



हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड
(भारत सरकार का उपक्रम) रजिस्टर्ड ऑफिस : 17, जमशेदजी टाटा रोड, मुंबई - 400 020
HINDUSTAN PETROLEUM CORPORATION LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE : 17, JAMSHEDJI TATA ROAD, MUMBAI- 400 020

2 जी इथेनॉल बायो-रिफाइनरी प्रोजेक्ट: बठिण्डा रिटेल क्षेत्रीय कार्यालय : अर्बन एस्टेट, फेस - II, पार्ट - II, बठिण्डा - 151001
2G Ethanol Bio-Refinery Project : BATHINDA RETAIL REGIONAL OFFICE : URBAN ESTATE, PHASE-II, PART-II, BATHINDA-151001
website : www.hindustanpetroleum.com

To,
The Deputy Director / Scientist 'C'
Ministry of Environment, Forests & Climate Change,
Northern Regional Office
Bays No. 24-25, Sector-31A,
Dakshin Marg, Chandigarh-160030
(Email: chdmoeenv@gmail.com)

Sub: Submission of six-monthly compliance report of stipulated conditions of Environmental Clearance for setting up 2G Ethanol Bio-refinery plant of capacity 100KLPD at Village- Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab) for the period of June 2023.

Ref: F.No. J-11011/221/2017-IA II (I) Dated- 23.09.2020

Sir/ Madam

This has reference to the EC vide letter no. J-11011/221/2017-IA II (I) Dated- 23.09.2020. In this regard, we are submitting hereby status report of compliance with the specific and general conditions for period June 2023. Documents enclosed along with report are mentioned below as

1. Point- wise compliance of stipulated environmental conditions & safeguards
2. Analysis Reports
3. Supporting Documents

Thanking You

For M/s Hindustan Petroleum Corporation Limited

(Authorized Signatory)

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Copy to:

1. The Director, Ministry of Environment, Forest & Climate Change, Govt of India, Sector 31, Chandigarh.
2. The Member Secretary, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar Delhi-32
3. The Member Secretary, Punjab Pollution Control Board, Vataran Bhawan, Nabha Road, Patiala, 147001 [Punjab]

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PURPOSE OF THE REPORT

1.0 Introduction

1.1 About Project: M/s Hindustan petroleum Corporation Limited has proposed to set up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bathinda (Punjab).

This Project has obtained Environmental Clearance vide letter dated 14th August, 2018 for setting up 2G Bio-refinery Plant of capacity 100 KLD and now has granted amended Environmental Clearance from Ministry of Environment, Forests and Climate Change Delhi, with certain conditions.

1.2 Purpose of the Report

As per the "Sub Para (i)" of "Para 10" of EIA Notification 2006, it is stated that *"It shall be mandatory for the project proponent to submit half-yearly compliance report in respect of the stipulated prior environmental clearance terms and conditions in hard and soft copies to the concerned regulatory authority, on 1st June and 1st December of each calendar year"* and as per compliance condition mentioned in Environment Clearance Letter.

The regulatory authorities in this case are MoEF& CC Delhi, MoEF& CC, Chandigarh and SPCB, Punjab. Various scheduled Site Visits were conducted by a team of Experts to Monitor Pollution related parameters as defined by CPCB / HSPCB. Samples for water and soil were also collected by NABL/ MoEF approved laboratory for analysis.

Based on the Specific and General Conditions mentioned in the EC Letter, a Compliance Report has been prepared and submitted regularly to the authority.

The Environmental assessment has been carried out to verify:

- 1) The proposed project does not have any adverse effect on the project site as well as its surrounding.
- 2) There is compliance with the conditions stipulated in the Environmental Clearance Letter.
- 3) The Project proponent is implementing the environmental safeguards in true spirit.
- 4) The project proponent is implementing the environmental pollution mitigative measures as suggested in approved EIA report.

1.3 Methodology for Preparation of Report is as follows:

- 1) Study of EC Letter & Related Documents,
- 2) Monitoring of Environment Parameters, viz. Ambient Air, Water, Noise & Soil by the NABL/MoEF labs.
- 3) Interpretation of Monitoring Results.
- 4) Preparation of half yearly Environmental Compliance Report.

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1.4 Generic Structure of Report:

- 1) Purpose of the Report, explaining the need of a Compliance Report and Methodology Adopted for preparation of Report.
- 2) Compliance Report, explaining the entire General & specific conditions in the EC Letter and providing details w.r.t. each condition/ guideline.
- 3) Monitoring Reports & Analysis, showing the level of emission within the project site for various Environment Parameters.
- 4) Photographs showing sample collection for environmental monitoring.
- 5) Supporting Documents which are mandatory for the project.

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ADHERENCE TO SPECIFIC AND GENERAL CONDITIONS

PART A- SPECIFIC CONDITION

S. No.	Conditions of Environmental Clearance	Status of Compliance
[A]	The final product (Ethanol) shall be used exclusively for fuel blending only.	<i>Noted.</i>
[B]	Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	<i>Consent to Establish (CTE) was obtained from PPCB valid till 31.12.2021 as per the amended EC.</i>
[C]	As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises	<i>As proposed zero discharge of waste water will be met during operational phase.</i>
[D]	Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.	<i>Authorization required for hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid waste Management Rules, 2016 will be obtained as per the requirement.</i>
[E]	To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines	<i>Measures will be taken to control fugitive emission, pollution control devices will be installed as per the requirement. Stack of adequate height as per the guidelines will be installed for the gaseous emission dispersion.</i>
[F]	Total fresh water requirement shall not exceed 2280 cum/day, proposed to be met from canal supply.	<i>Prescribed water requirement will not be exceeded.</i>
[G]	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through a separate conveyance system.	<i>We will ensure that process water is not mixed with storm water.</i>
[H]	The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.	<i>Noted.</i>

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[I]	<p>The company shall undertake waste minimization measures as below:-</p> <ol style="list-style-type: none"> i. Metering and control of quantities of active ingredients to minimize waste. ii. Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. iii. Use of automated filling to minimize spillage. iv. Use of Close Feed system into batch reactors. v. Venting equipment through vapour recovery system vi. Use of high pressure hoses for equipment clearing to reduce wastewater generation. 	<p><i>We will comply with the condition as per the requirement to minimize waste generation in the plant-</i></p> <ol style="list-style-type: none"> <i>i. Metering and control of quantities of active ingredients will be done regularly.</i> <i>ii. By products will be reused as raw material as much as possible according to requirement.</i> <i>iii. Automated filling will be carried out to minimize spillage</i> <i>iv. Close feed system will be used into batch reactors.</i> <i>v. Water scrubber, vent bottle & flame arrestors will be provided as per requirement.</i> <i>vi. High pressure hoses for equipment clearing will be used to reduce waste water generation.</i>
[J]	<p>The green belt of 5-10 m width shall be developed in more than 33% of the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.</p>	<p><i>We have submitted Green belt development plan to the MoEF&CC in the EIA report and same will be developed as per the EC requirement.</i></p>
[K]	<p>All the commitments made regarding issues raised during the public hearing/ consultation meeting shall be satisfactorily implemented.</p>	<p><i>Noted.</i></p>
[L]	<p>At least 1% of the total project cost shall be allocated for Corporate Environment Responsibility (CER) and the details along with time bound action plan shall be submitted to the Ministry's Regional Office.</p>	<p><i>The project is in initial stage and construction is yet to be commenced. CER details will be submitted to the authority in due course of time. .</i></p>
[M]	<p>For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.</p>	<p><i>Acoustically enclosed DG sets will be installed and Stack height will be kept as per the CPCB guidelines.</i></p>
[N]	<p>The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.</p>	<p><i>Fire Fighting system will be installed as per the condition.</i></p>
[O]	<p>Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.</p>	<p><i>Regular Health Check-up arrangement will be provided for the workers A qualified doctor will be appointed.</i></p>
[P]	<p>There shall be adequate space inside the plant premises earmarked for parking of vehicles for raw materials and finished products, and no parking to be allowed outside on public places.</p>	<p><i>No parking will be done outside on public places. Plan in this regard has already been submitted to authority.</i></p>
[Q]	<p>Storage of raw materials shall be either stored in silos or in covered areas to prevent dust pollution and other fugitive emissions.</p>	<p><i>During operation phase, raw materials will be stored properly in covered areas</i></p>
[R]	<p>Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the</p>	<p><i>We will comply.</i></p>

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	premises.	
[S]	CO ₂ generated from the process shall be bottled/made solid ice/value added products and sold to authorize vendors.	<i>Noted.</i>

11.1 OtherGenericConditions:-

S. No.	Conditions of Environmental Clearance	Status of Compliance
i.	The project authorities must strictly adhere to the stipulations made by the state Pollution Control Board (SPCB), State Government and/ or any other statutory authority.	<i>We ensure to follow the guidelines strictly.</i>
ii.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.	<i>Noted.</i>
iii.	The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one stations each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated	<i>Noted and same will be complied.</i>
iv.	The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R No. 826(E) dated 16 th November, 2009 Shall be Complied with.	<i>Noted.</i>
v.	The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).	<i>We will ensure to keep the noise levels within the standards.</i>
vi.	The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and utilize the same for different industrial operations within the plant.	<i>Noted.</i>
vii.	Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.	<i>Regular training of health & safety will be provided to the employees for chemical handling.</i>

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viii.	The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, risk mitigation measures and public hearing shall be implemented.	<i>Noted and will be complied as per the requirement.</i>
ix.	The company shall undertake all measures for improving socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villagers, administration and other stake holders. Also eco-developmental measures shall be undertaken for overall improvement of the environment.	<i>CSR activities will be undertaken as per the proposed plan.</i>
x.	A separate Environmental Management Cell equipped with full-fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.	<i>Noted.</i>
xi.	The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Changes well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/Pollution control measures shall not be diverted for any other purpose.	<i>Separate funds will be kept for the implementation of the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government.</i>
xii.	A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zila Parisad/ Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.	<i>Noted.</i>
xiii.	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status reports shall be posted on the website of the company.	<i>Noted. We are complying with the condition.</i>
xiv.	The environmental statement for each financial year ending 31 st March in Form-Vas is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional offices of MoEF&CC by e-mail.	<i>Noted.</i>
xv.	The project proponent shall inform the public that the project has been accorded environmental clearance by	<i>Copy of advertisements attached.</i>

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	<p>the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry at http://moef.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional office of the Ministry.</p>	
xvi.	<p>The Ministry reserves the right to stipulate additional conditions, if found necessary at subsequent stages and the project proponent shall implement all the said conditions in a time bound manner. The Ministry may revoke or suspend the environmental clearance, if implementation of any of the above conditions is not found satisfactory.</p>	<i>Noted.</i>
xvii.	<p>The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 read with subsequent amendments therein.</p>	<i>Noted.</i>

3

DETAILS OF ENVIRONMENTAL MONITORING

3.1 AMBIENT AIR QUALITY MONITORING

3.1.1 Ambient Air Quality Monitoring Stations

Ambient air quality monitoring has been carried out at twelve locations on quarterly bases, to assess the ambient air quality of the project site. This will enable to have a comparative analytical understanding about air quality and the changes in the air environment in the study area with respect to the condition prevailing. The locations of the ambient air quality monitoring stations are given in **Table 3.1**.

