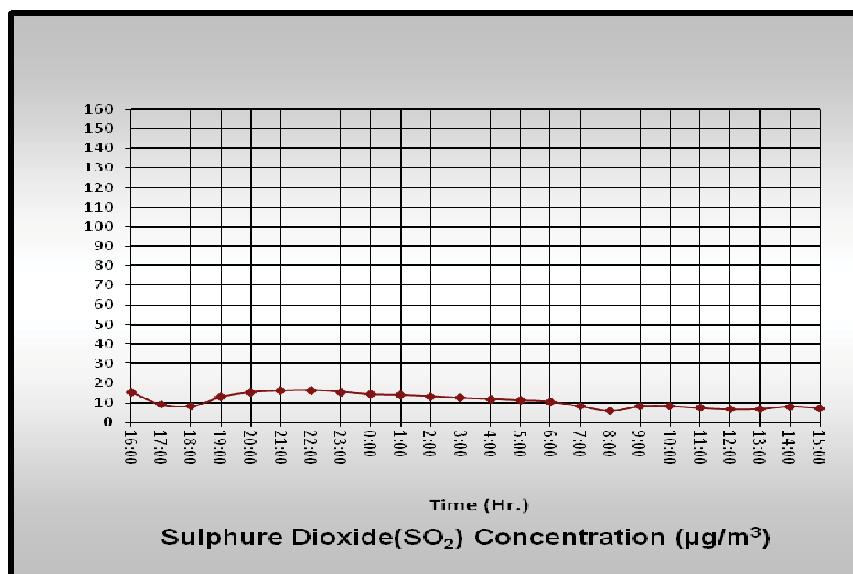
**Graph 09** shows prevailing concentrations of SO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Jalal Pur Village.





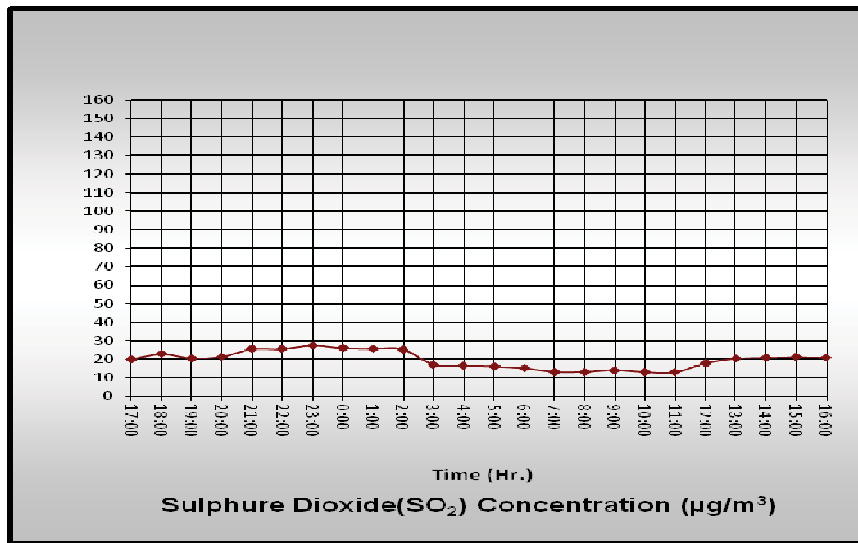
**Graph 09:** SO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Jalal Pur Village.

**Graph 10** shows prevailing concentrations of SO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Aduwal Village.



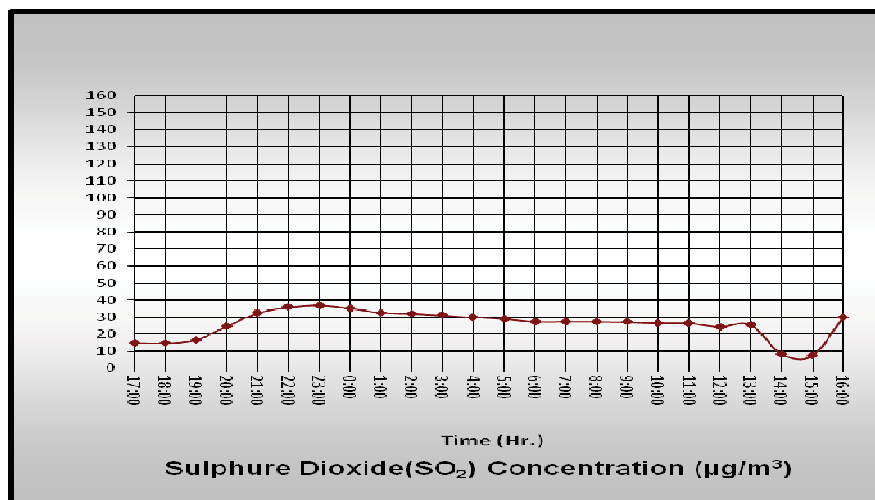
**Graph 10:** SO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Aduwal Village.

**Graph 11** shows prevailing concentrations of SO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Meirey Village.



**Graph 11:** SO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Meirey Village.

**Graph 12** shows prevailing concentrations of SO<sub>2</sub> in µg/m<sup>3</sup> at monitoring point during 24 hrs of monitoring at Kurar Village.

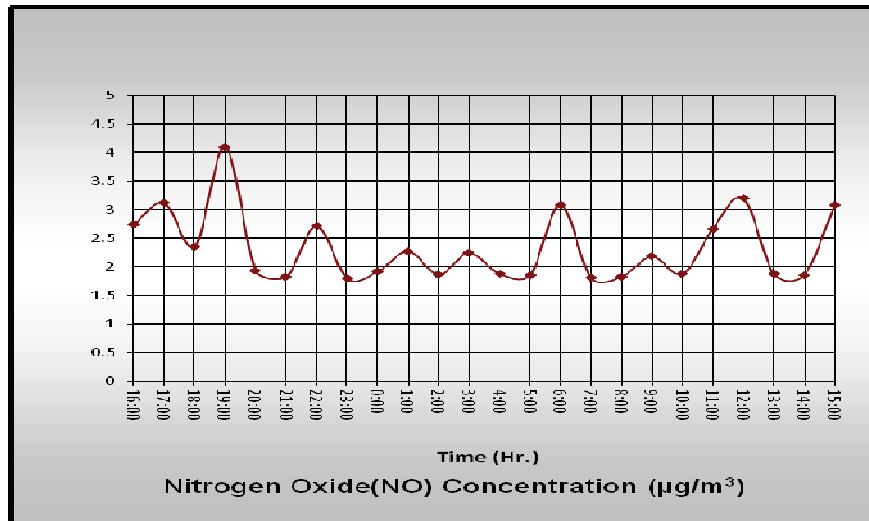


**Graph 12:** SO<sub>2</sub> Concentration during 24 Hrs. Monitoring at Kurar Village.

However the results of both nitrogen dioxide and sulphur dioxide were found very well within the limits defined in National Environmental Quality Standards (NEQS).

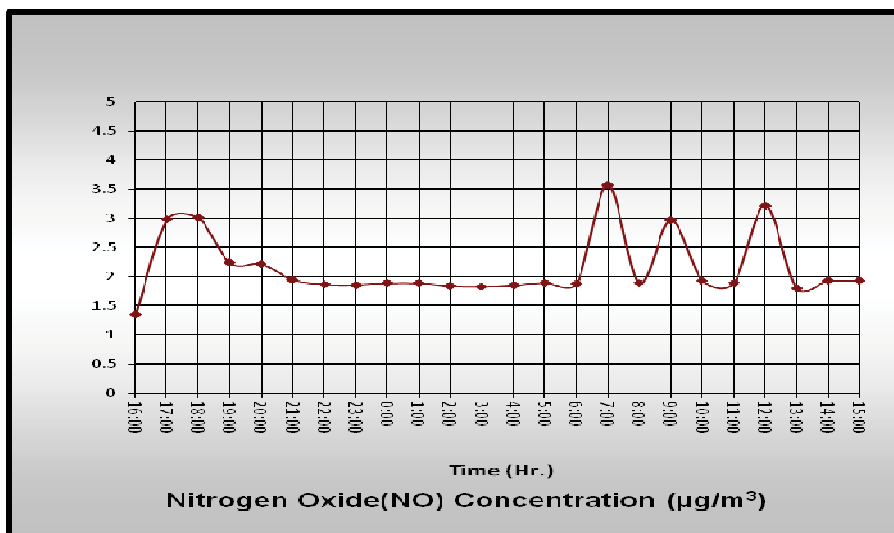
Average 24 hrs arithmetic mean mentioned in Environmental Quality Standards (NEQS) for Ambient Air for Nitrogen Oxide (NO) is 40 µg/m<sup>3</sup>. The average value obtained at monitoring site was 2.34 µg/m<sup>3</sup> at Jalal Pur Village, 2.16 µg/m<sup>3</sup> at Village Aduwal, 2.99 µg/m<sup>3</sup> at Village Meirey and 2.36 µg/m<sup>3</sup> Village Kurar.