Table 3.1 Details of Ambient Air Quality Monitoring Stations

S. No.	Location	Location Name/ Description	
		December 2022	March 2023
1.	AAQ1	Near Project site	Near Project site
2.	AAQ2	Jiwan Singh Wala	NasibPura
3.	AAQ3	Maawala	Kot Kashmir
4.	AAQ4	Mahi Nangal	Chathewala
5.	AAQ5	Leleana	KotFatta
6.	AAQ6	Baghi Bandar	Baghi Bandar
7.	AAQ7	Nasibpura	Kothbhara
8.	AAQ8	Kothbhara	Jiwan Singh Wala
9.	AAQ9	Kot Kashmir	GehriBoghi
10.	AAQ10	GehriBoghi	Mahi Nangal
11.	AAQ11	Chathewala	Maanwala
12.	AAQ12	KotFatta	Leleana

3.1.2 Ambient Air Quality Monitoring Methodology

Monitoring was conducted in respect of the following parameters:

- Particulate Matter 2.5 (PM 2.5)
- Particulate Matter 10 (PM 10)
- Sulphur Dioxide (SO₂)
- Oxides of Nitrogen (NO₂)
- Carbon Monoxide (CO)
- Ammonia (NH₃)
- Lead (Pb)
- Benzene (C₆H₆)
- Benzo(a)pyrene
- Ozone (O₃)
- Arsenic (As)

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- Nickel (Ni)
- Volatile Organic Carbon (VOCs)
- Hydrocarbon (as Methane)

Installation of Respirable Dust sampler (RDS) & Fine Particulate Sampler (FPS) was done with the attachment for the 24 hourly ambient air qualities monitoring as per Gazette Notification 16th November 2009.

The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB) and IS: 5182. The techniques used for ambient air quality monitoring and minimum detectable levels are given in **Table 3.2**.

Fine Particulate Sampler instruments have been used for monitoring Particulate Matter 2.5 (PM2.5 i.e. <2.5 microns), and Respirable Dust Sampler was used for sampling Repairable fraction (<10 microns), gaseous pollutants like SO₂, and NO₂. Bladder and Aspirator bags were used for collection Carbon monoxide samples. Gas Chromatography techniques have been used for the estimation of CO.

Table 3.2 Techniques used for Ambient Air Quality Monitoring

S. No.	Parameter	Technique	Technical Protocol
1	Particulate Matter 2.5	Fine Particulate Sampler, Gravimetric Method	SOP No. VEL/SOP/01, Section No. S 63
2	Particulate Matter 10	Respirable Dust Sampler, with cyclone separator, Gravimetric Method	IS: 5182 (P-23), 2006
3	Sulphur dioxide	Modified West and Gaeke	IS: 5182 (P-6)
4	Oxides of Nitrogen	Jacob & Hochheiser	IS: 5182 (P-2)
5	Carbon Monoxide	Gas Chromatography	IS:11255(P-6)
6	Ammonia	Distillation Method	IS: 5182 (P-22)
7	Lead	Atomic Absorption Spectro-photometer	IS: 5182 (P-10)
8	Benzene	Gas Chromatography	IS: 5182 (P-11)
9	Benzo(a)pyrene	Gas Chromatography	IS: 5182 (P-12)
10	Ozone	Colorimetry	IS: 5182 (P-9)
11	Arsenic	Atomic Absorption Spectro-photometer	IS: 5182 (P-22)
12	Nickel	Atomic Absorption Spectro-photometer	IS: 5182 (P-22)
13	Volatile Organic Carbon (VOCs)	IS:5182 (P-11)	IS:5182 (P-11)
14	Hydrocarbon (as Methane)	IS:5182 (P-17), 1979	IS:5182 (P-17), 1979

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3.1.3 Ambient Air Quality Monitoring Results (December-2022)

Table 3.6 Ambient Air Quality Monitoring Results (1-4 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ1	AAQ2	AAQ3	AAQ4	
1	Particulate Matter (PM _{2.5}), µg/m ³	56.86	47.68	40.92	40.25	60
2	Particulate Matter (PM ₁₀), µg/m ³	90.76	73.16	73.36	76.68	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	24.76	21.40	18.44	22.47	80
4	Sulphur Dioxide (SO ₂), µg/m ³	6.72	8.23	8.07	7.94	80
5	Carbon Monoxide (CO) mg/m ³	0.74	0.66	0.75	0.76	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	14.52	17.11	20.71	18.62	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic Carbon (VOCs)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

*NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Table 3.7 Ambient Air Quality Monitoring Results (5-8 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ5	AAQ6	AAQ7	AAQ8	
1	Particulate Matter (PM _{2.5}), µg/m ³	32.05	42.36	45.26	48.78	60
2	Particulate Matter (PM ₁₀), µg/m ³	73.36	79.06	86.08	81.00	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	26.24	20.80	20.76	22.08	80
4	Sulphur Dioxide (SO ₂), µg/m ³	8.33	6.86	8.08	8.34	80
5	Carbon Monoxide (CO) mg/m ³	0.69	0.68	0.74	0.76	4

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6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	19.25	19.54	16.34	24.70	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic Carbon (VOCs)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

Table 3.8 Ambient Air Quality Monitoring Results (9-12 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM _{2.5}), µg/m ³	41.35	42.86	31.52	31.05	60
2	Particulate Matter (PM ₁₀), µg/m ³	73.38	69.42	70.80	73.36	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	24.67	26.70	18.34	20.16	80
4	Sulphur Dioxide (SO ₂), µg/m ³	10.42	9.05	9.45	10.76	80
5	Carbon Monoxide (CO) mg/m ³	0.75	0.64	0.86	0.82	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene,	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	19.51	19.72	20.71	23.36	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

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*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009



Figure 3.3 Location-wise Variation of Ambient Air Quality (December 2022)

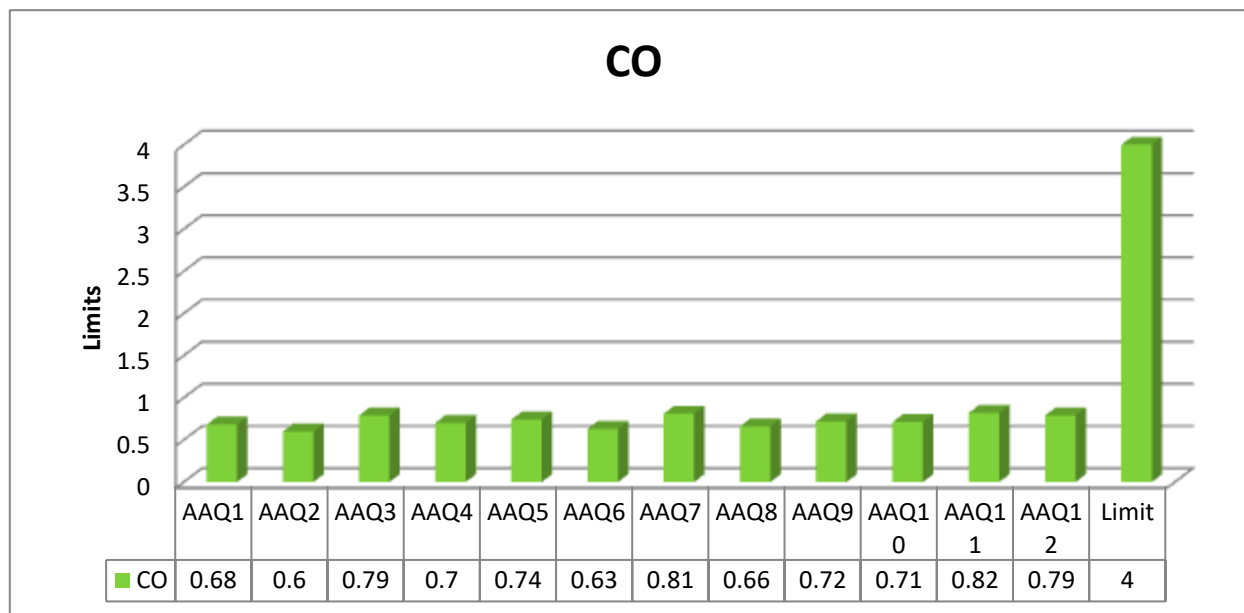


Figure 3.4 Location-wise Variation of CO in Ambient Air Quality (December 2022)

3.1.4 Discussion on Ambient Air Quality in the Study Area

PM₁₀ and PM_{2.5} levels at the project site are within the permissible limit of 100µg/m³ and 60 µg/m³ respectively (for residential, rural and other areas as stipulated in the National Ambient Air Quality Standards). SO₂, NO_x and CO was observed within the corresponding stipulated limits (Limit for SO₂ and NO_x: 80 µg/m³ and limit for CO: 4.0 mg/m³) at all monitoring locations. Station wise variation of ambient air quality parameters has been pictorially shown in **Figure 3.1, 3.2, 3.3 & 3.4**.

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3.1.5 Ambient Air Quality Monitoring Results (March -2023)

Table 3.3 Ambient Air Quality Monitoring Results (1-4 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ1	AAQ2	AAQ3	AAQ4	
1	Particulate Matter (PM _{2.5}), µg/m ³	52.68	44.14	48.22	42.68	60
2	Particulate Matter (PM ₁₀), µg/m ³	87.33	70.78	76.43	83.26	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	28.05	21.06	19.89	25.76	80
4	Sulphur Dioxide (SO ₂), µg/m ³	8.54	6.89	7.47	8.01	80
5	Carbon Monoxide (CO) mg/m ³	0.68	0.60	0.79	0.70	4
6	Ammonia (NH ₃), µg/m ³	22.06	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	16.57	14.44	22.43	17.01	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

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Table 3.4 Ambient Air Quality Monitoring Results (5-8 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ5	AAQ6	AAQ7	AAQ8	
1	Particulate Matter (PM _{2.5}), µg/m ³	35.68	40.15	55.36	50.23	60
2	Particulate Matter (PM ₁₀), µg/m ³	68.24	73.54	79.17	85.69	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	21.89	17.68	15.86	20.47	80
4	Sulphur Dioxide (SO ₂), µg/m ³	6.12	9.01	7.86	6.57	80
5	Carbon Monoxide (CO) mg/m ³	0.74	0.63	0.81	0.66	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene, ng/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	24.69	21.00	24.86	16.03	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic Carbon (VOCs)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

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Table 3.5 Ambient Air Quality Monitoring Results (9-12 Location)

S. No.	Parameter	Test Result				NAAQS*
		AAQ9	AAQ10	AAQ11	AAQ12	
1	Particulate Matter (PM _{2.5}), µg/m ³	38.47	53.21	33.14	44.13	60
2	Particulate Matter (PM ₁₀), µg/m ³	78.26	88.11	77.26	63.58	100
3	Nitrogen Dioxide (NO ₂), µg/m ³	22.87	28.86	24.41	21.79	80
4	Sulphur Dioxide (SO ₂), µg/m ³	9.33	7.12	6.33	7.01	80
5	Carbon Monoxide (CO) mg/m ³	0.72	0.71	0.82	0.79	4
6	Ammonia (NH ₃), µg/m ³	BLQ(LOQ 20.0)	20.96	BLQ(LOQ 20.0)	BLQ(LOQ 20.0)	400
7	Lead (Pb), µg/m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	1
8	Benzene(C ₆ H ₆),µg/m ³	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	05
9	Benzo(a)pyrene,	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	BLQ(LOQ 0.5)	01
10	Ozone (O ₃),µg/m ³	20.32	17.55	26.01	19.78	180
11	Arsenic As, ng/ m ³	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	6
12	Nickel Ni, ng/ m ³	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	BLQ(LOQ 5.0)	20
13	Volatile Organic	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	BLQ(LOQ 0.05)	--
14	Hydrocarbon (as Methane)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	--

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009

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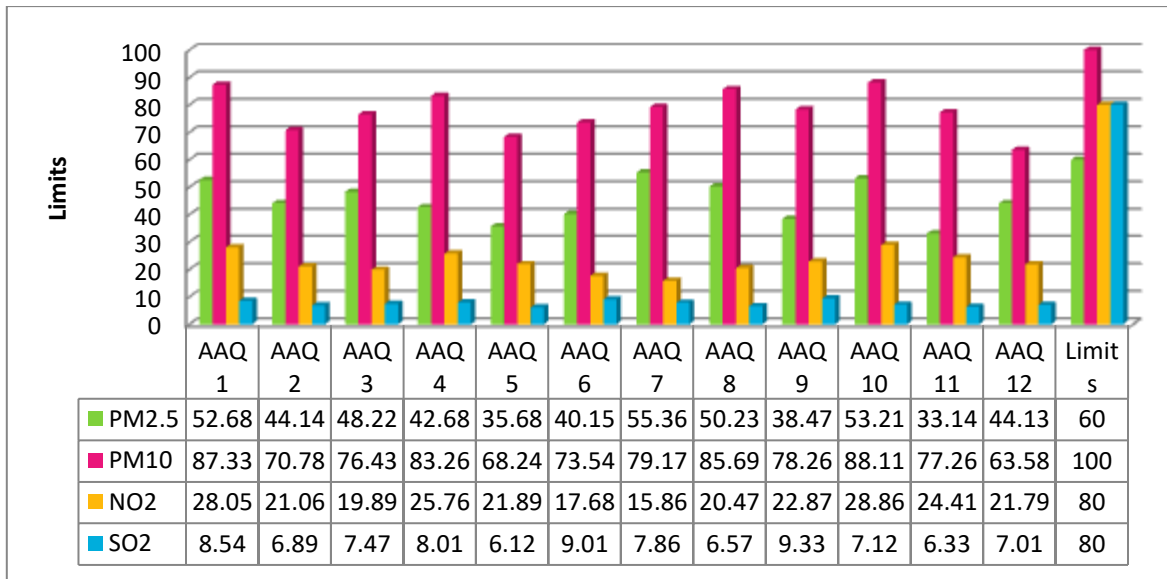


Figure 3.1 Location-wise Variation of Ambient Air Quality (March 2023)

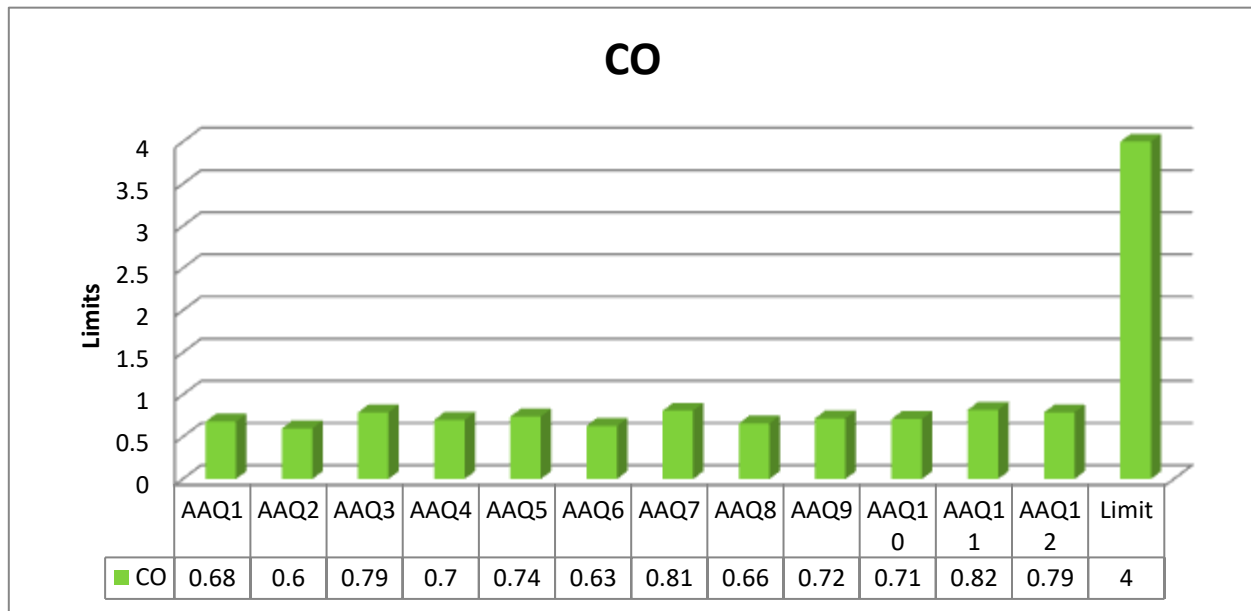


Figure 3.2 Location-wise Variation of CO in Ambient Air Quality (March 2023)

3.1.6 Discussion on Ambient Air Quality in the Study Area

PM₁₀ and PM_{2.5} levels at the project site are within the permissible limit of 100µg/m³ and 60 µg/m³ respectively (for residential, rural and other areas as stipulated in the National Ambient Air Quality Standards). SO₂, NO_x and CO was observed within the corresponding stipulated limits (Limit for SO₂ and NO_x: 80 µg/m³ and limit for CO: 4.0 mg/m³) at all monitoring locations. Station wise variation of ambient air quality parameters has been pictorially shown in **Figure 3.1, 3.2, 3.3 & 3.4**.

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3.2 AMBIENT NOISE MONITORING

3.2.1 Ambient Noise Monitoring Locations

The main objective of noise monitoring in the study area is to assess the present ambient noise levels in near front gate due to various construction allied activities and increased vehicular movement. A preliminary reconnaissance survey has been undertaken to identify the major noise generating sources in the area. Ambient noise monitoring was conducted at 12 locations in and around the project site on quarterly bases as given in **Table 3.9**.

Table 3.9 Details of Ambient Noise Monitoring Stations

S. No.	Location Code	Location Name/ Description		Present Land use
		December 2022	March 2023	
1.	N1	Near Project site	Near Project site	Industrial
2.	N2	Jiwan Singh Wala	NasibPura	Residential
3.	N3	Maawala	Kot Kashmir	Residential
4.	N4	Mahi Nangal	Chathewala	Residential
5.	N5	Leleana	KotFatta	Residential
6.	N6	Baghi Bandar	Baghi Bandar	Residential
7.	N7	Nasibpura	Kothbhara	Residential
8.	N8	Kothbhara	Jiwan Singh Wala	Residential
9.	N9	Kot Kashmir	GehriBoghi	Residential
10.	N10	GehriBoghi	Mahi Nangal	Residential
11.	N11	Chathewala	Maanwala	Residential
12.	N12	KotFatta	Leleana	Residential

3.2.2 Methodology of Noise Monitoring

Noise levels were measured using sound level meter. Noise level monitoring was carried out continuously for 24-hours with one hour interval starting at 06:00hrs to 06:00hrs next day. The noise levels were monitored on working days only. During each hour Leq were directly computed by the instrument based on the sound pressure levels. Monitoring was carried out at 'A' response and fast mode.

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3.2.3 Ambient Noise Monitoring Results (December -2022)

The location wise ambient noise monitoring results is summarized in **Table 3.13, 3.14& 3.15**. The location-wise variation of noise levels are graphically presented in **Figure**

Table 3.13 Ambient Noise Monitoring Results (1-4 Location)

Parameter	N1		N2		N3		N4	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	73.8	65.1	56.2	47.4	54.8	45.8	52.6	42.6
Lmin	51.2	41.8	42.9	35.1	39.6	33.2	35.8	31.0
Leq	58.76	47.06	52.06	40.52	46.52	39.46	43.51	37.06
CPCB Limit (Leq in dB(A) Industrial Limit& Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.00	45.00

Note *A “decibel” is a unit in which noise is measured.

Table 3.14 Ambient Noise Monitoring Results (5-8 Location)

Parameter	N5		N6		N7		N8	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	53.4	43.2	53.6	42.1	53.4	46.2	53.1	48.2
Lmin	32.5	33.6	32.5	32.5	32.5	34.6	34.8	35.4
Leq	45.18	40.82	44.29	38.76	47.18	41.70	47.25	42.84
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note *A “decibel” is a unit in which noise is measured.

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Table 3.15 Ambient Noise Monitoring Results (9-12 Location)

Parameter	N9		N10		N11		N12	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	54.8	44.6	52.1	43.5	53.4	43.8	56.2	42.6
Lmin	35.2	29.1	35.1	34.8	39.0	31.2	40.1	34.1
Leq	44.54	32.84	43.28	40.26	46.72	39.49	52.28	36.45
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured

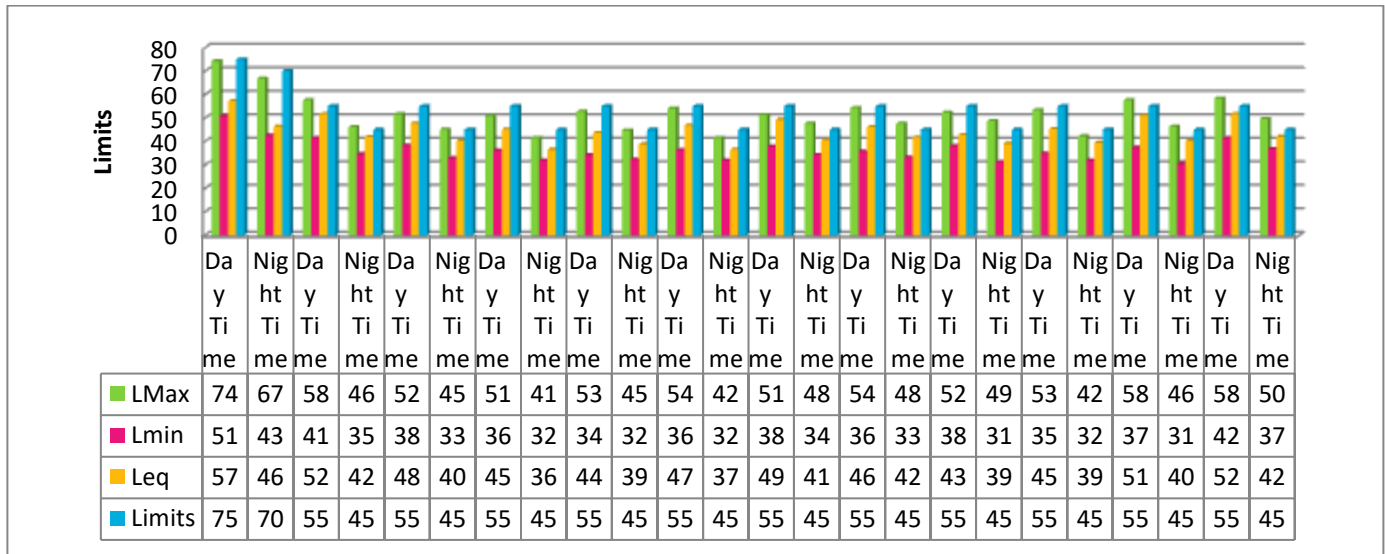


Figure 3.6 Location-wise Variation of Ambient Noise Levels (December 2022)

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3.2.4 Ambient Noise Monitoring Results (March-2023)

The location wise ambient noise monitoring results is summarized in **Table 3.10, 3.11 & 3.12**. The location-wise variation of noise levels are graphically presented in **Figure**

Table 3.10 Ambient Noise Monitoring Results (1-4 Location)

Parameter	N1		N2		N3		N4	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	74.2	66.9	57.6	46.1	51.6	45.1	50.8	41.4
Lmin	50.8	42.5	41.4	34.5	38.2	32.8	36.2	31.8
Leq	57.18	46.32	51.76	41.86	47.68	40.11	45.16	36.48
CPCB Limit (Leq in dB(A) Industrial Limit & Residential Limit)	75.00	70.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured.

Table 3.11 Ambient Noise Monitoring Results (5-8 Location)

Parameter	N5		N6		N7		N8	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	52.7	44.7	54.1	41.5	51.2	47.6	54.3	47.6
Lmin	34.1	32.3	36.4	31.8	37.8	34.2	35.7	33.2
Leq	43.55	38.78	46.78	36.59	49.26	40.57	46.12	41.71
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured.