**Graph 13** shows prevailing concentrations of NO in  $\mu\text{g}/\text{m}^3$  at monitoring point during 24 hrs of monitoring at Jalal Pur Village.



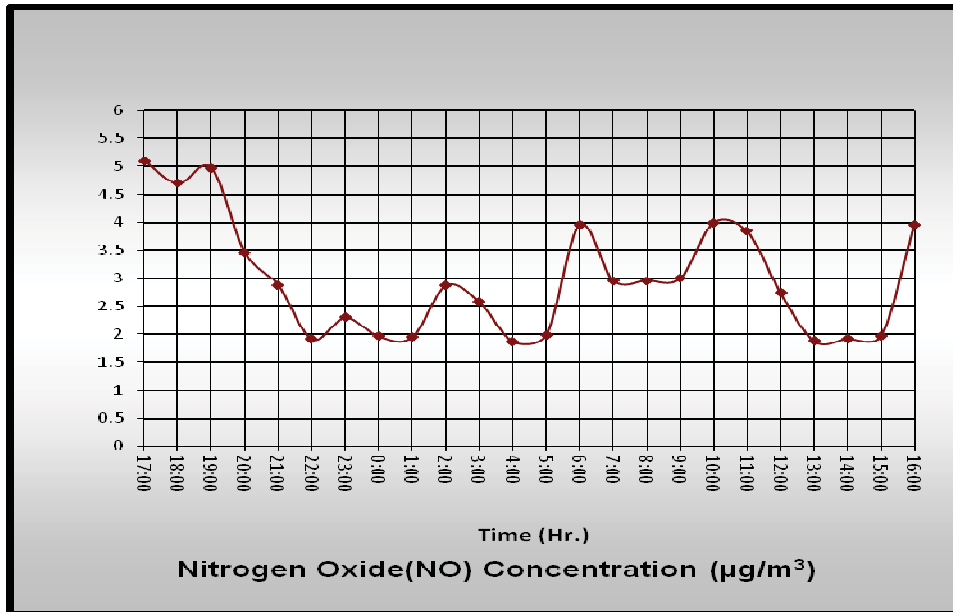
**Graph 13:** NO Concentration during 24 Hrs. Monitoring at Jalal Pur Village.

**Graph 14** shows prevailing concentrations of NO in  $\mu\text{g}/\text{m}^3$  at monitoring point during 24 hrs of monitoring at Aduwal Village.



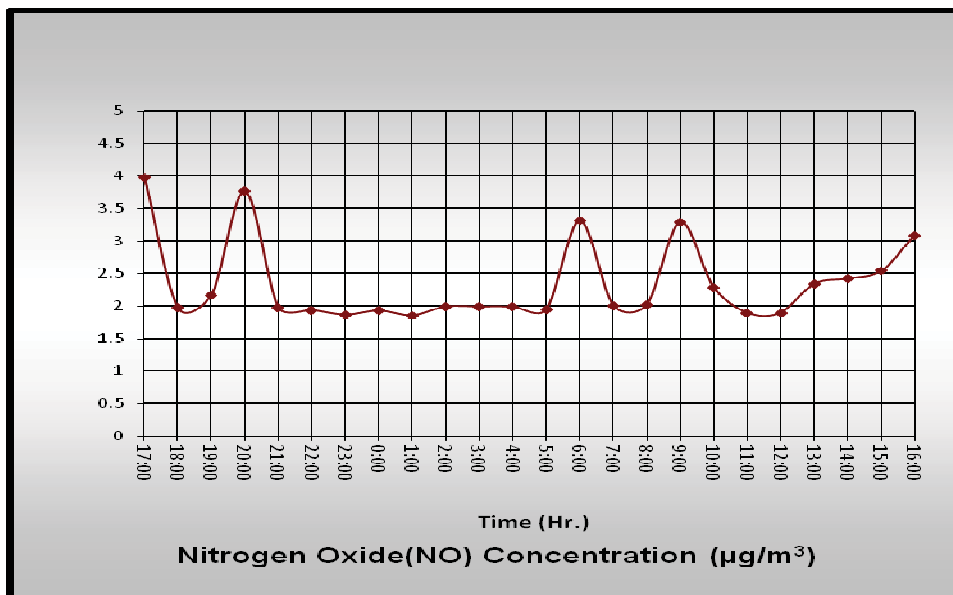
**Graph 14:** NO Concentration during 24 Hrs. Monitoring at Aduwal Village

**Graph 15** shows prevailing concentrations of NO in  $\mu\text{g}/\text{m}^3$  at monitoring point during 24 hrs of monitoring at Meirey Village.



**Graph 15:** NO Concentration during 24 Hrs. Monitoring at Meirey Village

**Graph 16** shows prevailing concentrations of NO in  $\mu\text{g}/\text{m}^3$  at monitoring point during 24 hrs of monitoring at Kurar Village.



**Graph 16:** NO Concentration during 24 Hrs. Monitoring at Kurar Village

The ambient particulate matter  $\text{PM}_{10}$  was found in the range of  $52.21 \mu\text{g}/\text{m}^3$  at Jalal Pur Village,  $58.03 \mu\text{g}/\text{m}^3$  at Village Aduwal,  $39.50 \mu\text{g}/\text{m}^3$  at Village Meirey and  $47.29 \mu\text{g}/\text{m}^3$  Village Kurar.

The ambient particulate matter  $\text{PM}_{2.5}$  was found in the range of  $7.99 \mu\text{g}/\text{m}^3$  at Jalal Pur Village,  $8.70 \mu\text{g}/\text{m}^3$  at Village Aduwal,  $6.18 \mu\text{g}/\text{m}^3$  at Village Meirey and  $8.30 \mu\text{g}/\text{m}^3$  Village Kurar.

**Table 2:** Average Obtained Concentrations of Priority Pollutants at Jalal Pur and Aduwal Village

Parameters Unit		Average Concentration (24 hrs. Duration)		NEQS
		Jalal Pur Village	Aduwal Village	
Oxides of Nitrogen (NO <sub>2</sub> )	µg/m <sup>3</sup>	7.68	8.47	80 (µg/ m <sup>3</sup> ) For 24 Hours
Nitrogen Oxide (NO)	µg/m <sup>3</sup>	2.34	2.16	40 (µg/ m <sup>3</sup> ) For 24 Hours
Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	21.74	10.98	120 (µg/ m <sup>3</sup> ) For 24 Hours
Carbon Monoxide (CO)	mg/m <sup>3</sup>	2.51	2.58	05 (mg/m <sup>3</sup> ) For 08 Hours
Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	52.21	58.03	150 (µg/ m <sup>3</sup> ) For 24 Hours
Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	7.99	8.70	35 (µg/ m <sup>3</sup> )

**Table 3:** Average Obtained Concentrations of Priority Pollutants at Meirey and Kurar Village

Parameters Unit		Average Concentration (24 hrs. Duration)		NEQS
		Meirey Village	Kurar Village	
Oxides of Nitrogen (NO <sub>2</sub> )	µg/m <sup>3</sup>	7.21	7.64	80 (µg/ m <sup>3</sup> ) For 24 Hours
Nitrogen Oxide (NO)	µg/m <sup>3</sup>	2.99	2.36	40 (µg/ m <sup>3</sup> ) For 24 Hours
Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	19.72	26.08	120 (µg/ m <sup>3</sup> ) For 24 Hours
Carbon Monoxide (CO)	mg/m <sup>3</sup>	2.54	2.59	05 (mg/m <sup>3</sup> ) For 08 Hours
Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	39.50	47.29	150 (µg/ m <sup>3</sup> ) For 24 Hours
Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	6.18	8.30	35 (µg/ m <sup>3</sup> )



## **Annexure – I**

### **Meteorological Data**



## Meteorological Data

Client : NEC Consultants pvt ltd.  
Monitoring Point : Jalal Pur Sharif  
Monitoring Location : Tehsil Pind Dadan Khan  
Date of Intervention : August 28-29, 2015

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
16:00	34	W	4.0	51	749.8
17:00	34	W	4.0	55	749.7
18:00	32	W	3.1	66	749.6
19:00	30	NW	1.3	70	749.7
20:00	29	NW	0.9	74	750.0
21:00	29	N	0.9	75	750.4
22:00	27	N	0.2	83	750.6
23:00	27	N	0.4	83	750.7
00:00	28	N	1.8	72	750.5
01:00	27	NE	2.7	84	750.5
02:00	26	E	1.3	88	750.4
03:00	26	E	1.8	86	750.1
04:00	25	E	0.2	88	750.2
05:00	25	E	2.2	87	750.2
06:00	25	E	1.3	84	750.6
07:00	26	E	0.2	86	750.9
08:00	28	NW	2.2	79	751.1
09:00	32	W	2.7	66	751.1
10:00	35	W	2.7	56	751.1
11:00	36	NW	4.0	51	750.8
12:00	36	NW	4.0	50	750.5
13:00	37	W	3.6	50	750.3
14:00	36	W	4.9	53	749.6
15:00	36	W	4.2	55	745.5

- This report is not valid for any negotiation.
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For and on behalf of,