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Table 3.12 Ambient Noise Monitoring Results (9-12 Location)

Parameter	N9		N10		N11		N12	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Lmax	52.3	48.7	53.4	42.2	57.6	46.3	58.3	49.6
Lmin	38.1	31.2	34.8	31.9	37.3	30.5	41.5	36.8
Leq	42.68	39.04	45.33	39.46	51.04	40.12	51.68	42.02
CPCB Limit (Leq in dB(A) Residential Limit)	55.00	45.00	55.00	45.00	55.00	45.00	55.00	45.00

Note: *A “decibel” is a unit in which noise is measured

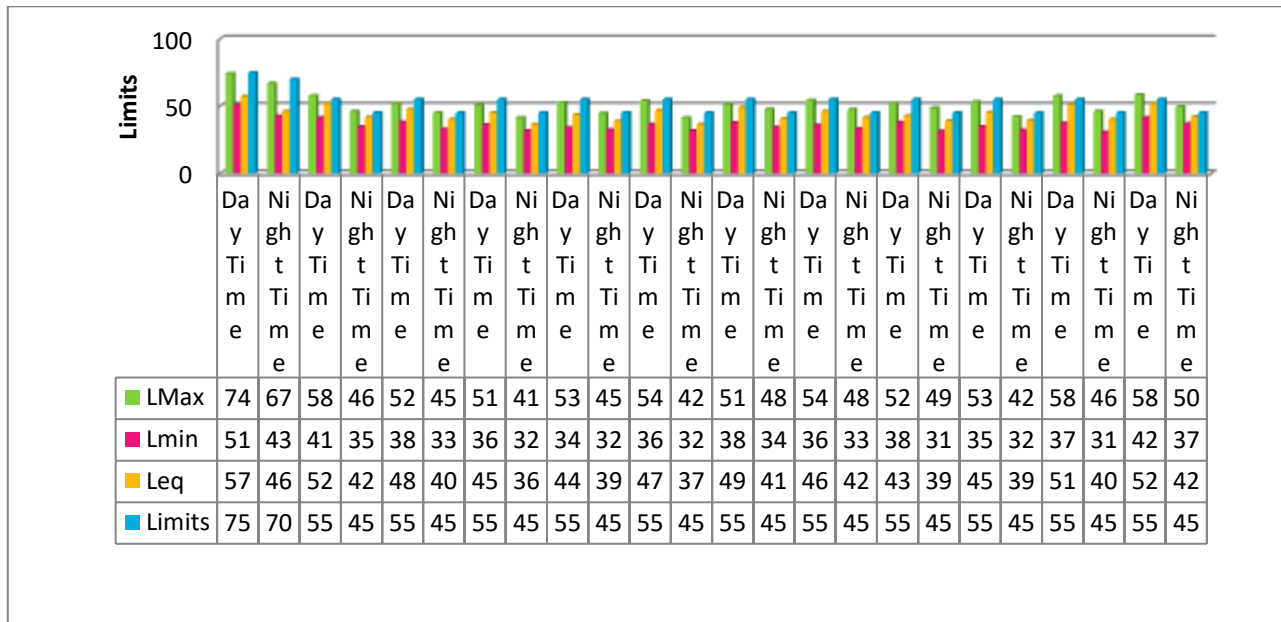


Figure 3.6 Location-wise Variation of Ambient Noise Levels (September 2022)

3.2.4 Discussion on Ambient Noise Levels in the Study Area

Day Time Noise Levels (L_{day}):

The day time noise level at all the locations were found to within limits prescribed for Industrial area i.e. 75 dB (A) and for residential are 55 dB (A).

Night Time Noise Levels (L_{night}):

The night time noise level at all the locations were found to within limit prescribed for Industrial area i.e. 70 dB (A) and for residential are 45

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3.3 WATER QUALITY MONITORING

3.3.1 Ground Water Quality Monitoring Locations

Keeping in view the importance of Ground water & Surface water as an important source of water to the local population, sample of ground water & surface water was collected from the project site for the assessment of impacts of the project on the ground water quality & surface water quality.

Water sample was collected from the project site and nearby villages. The sample was analyzed for various parameters to compare with the standards for water as per IS: 10500 for water sources. The details of water sampling locations are given in **Table 3.16**

Table 3.16 Details of Water Quality Monitoring Station

S. No.	Location Code	Location Name/ Description	
		December 2022	March 2023
1.	W 1	Ground Water (Near Project Site)	Ground Water (Near Project Site)
2.	W 2	Ground Water (Jiwan Singh Wala)	Ground Water (Jiwan Singh Wala)
3.	W 3	Ground Water (Maanwala)	Ground Water (Maanwala)
4.	W 4	Ground Water (Mahi Nangal)	Ground Water (Mahi Nangal)
5.	W 5	Ground Water (Kot Kashmir)	Ground Water (Kot Kashmir)
6.	W 6	Ground Water (NasibPura)	Ground Water (NasibPura)
7.	W 7	Ground Water (Baghi Bandar)	Ground Water (Baghi Bandar)
8.	W 8	Surface Water (KotFatta)	Surface Water (KotFatta)
9.	W 9	Surface Water (Chathewala)	Surface Water (Chathewala)

3.3.2 Methodology of Groundwater & Surface water Quality Monitoring

Sampling of water was carried out on **December 2022 & March 2023**. Samples were collected as grab sample and sampling forms are filled in as per the sampling plan. The preservative sample were properly added to preserve as per standard operating procedures (SOP) and stored immediately in ice boxes, which were ensured for appropriate temperatures. Sample for chemical analysis was collected in polyethylene carboys. Sample collected for metal content were acidified to <2 pH with 1 ml HNO₃. A sample for bacteriological analysis was collected in sterilized glass bottles.

Soon after the completion of sampling, chain of custody sheets for the samples are filled in and then they were transported to laboratory for further analysis. Proper care was taken during packing and transportation of samples. All the samples reached the central laboratory within the holding times for different parameters. After ensuring the same the samples were forwarded immediately for analysis.

The samples were analyzed as per the standard procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA) and CPCB. The analytical techniques and the test methods adopted for testing of water are given in **Table 3.17-3.34**.

3.3.3 Ground Water & Surface Water Quality Monitoring Results (December 2022)

The detailed ground water & surface water quality monitoring results are presented in **Table 3.26-3.34**

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Table 3.26 Ground water Quality Monitoring Result (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.42	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	284.31	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	78.54	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	260.40	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	64.16	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	21.47	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	560.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	25.15	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.71	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	5.28	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.20	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.37	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation

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27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	928	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	18.2	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.1	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.27 Ground water Quality Monitoring Result (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.86	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	218.24	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	74.82	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	221.28	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	56.64	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	7.67	mg/L	30	100

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12.	Total Dissolved	IS 3025 (P-16)	528.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	31.28	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.65	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	4.06	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.31	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	880	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	34.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total

Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

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Table 3.28 Ground water Quality Monitoring Result (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.56	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	254.21	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	72.84	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	219.27	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	69.35	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	17.61	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	718.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	52.06	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.48	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	6.23	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.42	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation

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27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1135	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	38.4	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml	----

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.29 Ground water Quality Monitoring Result (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.21	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	342.48	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	90.80	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	271.00	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	78.24	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No

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11.	Magnesium as Mg	APHA 3500 Mg B	28.17	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	647.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	52.84	mg/L	200	400
14.	Fluoride as F	APHA 4500 FD	0.76	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	6.28	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.52	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1038	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	24.2	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.6	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total

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Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.30 Ground water Quality Monitoring Result (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.24	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	228.34	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	76.28	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	182.45	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	61.52	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	9.24	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	516.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	52.91	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.82	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	5.14	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.16	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.31	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation

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27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	816	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	32.0	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.31 Ground water Quality Monitoring Result (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	8.04	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	198.26	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	52.73	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	173.60	mg/L	200	600

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9.	Chloride as Cl	IS 3025 (P-32)	45.28	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	16.20	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	407.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	12.34	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.72	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	5.18	mg/L	45	No Relaxation
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	640	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	10.8	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	

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36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
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*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.32 Ground water Quality Monitoring Result (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.76	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness as CaCO ₃	IS 3025 (P-21)	181.25	mg/L	200	600
7.	Calcium as Ca	IS 3025 (P-40)	45.26	mg/L	75	200
8.	Alkalinity as CaCO ₃	IS 3025 (P-23)	184.76	mg/L	200	600
9.	Chloride as Cl	IS 3025 (P-32)	42.35	mg/L	250	1000
10.	Cyanide as CN	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium as Mg	APHA 3500 Mg B	16.60	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	473.00	mg/L	500	2000
13.	Sulphate as SO ₄	IS 3025 (P-24)	29.24	mg/L	200	400
14.	Fluoride as F	APHA 4500 F D	0.61	mg/L	1.0	1.5
15.	Nitrate as NO ₃	IS 3025 (Part -34)	3.92	mg/L	45	No
16.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.09	mg/L	1.0	No Relaxation
17.	Aluminium as Al	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium as Cr	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc as Zn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.18	mg/L	5.0	15.0
24.	Copper as Cu	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5

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25.	Manganese as Mn	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium as Cd	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium as Se	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic as As	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury as Hg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	740	µS/cm	--	--
32.	Ammonia as NH ₃	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	25.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	---	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml	

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

Table 3.33 Surface water Quality Monitoring Result (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.42	--
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	12.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	--
5.	Taste	IS 3025 (P-8)	NR	--
6.	Chloride as Cl	IS 3025 (P-32)	73.41	mg/L
7.	Conductivity	IS 3025 (P-14)	679	µS/cm
8.	Nitrate as NO ₃	IS 3025 (P-34)	16.24	mg/L
9.	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L
10.	Total Dissolved Solids	IS 3025 (P-16)	409.00	mg/L
11.	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L

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12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.22	mg/L
13.	Sulphate as SO ₄	IS 3025 (P-24)	12.91	mg/L
14.	Fluoride as F	APHA 4500 F D	0.62	mg/L
15.	BOD (3 Days at 20°C)	IS 3025 (P-44)	4.25	mg/L
16.	COD	IS 3025 (P-58)	25.34	mg/L
17.	Free Ammonia as N	IS 3025 (P-34)	9.25	mg/L
18.	Total Coliform	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	Per 100ml
19.	Arsenic as As	IS 3025 (P-21)	151.00	mg/L
20.	Total Hardness as CaCO ₃	IS 3025 (P-40)	41.86	mg/L
21.	Calcium as Ca	IS 3025 (P-23)	168.24	mg/L
22.	Alkalinity as CaCO ₃	APHA 3500 Mg B Calculation Method	11.31	mg/L
23.	Magnesium as Mg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.28	mg/L
24.	Copper as Cu	IS 3025 (P-45)	52.81	mg/L
25.	Sodium	IS 3025 (P-45)	6.1	mg/L
26.	Potassium	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Chromium as Cr	IS 15185:2016	Absent	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.

Table 3.34 Surface water Quality Monitoring Result (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25°C)	IS 3025 (P-11)	7.21	--
2	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3	Turbidity	IS 3025 (P-10)	23.0	NTU
4	Odour	IS 3025 (P-5)	Agreeable	--
5	Taste	IS 3025 (P-8)	NR	--
6	Chloride as Cl	IS 3025 (P-32)	51.26	mg/L
7	Conductivity	IS 3025 (P-14)	826	µS/cm
8	Nitrate as NO ₃	IS 3025 (P-34)	5.44	mg/L
9	Iron as Fe	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L
10	Total Dissolved Solids	IS 3025 (P-16)	527.00	mg/L
11	Lead as Pb	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.21	mg/L
13	Sulphate as SO ₄	IS 3025 (P-24)	26.84	mg/L
14	Fluoride as F	APHA 4500 F D	0.42	mg/L

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15	BOD (3 Days at	IS 3025 (P-44)	3.92	mg/L
16	COD	IS 3025 (P-58)	20.15	mg/L
17	Free Ammonia as	IS 3025 (P-34)	6.24	mg/L
18	Total Coliform	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	Per 100ml
19	Arsenic as As	IS 3025 (P-21)	158.34	mg/L
20	Total Hardness as CaCO ₃	IS 3025 (P-40)	58.31	mg/L
21	Calcium as Ca	IS 3025 (P-23)	182.24	mg/L
22	Alkalinity as CaCO ₃	APHA 3500 Mg B Calculation Method	3.12	mg/L
23	Magnesium as Mg	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.06	mg/L
24	Copper as Cu	IS 3025 (P-45)	42.1	mg/L
25	Sodium	IS 3025 (P-45)	1.0	mg/L
26	Potassium	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27	Total Chromium as Cr	IS 15185:2016	Absent	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.