**SGS PAKISTAN (PVT) LTD**

**E(QA)**

**SH**



## Meteorological Data

Client : NEC Consultants pvt ltd.  
Monitoring Point : Near Aduwal Village  
Monitoring Location : Tehsil Pind Dadan Khan  
Date of Intervention : August 29-30, 2015

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	<sup>o</sup> C		m/s	%	
16:00	36	W	4.9	53	749.9
17:00	35	NW	4.5	56	748.2
18:00	35	SE	3.6	66	748.2
19:00	33	SE	2.2	70	748.5
20:00	33	SE	1.8	76	748.8
21:00	31	SE	0.4	80	749.3
22:00	29	SE	0.4	83	749.4
23:00	29	E	1.3	87	749.7
00:00	29	E	0.9	87	749.5
01:00	28	E	0.9	87	749.4
02:00	28	E	0.9	88	749.3
03:00	28	E	1.3	89	749.2
04:00	28	NE	1.3	90	749.1
05:00	27	N	1.3	91	749.5
06:00	27	NW	1.8	92	749.9
07:00	28	NW	2.2	89	750.2
08:00	31	NE	3.6	80	750.4
09:00	33	NE	3.1	70	750.4
10:00	34	NE	3.6	66	750.6
11:00	36	SW	4.9	61	750.3
12:00	36	SW	5.8	59	749.8
13:00	37	SW	5.4	57	749.5
14:00	37	SW	7.0	56	748.8
15:00	32	SW	8.9	49	749.0

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For and on behalf of,

**SGS PAKISTAN (PVT) LTD**

**E(QA)**

**SH**





## Meteorological Data

Client : NEC Consultants pvt ltd.  
Monitoring Point : Meirey Village  
Monitoring Location : Tehsil Pind Daden Khan  
Date of Intervention : August 30-31, 2015

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	<sup>o</sup> C		m/s	%	
17:00	36	E	3.6	57	749.2
18:00	31	E	4.5	63	748.8
19:00	29	E	7.2	64	748.3
20:00	23	N	18.8	89	751.9
21:00	23	NE	14.8	94	750.3
22:00	25	E	9.4	77	749.9
23:00	24	S	3.6	84	750.5
00:00	25	SW	3.6	86	750.9
01:00	26	N	4.0	76	750.8
02:00	25	N	3.1	79	750.0
03:00	25	N	4.5	81	750.5
04:00	26	NW	4.9	81	751.4
05:00	25	W	5.4	84	750.5
06:00	26	NE	5.4	81	751.4
07:00	26	NE	6.3	72	752.0
08:00	27	NE	4.5	69	752.0
09:00	28	E	3.1	66	752.1
10:00	31	SE	2.7	60	752.1
11:00	33	S	2.2	55	752.1
12:00	34	E	2.2	47	751.9
13:00	37	NW	2.2	45	751.7
14:00	37	NW	2.7	42	751.2
15:00	37	NW	2.7	43	750.6
16:00	37	W	2.7	43	750.7

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For and on behalf of,

**SGS PAKISTAN (PVT) LTD**

**E(QA)**

**SH**

Annexure-I

3



## Meteorological Data

Client : NEC Consultants pvt ltd.  
Monitoring Point : Kurar Village  
Monitoring Location : District Khushab  
Date of Intervention : 31 August – 1 September, 2015

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	°C		m/s	%	
17:00	33	N	2.9	59	749.5
18:00	32	N	2.2	59	749.9
19:00	30	N	2.2	70	750.1
20:00	29	N	2.2	70	750.3
21:00	28	N	2.2	68	750.3
22:00	28	N	2.7	69	750.2
23:00	28	N	2.2	70	749.9
00:00	28	N	2.7	70	749.6
01:00	27	N	2.7	71	749.4
02:00	26	N	1.3	76	749.1
03:00	25	N	0.9	81	749.2
04:00	24	N	0.9	83	749.3
05:00	24	N	1.3	87	749.4
06:00	24	W	1.8	86	749.5
07:00	28	W	1.8	75	749.7
08:00	32	NW	2.2	65	750.0
09:00	33	SW	2.2	56	750.2
10:00	35	S	2.7	54	750.2
11:00	37	SW	2.7	49	749.9
12:00	37	W	4.9	44	749.5
13:00	37	W	4.8	43	749.3
14:00	37	W	4.0	46	748.9
15:00	37	W	4.5	46	748.5
16:00	36	W	4.8	45	748.6

- This report is not valid for any negotiation.
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For and on behalf of,

**SGS PAKISTAN (PVT) LTD**

**E(QA)**

**SH**