3.3.4 Ground Water & Surface Water Quality Monitoring Results (March 2022)

The detailed ground water & surface water quality monitoring results are presented in **Table 3.17-3.25**

Table 3.17 Ground water Quality Monitoring Result (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.29	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	272.13	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	70.24	mg/L	75	200
8.	Alkalinity (as	IS 3025 (P-23)	251.48	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	60.36	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No

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11.	Magnesium (as Mg)	APHA 3500 Mg B	23.54	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	542.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	21.68	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 FD	0.62	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	4.48	mg/L	45	No
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.18	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	901	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	21.4	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.1	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	--	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	'Shall not be detectable in any 100 ml	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total

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Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.18 Ground water Quality Monitoring Result (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.58	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	210.56	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	71.36	mg/L	75	200
8.	Alkalinity (as	IS 3025 (P-23)	214.66	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	51.26	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B	7.90	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	532.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	22.68	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 FD	0.61	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	3.59	mg/L	45	No
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.16	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L	5.0	15.0

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24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	857	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	33.5	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.2	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.19 Ground water Quality Monitoring Result (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.62	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	259.59	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	64.32	mg/L	75	200
8.	Alkalinity (as	IS 3025 (P-23)	209.33	mg/L	200	600

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9.	Chloride (as Cl)	IS 3025 (P-32)	71.49	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B	24.08	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	711.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	41.65	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 FD	0.56	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.23	mg/L	45	No
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.40	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1112	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	31.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	

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Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.20 Ground water Quality Monitoring Result (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.13	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	316.48	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	76.26	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	248.00	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	73.68	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	30.67	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	612.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	46.23	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.78	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	6.02	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0

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23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.36	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1068	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	20.5	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.7	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.21 Ground water Quality Monitoring Result (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.65	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	211.54	mg/L	200	600

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7.	Calcium (as Ca)	IS 3025 (P-40)	62.87	mg/L	75	200
8.	Alkalinity (as	IS 3025 (P-23)	171.69	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	54.23	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B	13.29	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	502.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	58.62	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.87	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.87	mg/L	45	No
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.21	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.22	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	835	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	34.0	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.8	mg/L	--	--

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35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any

Note: *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.22 Ground water Quality Monitoring Result (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.66	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	186.55	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	48.36	mg/L	75	200
8.	Alkalinity (as)	IS 3025 (P-23)	166.03	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	40.21	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.01	mg/L	30	100
12.	Total Dissolved	IS 3025 (P-16)	401.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	18.36	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.66	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	4.55	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.13	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01,	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation

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20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	623	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	12.8	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.1	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

©Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.23 Ground water Quality Monitoring Result (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limits)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.69	--	6.5 to 8.5	No
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable

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5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	172.56	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	41.23	mg/L	75	200
8.	Alkalinity (as	IS 3025 (P-23)	171.33	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	40.17	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.93	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	466.00	mg/L	500	2000
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	23.69	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.54	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	3.25	mg/L	45	No
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium(as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No
22.	Anionic Detergents	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.28	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	723	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation

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33.	Sodium	IS 3025 (P-45)	22.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any	

Note: - *BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

@Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).

Table 3.24 Surface water Quality Monitoring Result (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.63	--
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	15.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	--
5.	Taste	IS 3025 (P-8)	NR	--
6.	Chloride (as Cl)	IS 3025 (P-32)	76.22	mg/L
7.	Conductivity	IS 3025 (P-14)	693	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34)	14.69	mg/L
9.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L
10.	Total Dissolved Solids	IS 3025 (P-16)	424.00	mg/L
11.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.26	mg/L
13.	Sulphate(as SO ₄)	IS 3025 (P-24)	10.16	mg/L
14.	Fluoride (as F)	APHA 4500 F D	0.69	mg/L
15.	BOD (5 Days at	IS 3025 (P-44)	3.68	mg/L
16.	COD	IS 3025 (P-58)	23.92	mg/L
17.	Free Ammonia (as	IS 3025 (P-34)	8.15	mg/L
18.	Total Coliform	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	Per 100ml
19.	Arsenic (as As)	IS 3025 (P-21)	141.00	mg/L
20.	Total Hardness (as CaCO ₃)	IS 3025 (P-40)	48.66	mg/L
21.	Calcium (as Ca)	IS 3025 (P-23)	160.48	mg/L
22.	Alkalinity (as	APHA 3500 Mg B Calculation Method	4.76	mg/L

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23.	Magnesium (as Mg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	2.88	mg/L
24.	Copper (as Cu)	IS 3025 (P-45)	57.55	mg/L
25.	Sodium (as Na)	IS 3025 (P-45)	3.3	mg/L
26.	Potassium (as K)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Chromium (as Cr)	IS 15185:2016	Absent	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.

Table 3.25 Surface water Quality Monitoring Result (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1	pH (at 25°C)	IS 3025 (P-11)	7.46	--
2	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3	Turbidity	IS 3025 (P-10)	20.0	NTU
4	Odour	IS 3025 (P-5)	Agreeable	--
5	Taste	IS 3025 (P-8)	NR	--
6	Chloride (as Cl)	IS 3025 (P-32)	51.66	mg/L
7	Conductivity	IS 3025 (P-14)	811	µS/cm
8	Nitrate (as NO ₃)	IS 3025 (P-34)	5.89	mg/L
9	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L
10	Total Dissolved Solids	IS 3025 (P-16)	511.00	mg/L
11	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.28	mg/L
13	Sulphate(as SO ₄)	IS 3025 (P-24)	21.39	mg/L
14	Fluoride (as F)	APHA 4500 F D	0.38	mg/L
15	BOD (5 Days at	IS 3025 (P-44)	2.47	mg/L
16	COD	IS 3025 (P-58)	17.35	mg/L
17	Free Ammonia (as	IS 3025 (P-34)	5.57	mg/L
18	Total Coliform	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	Per 100ml
19	Arsenic (as As)	IS 3025 (P-21)	142.35	mg/L
20	Total Hardness (as CaCO ₃)	IS 3025 (P-40)	51.16	mg/L

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21	Calcium (as Ca)	IS 3025 (P-23)	174.39	mg/L
22	Alkalinity (as)	APHA 3500 Mg B Calculation Method	3.57	mg/L
23	Magnesium (as Mg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.11	mg/L
24	Copper (as Cu)	IS 3025 (P-45)	47.6	mg/L
25	Sodium (as Na)	IS 3025 (P-45)	1.3	mg/L
26	Potassium (as K)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27	Total Chromium (as Cr)	IS 15185:2016	Absent	mg/L

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.

3.4 SOIL MONITORING

3.4.1 Soil Monitoring Locations

The objective of the soil monitoring is to identify the impacts of ongoing project activities on soil quality and also predict impacts, which have arisen due to execution of various constructions allied activities. Accordingly, a study of assessment of the soil quality has been carried out.

To assess impacts of ongoing project activities on the soil in the area, the physico-chemical characteristics of soils were examined by obtaining soil samples from selected points and analysis of the same. Single sample of soil was collected from the project site for studying soil characteristics, the location of which is listed in **Table 3.35**.

Table 3.35 Details of Soil Quality Monitoring Location

S. No.	Location Code	Location Name/ Description	
		December 2022	March 2023
1.	S1	Near Project Site	Near Project Site
2.	S2	Jiwan Singh wala	Jiwan Singh wala
3.	S3	MaanWala	MaanWala
4.	S4	Mahi Nangal	Mahi Nangal
5.	S5	Leleana	Leleana
6.	S6	Baghi Bandar	Baghi Bandar
7.	S7	NasibPura	NasibPura
8.	S8	Kotbhara	Kotbhara
9.	S9	Kot Kashmir	Kot Kashmir
10.	S10	GehriBoghi	GehriBoghi
11.	S11	Chathewala	Chathewala
12.	S12	KotFatta	KotFatta

3.4.2 Methodology of Soil Monitoring

The sampling has been done in line with IS: 2720 & Methods of Soil Analysis, Part-1, 2nd edition, 1986 of American Society for Agronomy and Soil Science Society of America. The homogenized samples were analyzed

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for physical and chemical characteristics (physical, chemical and heavy metal concentrations). The soil samples were collected in the month of **December 2022 & March 2023**.

The samples have been analyzed as per the established scientific methods for physic-chemical parameters. The heavy metals have been analyzed by using Atomic Absorption Spectrophotometer.

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3.4.3 Soil Monitoring Results (December 2022)

Single sample of soil is collected from the site to check the quality of soil of the study area .The physio-chemical characteristics of the soil, as obtained from the analysis of the soil sample, are presented in **Table 3.48-3.59**.

Table 3.48 Physico-Chemical Characteristics of Soil in the Study Area (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	6.94	--
2.	Conductivity	IS 14767	0.318	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	25.42	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.38	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	42.51	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	21.33	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	26.18	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	98.47	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.84	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	18.35	%
14.	Available Nitrogen as N	IS:14684	152.48	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	12.63	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.29	%
17.	Organic Carbon	IS 2720 (P-22)	0.47	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.51	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.18	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	10.41	%

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Table 3.49 Physico-Chemical Characteristics of Soil in the Study Area (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	6.51	--
2.	Conductivity	IS 14767	0.362	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	45.10	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.39	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.26	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	60.52	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	51.24	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	122.46	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.19	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.62	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.62	%
14.	Available Nitrogen as N	IS:14684	248.13	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	24.51	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	20.35	%
17.	Organic Carbon	IS 2720 (P-22)	0.48	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.75	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.35	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.92	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.46	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	12.44	%

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Table 3.50 Physico-Chemical Characteristics of Soil in the Study Area (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	8.25	--
2.	Conductivity	IS 14767	0.354	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.62	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.59	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	51.18	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	30.46	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	41.29	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	139.84	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.76	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.56	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.23	%
14.	Available Nitrogen as N	IS:14684	240.72	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	27.87	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	11.27	%
17.	Organic Carbon	IS 2720 (P-22)	0.45	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.76	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.58	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.86	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.28	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.23	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	20.06	%

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Table 3.51 Physico-Chemical Characteristics of Soil in the Study Area (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.96	--
2.	Conductivity	IS 14767	0.379	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	34.25	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.51	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	35.64	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	47.86	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	51.26	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	138.08	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.69	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.51	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	28.62	%
14.	Available Nitrogen as N	IS:14684	219.28	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.47	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.76	%
17.	Organic Carbon	IS 2720 (P-22)	0.37	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.52	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.74	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.0	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.78	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.80	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	17.06	%

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Table 3.52 Physico-Chemical Characteristics of Soil in the Study Area (Leleana)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	8.27	--
2.	Conductivity	IS 14767	0.344	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	18.51	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.23	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	49.25	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.51	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	40.32	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	84.27	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.15	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.64	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.37	%
14.	Available Nitrogen as N	IS:14684	198.70	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	18.22	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.25	%
17.	Organic Carbon	IS 2720 (P-22)	0.38	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.73	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.74	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	4.28	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.15	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	17.40	%

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Table 3.53 Physico-Chemical Characteristics of Soil in the Study Area (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.62	--
2.	Conductivity	IS 14767	0.326	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	21.35	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.20	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.18	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	52.28	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	39.41	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	116.27	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.51	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	18.26	%
14.	Available Nitrogen as N	IS:14684	202.40	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	10.25	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	5.94	%
17.	Organic Carbon	IS 2720 (P-22)	0.52	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.65	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.54	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.42	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.51	%

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Table 3.54 Physico-Chemical Characteristics of Soil in the Study Area (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.62	--
2.	Conductivity	IS 14767	0.318	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	36.52	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.34	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	50.45	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	42.18	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	77.80	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	154.23	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.62	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.78	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	35.22	%
14.	Available Nitrogen as N	IS:14684	251.35	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	26.42	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	14.54	%
17.	Organic Carbon	IS 2720 (P-22)	0.54	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.58	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.72	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.13	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	18.22	%

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Table 3.55 Physico-Chemical Characteristics of Soil in the Study Area (Kotbhara)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.24	--
2.	Conductivity	IS 14767	0.324	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	36.28	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.32	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	42.81	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	51.46	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.52	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	151.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.72	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.18	%
14.	Available Nitrogen as N	IS:14684	251.27	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	15.34	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.18	%
17.	Organic Carbon	IS 2720 (P-22)	0.42	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.56	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.36	%

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Table 3.56 Physico-Chemical Characteristics of Soil in the Study Area (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.45	--
2.	Conductivity	IS 14767	0.314	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	26.54	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.32	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	45.28	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	37.19	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	40.34	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.51	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.45	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.81	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	20.50	%
14.	Available Nitrogen as N	IS:14684	238.06	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	14.21	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.04	%
17.	Organic Carbon	IS 2720 (P-22)	0.76	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.56	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.37	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.42	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.28	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	11.24	%

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Table 3.57 Physico-Chemical Characteristics of Soil in the Study Area (Gehri Boghi)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.36	--
2.	Conductivity	IS 14767	0.304	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	35.42	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.79	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	51.24	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	38.41	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	52.18	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.72	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.62	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.76	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.61	%
14.	Available Nitrogen as N	IS:14684	241.42	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	21.51	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.28	%
17.	Organic Carbon	IS 2720 (P-22)	0.61	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.68	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.72	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.25	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	25.28	%

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Table 3.58 Physico-Chemical Characteristics of Soil in the Study Area (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.46	--
2.	Conductivity	IS 14767	0.346	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.51	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.47	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	52.10	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	41.62	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	58.91	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.36	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.75	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.62	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	28.45	%
14.	Available Nitrogen as N	IS:14684	227.11	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.38	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.21	%
17.	Organic Carbon	IS 2720 (P-22)	0.54	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.63	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.08	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.31	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.25	%

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Table 3.59 Physico-Chemical Characteristics of Soil in the Study Area (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.52	--
2.	Conductivity	IS 14767	0.364	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	25.31	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.45	gm/cc
7.	Chloride as Cl	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	71.62	%
8.	Calcium as Ca	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	48.24	%
9.	Sodium as Na	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	41.34	%
10.	Potassium as K	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	157.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.34	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.82	%
13.	Magnesium as Mg	VEL/STP/EN/72, Issue No. 01, 01/11/2021	31.45	%
14.	Available Nitrogen as N	IS:14684	241.62	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	25.28	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.19	%
17.	Organic Carbon	IS 2720 (P-22)	0.62	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.94	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.75	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.72	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.82	%

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3.4.3 Soil Monitoring Results (March 2023)

Single sample of soil is collected from the site to check the quality of soil of the study area .The physio-chemical characteristics of the soil, as obtained from the analysis of the soil sample, are presented in **Table 3.36-3.47**.

Table 3.36 Physico-Chemical Characteristics of Soil in the Study Area (Near Project Site)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.46	--
2.	Conductivity	IS 14767	0.325	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	30.24	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.38	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.68	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	20.35	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	28.14	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	92.58	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	5.06	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.80	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	16.87	%
14.	Available Nitrogen (as N)	IS:14684	147.15	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	10.87	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	14.02	%
17.	Organic Carbon	IS 2720 (P-22)	0.46	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.47	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.15	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.40	mg/kg

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23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	18.06	%

Table 3.37 Physico-Chemical Characteristics of Soil in the Study Area (Jiwan Singh Wala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.54	--
2.	Conductivity	IS 14767	0.348	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	42.47	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.24	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	37.41	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	55.42	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	50.78	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	118.33	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.46	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.81	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	23.67	%
14.	Available Nitrogen (as N)	IS:14684	266.08	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.74	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	17.26	%
17.	Organic Carbon	IS 2720 (P-22)	0.47	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.57	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.70	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.65	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.47	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	16.42	%

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Table 3.38 Physico-Chemical Characteristics of Soil in the Study Area (Maanwala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.78	--
2.	Conductivity	IS 14767	0.346	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	26.22	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.46	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	46.23	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	33.87	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	43.75	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	131.38	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.68	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	17.54	%
14.	Available Nitrogen (as N)	IS:14684	231.47	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	25.33	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	13.06	%
17.	Organic Carbon	IS 2720 (P-22)	0.39	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.78	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.53	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.81	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.00	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.46	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg

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24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.45	%
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Table 3.39 Physico-Chemical Characteristics of Soil in the Study Area (Mahi Nangal)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.66	--
2.	Conductivity	IS 14767	0.338	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	31.48	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.52	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	38.45	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	44.13	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	58.02	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	130.48	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.73	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.55	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.19	%
14.	Available Nitrogen (as N)	IS:14684	198.44	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	17.69	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.76	%
17.	Organic Carbon	IS 2720 (P-22)	0.32	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.68	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.24	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.13	mg/kg

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22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.17	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.06	%

Table 3.40 Physico-Chemical Characteristics of Soil in the Study Area (Leleana)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	8.21	--
2.	Conductivity	IS 14767	0.316	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	18.72	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.36	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.77	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	36.24	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	48.11	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	80.87	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.01	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.60	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	17.78	%
14.	Available Nitrogen (as N)	IS:14684	204.52	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	14.48	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.35	%
17.	Organic Carbon	IS 2720 (P-22)	0.35	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.66	mg/kg

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19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.81	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	4.01	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.66	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.78	%

Table 3.41 Physico-Chemical Characteristics of Soil in the Study Area (Baghi Bandar)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.82	--
2.	Conductivity	IS 14767	0.312	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	24.47	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.22	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	37.68	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	59.01	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	35.57	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	113.29	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.24	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.66	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	20.78	%
14.	Available Nitrogen (as N)	IS:14684	212.58	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	9.14	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	9.26	%
17.	Organic Carbon	IS 2720 (P-22)	0.39	%

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18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.65	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.79	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.01	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	13.06	%

Table 3.42 Physico-Chemical Characteristics of Soil in the Study Area (Nasibpura)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.89	--
2.	Conductivity	IS 14767	0.310	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.89	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.26	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.14	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	40.89	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	72.35	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	135.87	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.89	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	30.88	%
14.	Available Nitrogen (as N)	IS:14684	247.35	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	21.79	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	15.36	%

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17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.40	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.68	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.37	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	20.87	%

Table 3.43 Physico-Chemical Characteristics of Soil in the Study Area (Kotbhara)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.36	--
2.	Conductivity	IS 14767	0.357	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.30	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	35.81	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	51.46	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.52	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	151.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.70	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.18	%
14.	Available Nitrogen (as N)	IS:14684	251.27	kg./hec.

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15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	15.34	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.18	%
17.	Organic Carbon	IS 2720 (P-22)	0.41	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.56	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	10.58	%

Table 3.44 Physico-Chemical Characteristics of Soil in the Study Area (Kot Kashmir)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.68	--
2.	Conductivity	IS 14767	0.322	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.06	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.42	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	48.66	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.48	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	43.11	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	123.48	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.24	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.64	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.58	%

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14.	Available Nitrogen (as N)	IS:14684	228.48	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	12.69	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	13.55	%
17.	Organic Carbon	IS 2720 (P-22)	0.37	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.71	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.50	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.33	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.04	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.56	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.92	%

Table 3.45 Physico-Chemical Characteristics of Soil in the Study Area (GehriBoghi)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.23	--
2.	Conductivity	IS 14767	0.339	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	34.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.58	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.39	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.24	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	50.78	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	120.29	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.03	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.77	%

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13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	22.18	%
14.	Available Nitrogen (as N)	IS:14684	256.38	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	18.77	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	11.55	%
17.	Organic Carbon	IS 2720 (P-22)	0.45	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.77	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.89	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.29	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.36	%

Table 3.46 Physico-Chemical Characteristics of Soil in the Study Area (Chathewala)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.63	--
2.	Conductivity	IS 14767	0.341	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.36	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.78	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	39.25	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	61.22	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	126.68	%

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(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)

11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.35	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	30.58	%
14.	Available Nitrogen (as N)	IS:14684	235.47	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	17.69	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.36	%
17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.76	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.35	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.87	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.79	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	16.08	%

Table 3.47 Physico-Chemical Characteristics of Soil in the Study Area (KotFatta)

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.72	--
2.	Conductivity	IS 14767	0.361	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	27.69	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.42	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	68.02	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	44.26	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.58	%

Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab

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10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	143.59	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.78	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.75	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	34.12	%
14.	Available Nitrogen (as N)	IS:14684	232.87	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.57	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	15.02	%
17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.90	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.79	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.51	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.33	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.55	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.66	%

3.4.5 Discussion on Soil Characteristics in the Study Area

The soil in study area is characterized by moderate organic content. The soil quality in the project area has not been affected by the project activities.

3.5 Site Photographs

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
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**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



Ambient Noise Monitoring

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



Ambient Air Monitoring



Soil Sampling

**Project: Setting up 2G Ethanol Bio-Refinery plant of capacity 100 KLPD at village Nasibpura, Tehsil Talwandi Sabo, Bhatinda, Punjab
(F.No. J-11011/221/2017-IA II (I) Dated-23/11/2020)**



Water Sampling



PUNJAB POLLUTION CONTROL BOARD

Zonal Office, Power House Road, Street No. 12, Bathinda.

Website:- www.ppcb.gov.in

Office Dispatch No :

Registered/Speed Post

Date:

Industry Registration ID: R19BTI356560

Application No : 14320137

To,

Shri Sanjay Kumar
Hindustan Petroleum Corporation Limited, 6th Floor, Core-ii North Tower, Scope Minar, Laxmi Nagar
Delhi, Delhi-110092

Subject: Grant of "Consent to Establish"(NOC) for an industrial unit u/s 25 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981.

With reference to your application for obtaining fresh 'Consent to Establish'(NOC) an industrial plant u/s 25 of Water (Prevention & Control of Pollution) Act, 1974 and u/s 21 of Air (Prevention & Control of Pollution) Act, 1981, you are, hereby, permitted to establish the industrial unit to discharge the effluent(s) & emission(s) arising out of your premises subject to the Terms and Conditions as specified in this Certificate.

1. Particulars of Consent to Establish (NOC) granted to the Industry

Certificate No.	CTE/Fresh/BTI/2021/14320137
Date of issue :	04/01/2021
Date of expiry :	31/12/2021
Certificate Type :	Fresh

2. Particulars of the Industry

Name & Designation of the Applicant	Sanjay Kumar, (Cheif Manager Bio Fuels)
Address of Industrial premises	Hindustan Petroleum Corporation Limited, Vill - Nasibpura, taluka - Talwandi Sabo, Distt - Bathinda, Talwandi Sabo, Bathinda-151001
Capital Investment of the Industry	109625.0 lakhs
Category of Industry	Red
Type of Industry	1060-Distillery (molasses / grain / yeast based)
Scale of the Industry	Large
Office District	Bathinda
Consent Fee Details	Rs. 10,80,000/- vide R.No. 362293229 dt. 14.12.2020.
Raw Materials (Name with quantity per day)	<ul style="list-style-type: none">• Bio-mass @ 500 TPD.• Yeast @ .05 TPD• Acid @ 10 TPD• Enzymes @ 3.5 TPD• Nutrients @ 4 TPD• Chemicals @ 23 TPD

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Products (Name with quantity per day)	<i>Ethanol @ 100 KLD</i>
By-Products, if any,(Name with quantity per day)	<ul style="list-style-type: none"> • <i>CO2 @ 75 TPD.</i> • <i>Fuel Oil @ 0.3 TPD.</i> • <i>Technical Alcohol @ 2.0 TPD.</i> • <i>Ash @ 125 TPD.</i>
Details of the machinery and processes	<i>2G ethanol generation from lingo-cellulosic biomass</i>
Details of the Effluent Treatment Plant	<ul style="list-style-type: none"> • <i>Stream I – Trade Effluent @ 512 KLD to be generated from boiler blow down, DM plant and cooling tower blow down will be treated through reverse osmosis followed by MEE treatment. The treated effluent will be utilized as cooling tower makeup water.</i> • <i>Stream II – Effluent generated from process condensate is proposed to be treated through anaerobic followed by aerobic biological process and thereafter the effluent will be utilized as utility makeup water.</i> • <i>Domestic Effluent @ 10 KLD to be treated in the sewage treatment plant based on MBR technology.</i>
Mode of Disposal of Effluent	<ul style="list-style-type: none"> • <i>Trade Effluent – It has been proposed to achieve Zero Liquid discharge.</i> • <i>Domestic Effluent @ 10 KLD – discharged onto land for plantation after treatment in the STP.</i>
Standards to be achieved under Water (Prevention & Control of Pollution) Act, 1974	<i>As prescribed by the PPCB/CPCB/MOEF.</i>
Sources of emissions and type of pollutants	<ul style="list-style-type: none"> • <i>Two boilers of capacity 42 TPH each has been proposed.</i> • <i>Two DG sets of capacity 2000 KVA each has been proposed.</i>
Mode of disposal of emissions with stack height	<ul style="list-style-type: none"> • <i>Separate stacks of adequate height have been proposed with boiler furnaces.</i> • <i>Separate stacks of adequate height have been proposed with DG sets.</i>
Quantity of fuel required in TPD	<ul style="list-style-type: none"> • <i>Paddy Straw / Wet Cake as fuel proposed to be used in both the boilers of capacity 42 TPH each.</i> • <i>HSD for DG sets.</i>
Type of Air Pollution Control Devices to be installed	<ul style="list-style-type: none"> • <i>Separate Electrostatic Precipitators (ESP) as APCD with both the boilers of capacity 42 TPH each.</i> • <i>Separate Canopies with both the DG sets of capacity 2000 KVA each.</i>
Standards to be achieved under Air (Prevention & Control of Pollution) Act, 1981	<i>As prescribed by the PPCB/CPCB/MOEF.</i>

04/01/2021

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(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)

Endst. No.:

Dated:

A copy of the above is forwarded to the following for information and necessary action please:

Environmental Engineer, Punjab Pollution Control Board, Regional Office, Bathinda.



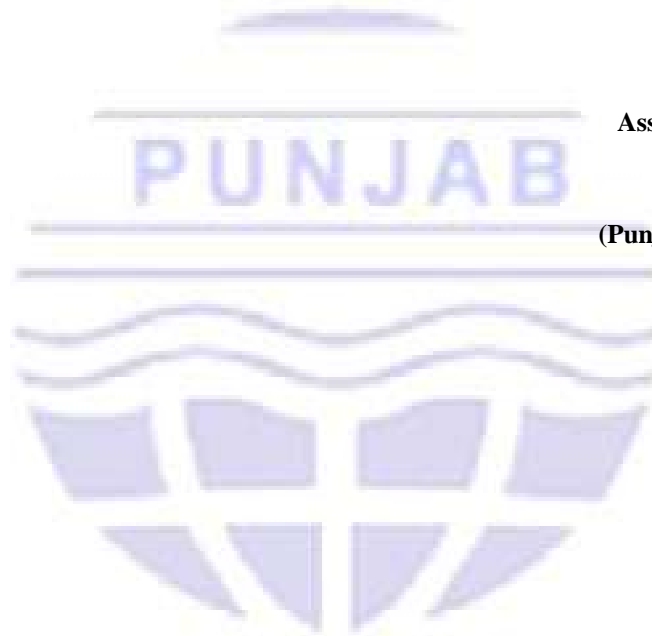
04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)



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A. GENERAL CONDITIONS

1. The industry shall apply for consent of the Board as required under the provision of Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Pollution) Act, 1981 & Authorization under Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016, two months before the commissioning of the industry.
2. The industry shall provide adequate arrangements for fighting the accidental leakages/ discharge of any air pollutant/gas/liquids from the vessels, mechanical equipments etc. which are likely to cause environmental pollution.
3. The Industry shall apply for further extension in the validity of the CTE atleast two months before the expiry of this CTE, if applicable.
4. The industry shall comply with any other conditions laid down or directions issued by the Board under the provisions of the Water (Prevention & Control of Pollution) Act, 1974 and the Air (Prevention & Control of Pollution) Act,1981 from time to time.
5. The project has been approved by the Board from pollution angle and the industry shall obtain the approval of site from other concerned departments, if need be.
6. The industry shall get its building plans approved under the provisions of section 3-A of Punjab Factory Rules, 1952.
7. The industry shall put up display board indicating the Environment data in the prescribed format at the main entrance gate.
8. The industry shall provide port-holes, platforms and/or other necessary facilities as may be required for collecting samples of emissions from any chimney, flue or duct or any other outlets.

Specifications of the port-holes shall be as under:-

- i) The sampling ports shall be provided atleast 8 times chimney diameter downstream and 2 times upstream from the flow disturbance. For a rectangular cross section the equivalent diameter (D_e) shall be calculated from the following equation to determine upstream, downstream distance:-
$$D_e = 2 LW / (L+W)$$

Where L= length in mts. W= Width in mts.
 - ii) The sampling port shall be 7 to 10 cm in diameter
9. The industry shall discharge all gases through a stack of minimum height as specified in the following standards laid down by the Board.

(i) Stack height for boiler plants

S.NO.	Boiler with Steam Generating Capacity	Stack heights
1.	Less than 2 ton/hr.	9 meters or 2.5 times the height of neighboring building whichever is more
2.	More than 2 ton/hr. to 5 ton/hr.	12 meters
3.	More than 5 ton/hr. to 10 ton/hr	15 meters
4.	More than 10 ton/hr. to 15 ton/hr	18 meters
5.	More than 15 ton/hr. to 20 ton/hr	21 meters
6.	More than 20 ton/hr. to 25 ton/hr.	24 meters
7.	More than 25 ton/hr. to 30 ton/hr.	27 meters
8.	More than 30 ton/hr.	30 meters or using the formula $H = 14 Q_g^{0.3}$ or $H = 74 (Q_p)^{0.24}$ Where Q_g = Quantity of SO ₂ in Kg/hr. Q_p = Quantity of particulate matter in Ton/day.

Note : Minimum Stack height in all cases shall be 9.0 mtr. or as calculated from relevant formula whichever is more.

(ii) For industrial furnaces and kilns, the criteria for selection of stack height would be based on fuel used for the corresponding steam generation.

(iii) Stack height for diesel generating sets:

Capacity of diesel generating set	Height of the Stack	
0-50 KVA	Height of the building	+ 1.5 mt
50-100 KVA	-do-	+ 2.0 mt.
100-150 KVA	-do-	+ 2.5 mt.
150-200 KVA	-do-	+ 3.0 mt.
200-250 KVA	-do-	+ 3.5 mt.
250-300 KVA	-do-	+ 3.5 mt.

For higher KVA rating stack height H (in meter) shall be worked out according to the formula:

$$H = h + 0.2 (KVA)^{0.5}$$

where h = height of the building in meters where the generator set is installed.

10. The industry shall put up canopy on its DG sets and also provide stack of adequate height as per norms prescribed by the Board and shall ensure the compliance of instructions issued by the Board vide office order no. Admin./SA-2/F.No.783/2011/448 dated 8/6/2010.
11. The industry shall put up canopy on its DG sets and also provide stack of adequate height as per norms prescribed by the Board and shall ensure the compliance of instructions issued by the Board vide office order no. Admin./SA-2/F.No.783/2011/448 dated 8/6/2010.
 - (i) Once in Year for Small Scale Industries.
 - (ii) Four in a Year for Large/Medium Scale Industries.
 - (iii) The industry will submit monthly reading/ data of the separate energy meter installed for running of effluent treatment plant/re-circulation system to the concerned Regional Office of the Board by the 5th of the following month.
12. The industry shall provide flow meters at the source of water supply, at the outlet of effluent treatment plant and shall maintain the record of the daily reading and submit the same to the concerned Regional Office by the 5th day of the following month.
13. The industry shall make necessary arrangements for the monitoring of stack emissions and shall get its emissions analyzed from lab approved / authorized by the Board:-
 - (i) Once in Year for Small Scale Industries.
 - (ii) Twice/thrice/four time in a Year for Large/Medium Scale Industries.
14. The pollution control devices shall be interlocked with the manufacturing process of the industry.
15. The Board reserves the right to revoke this "consent to establish" (NOC) at any time, in case the industry is found violating any of the conditions of this "consent to establish" and/or the provisions of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 as amended from time to time.
16. The industry shall plant minimum of three suitable varieties of trees at the density of not less than 1000 trees per acre along the boundary of the industrial premises.
17. The issuance of this consent does not convey any property right in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or Local Laws or Regulations.
18. The consent does not authorize or approve the construction of any physical structures or facilities for undertaking of any work in any natural watercourse.
19. Nothing in this NOC shall be deemed to neither preclude the institution of any legal action nor relieve the applicant from any responsibilities, liabilities or penalties to which the applicant is or may be subjected under this or any other Act.
20. The diversion or bye pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this consent is prohibited except.
 - (i) Where unavoidable to prevent loss of life or some property damage or
 - (ii) Where excessive storm drainage or run off would damage facilities necessary for compliance with terms and conditions of this consent. The applicant shall immediately notify the consent issuing authority in writing of each such diversion or bye-pass.
21. The industry shall ensure that no water pollution problem is created in the area due to discharge of effluents from its industrial premises.

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22. The industry shall comply with the conditions imposed if any by the SEIAA/MOEF in the Environmental Clearance granted to it as required under EIA notification dated 14/9/06, if applicable.
23. The industry shall earmark a land within their premises for disposal of boiler ash in an environmentally sound manner, and / or the industry shall make necessary arrangements for proper disposal of fuel ash in a scientific manner and shall maintain proper record for the same, if applicable.
24. The industry shall obtain and submit Insurance cover as required under the Public Liability Insurance Act, 1991.
25. The industry shall submit a site emergency plan approved by the Chief Inspector of Factories, Punjab as applicable.
26. The industry shall provide proper and adequate air pollution control arrangements for control emission from its coal/fuel handling area, if applicable.
27. The Industry shall comply with the code of practice as notified by the Government / Board for the type of Industries where the siting guidelines / code of practice have been notified
28. Solids, sludge, filter backwash or other pollutant removed from or resulting from treatment or control of waste waters shall be disposed off in such a manner so as to prevent any pollutants from such materials from entering into natural water.
29. The industry shall submit a detailed plan showing therein, the distribution system for conveying waste-waters for application on land for irrigation along with the crop pattern to be adopted throughout the year.
30. The industry shall not irrigate the vegetable crops with the treated effluents which are used/ consumed as raw.
31. The industry shall ensure that its production capacity & quantity of trade effluent do not exceed the quantity mentioned in the NOC and shall not carry out any expansion without the prior permission/NOC of the Board.
32. All amendments/revisions made by the Board in the emission/stack height standards shall be applicable to the industry from the date of such amendments/revisions.
33. The industry shall not cause any nuisance/traffic hazard in vicinity of the area.
34. The industry shall maintain the following record to the satisfaction of the Board :-
 - (i) Log books for running of air pollution control devices or pumps/motors used for it.
 - (ii) Register showing the result of various tests conducted by the industry for monitoring of stack emissions and ambient air.
 - (iii) Register showing the stock of absorbents and other chemicals to be used for scrubbers.
35. The industry shall ensure that there will not be significant visible dust emissions beyond the property line.
36. The industry shall establish sufficient number of piezometer wells in consultation with the concerned Regional Office, of the Board to monitor the impact on the Ground Water Quantity due to the industrial operations, if applicable.
37. The industry shall provide adequate and appropriate air pollution control devices to contain emissions from handling, transportation and processing of raw material & product of the industry



04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer
For & on behalf
of
(Punjab Pollution Control Board)

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B. SPECIAL CONDITIONS

1. The industry shall comply with the conditions of the Environmental Clearance granted to it from MoEF vide F.No. J-11011/221/2017-IA II (I) dated 14.08.2018 & further amendment issued vide letter dated 23.09.2020.
2. The industry will ensure to achieve zero liquid discharge and it shall be further ensured that no waste / treated water is discharged, without prior permission of the Board.
3. The industry shall develop thick green belt all along the boundary wall covering 33% of the total project area as per the karnal technology in compliance to the conditions of the Environmental Clearance.
4. The industry shall manage and transport the fuel ash to be generated from its boilers in a scientific manner.
5. The industry will install pollution control devices as proposed simultaneously with the commissioning of the main project.



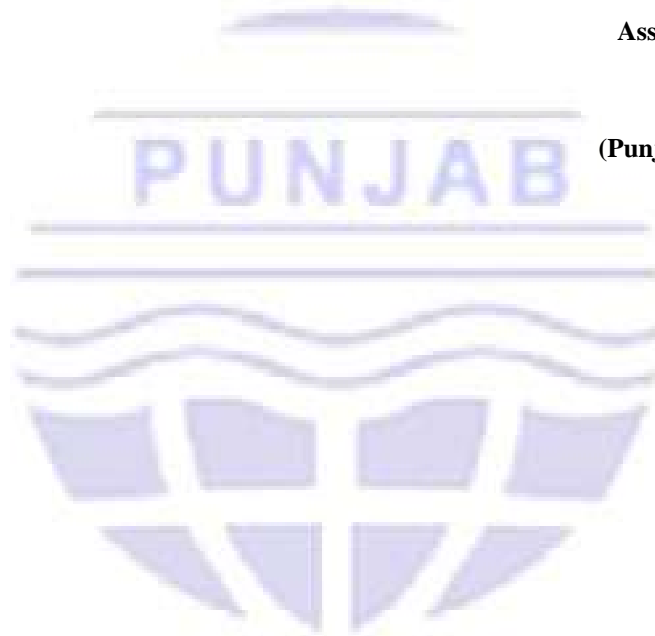
04/01/2021

(Ruby Sidhu)
Asstt Environmental Engineer

For & on behalf

of

(Punjab Pollution Control Board)





Test Report

Sample Number:	VEL/HPCL/A/01	Report No.:	VEL/A/2212150001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°05'46.90" N	Party Reference No.:	NIL
Longitude:	75°01'00.75" E	Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Near Project Site
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/06
Calibrated
Clear Sky
09/12/2022 to 10/12/2022
09:30 AM to 09:30 AM
Min. 14.0°C, Max. 28.0°C
Human, Vehicular, & Other Plant Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	56.86	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	90.76	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	24.76	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.72	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.74	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	460
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	14.52	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :-¹@ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

²SOP- Laboratory Standard Operating Procedure, ³BLQ- Below Limit of Quantification, ⁴LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A02
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
 Latitude: 30°07'94.18" N
 Longitude: 75°00'18.46" E

Report No.: VEL/A/2212150002
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Nasibpura
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/08
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 09/12/2022 to 10/12/2022
 Time of Monitoring : 10:00 AM to 10:00 AM
 Ambient Temperature (°C) : Min. 14.0°C, Max. 28.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [*] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	47.68	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.16	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	21.40	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.23	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.66	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	17.11	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppmv(v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (10)], [Part-II-sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A/03
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
 Latitude: 30°10'20.00" N
 Longitude: 75°00'70.00" E

Report No.: VEL/A/2112150003
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Kot Shamir
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/07
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 09/12/2022 to 10/12/2022
 Time of Monitoring : 10:30 AM to 10:30 AM
 Ambient Temperature (°C) : Min. 14.0°C, Max. 28.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	40.92	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.36	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	18.44	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.07	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.75	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	20.71	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 1 (3)(i)], [Part-II sec.-3(i)]18.11.2009.

*SOP- Laboratory Standard Operating Procedure. **BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number:	VEL/HPCL/A/04	Report No.:	VEL/A/2212150004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°03'57.98" N	Party Reference No.:	NIL
Longitude:	75°03'55.26" E	Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Chathewala
Instrument Used	: RDS & FPS Sampler with all Accessories
Instrument Code	: VEL/RDS/FPS/12
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 09/12/2022 to 10/12/2022
Time of Monitoring	: 11:00 AM to 11:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 28.0°C
Surrounding Activity	: Human & Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ² Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	40.25	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	76.68	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	22.47	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	7.94	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.76	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benz(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	18.62	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- (i) NAAQS - National Ambient Air Quality Standards; Schedule-VII, (Rule 3 (3B)), (Part-II-sec.3(1))18.11.2009.

(ii) SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number:	VEL/HPCL/A/05	Report No.:	VEL/A/2212150005
Name & Address of the Project:	M/S Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°05'49.86" N	Party Reference No.:	NIL
Longitude:	75°04'11.98" E	Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Ket Bharn
Instrument Used	: RDS & FPS Sampler with all Accessories
Instrument Code	: VEL/RDS/FPS/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 10/12/2022 to 11/12/2022
Time of Monitoring	: 11:45 AM to 11:45 AM
Ambient Temperature (°C)	: Min. 14.0 C, Max. 29.0 C
Surrounding Activity	: Human & Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	32.05	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.36	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	26.24	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.33	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDHR Method	0.69	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	19.25	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppmv(v/v)	--

Note :- (1) NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]18.11.2009.

(2) SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasāhpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°06'48.46" N
Longitude: 75°04'40.18" E

Report No.: VEL/A/2212150006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Kot Fatta
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 10/12/2022 to 11/12/2022
Time of Monitoring : 12:30 PM to 12:30 PM
Ambient Temperature (°C) : Min. 14.0°C, Max. 29.0°C
Surrounding Activity : Human & Vehicular, & Other Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	42.36	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	79.06	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	20.80	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.86	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.68	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	19.54	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	-
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	-

Note :- (1) NAAQS - National Ambient Air Quality Standards; Schedule-VII, (Rule 3 (3B)), (Part-II-sec.-3(i))18.11.2009.

(2) SCIP - Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A/07
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
 Sabo, Bathinda, Punjab
 Latitude: 30°04'18.29" N
 Longitude: 75°01'40.48" E

Report No.: VEL/A/2212150007
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Jiwan Singh Wala
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/07
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 10/12/2022 to 11/12/2022
 Time of Monitoring : 10:00 AM to 10:00 AM
 Ambient Temperature (°C) : Min. 14.0 C, Max. 29.0 C
 Surrounding Activity : Humn & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	45.26	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	86.08	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	20.76	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.08	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.74	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	16.34	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppmv(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3] (3B)], [Part-II-sec-3(i)](18.11.2009).

¹SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A/08
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd., Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
 Latitude: 30°20'45.12" N
 Longitude: 75°53'07.00" E

Report No.: VEL/A/2212150008
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Manwala
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/12
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 11/12/2022 to 12/12/2022
 Time of Monitoring : 11:10 AM to 11:10 AM
 Ambient Temperature (°C) : Min. 13.0°C, Max. 26.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [*] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	48.78	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	81.00	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	22.08	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.34	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.76	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	24.70	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	-
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	-

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 5 (3B)], [Part-II-sec. 3(i)]18.11.2009.

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Test Report

Sample Number: VEL/HPCL/A/09
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
 Latitude: 30°02'56.92" N
 Longitude: 75°06'43.06" E

Report No.: VEL/A/2212150009
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Baghi Bandar
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/08
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 11/12/2022 to 12/12/2022
 Time of Monitoring : 11:45 AM to 11:45 AM
 Ambient Temperature (°C) : Min. 13.0°C, Max. 26.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	41.35	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.38	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	24.67	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	10.42	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.75	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	19.51	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- (i) NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)(18.1.1.2009]

(ii) SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number:	VEL/HPCL/A/10	Report No.:	VEL/A/2212150010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
Latitude:	29°59'49.83" N	Party Reference No.:	NIL
Longitude:	75°01'15.53" E	Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Leleona
Instrument Used	: RDS & FPS Sampler with all Accessories
Instrument Code	: VEL/RDS/FPS/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 11/12/2022 to 12/12/2022
Time of Monitoring	: 10:00 AM to 10:00 AM
Ambient Temperature (°C)	: Min. 13.0°C, Max. 26.0°C
Surrounding Activity	: Human & Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	42.86	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	69.42	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	26.70	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	9.05	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.64	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	19.72	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards; Schedule-VII, (Rule 3 (30)) (Part-II-sec.-3(i))18.11.2009.

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Test Report

Sample Number:	VEL/HPCL/A/11	Report No.:	VEL/A/2212150011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bahinda, Punjab	Format No.:	7.8 F-03
Latitude:	30°02'31.98" N	Party Reference No.:	NIL
Longitude:	75°01'62.80" E	Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Mahi Nangal
Instrument Used	: RDS & FPS Sampler with all Accessories
Instrument Code	: VEL/RDS/FPS/12
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 10/12/2022 to 11/12/2022
Time of Monitoring	: 10:45 AM to 10:45 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 29.0°C
Surrounding Activity	: Human & Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No
Sampling & Analysis Protocol	: IS-5182 & CPCB Guideline
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	31.52	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	70.80	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	18.34	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	9.45	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.86	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benz(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	20.71	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note 1:- NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (2)(i)] [Part-II-sec.-3(e)] 18.11.2009

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Test Report

Sample Number: VEL/HPCL/A/12
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
 Sabo, Bathinda, Punjab
 Latitude: 30°08'21.78" N
 Longitude: 75°57'44.11" E

Report No.: VEL/A/2212150012
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 19/12/2022
 Period of Analysis: 15/12/2022 to 19/12/2022
 Receipt Date: 15/12/2022

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Gehri Bhagi
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/07
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Clear Sky
 Date of Monitoring : 11/12/2022 to 12/12/2022
 Time of Monitoring : 11:30 AM to 11:30 AM
 Ambient Temperature (°C) : Min. 13.0°C, Max. 26.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	31.05	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.36	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	20.16	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	10.76	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.82	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	23.36	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-20)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note 1:-@ NAAQS - National Ambient Air Quality Standards; Schedule-VII [Rule 3 (3B)], [Part-II-sec-3(i)](18.11.2009).

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/01	Report No.:	VEL/N/2212150006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Near Project Site
Latitude:	: 30°05'46.90" N
Longitude:	: 75°01'00.75" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 09/12/2022 to 10/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 28.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	73.8	65.1	dB(A)
2.	L _{min}	IS 9989	51.2	41.8	dB(A)
3.	L _{eq}	IS 9989	58.76	47.06	dB(A)
4.	CPCB Limits in dB(A) Leq (Industrial Area)	-	75.00	70.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/02	Report No.:	VEL/N/2212150007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Saho, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Nasibpura
Latitude:	: 30°07'94.18" N
Longitude:	: 75°00'18.46" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 09/12/2022 to 10/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 28.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB(A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	56.2	47.4	dB(A)
2.	L _{min}	IS 9989	42.9	35.1	dB(A)
3.	L _{eq}	IS 9989	52.06	40.52	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/03	Report No.:	VEL/N/2212150008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Shamir
Latitude:	: 30°10'29.00" N
Longitude:	: 75°00'79.00" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/08
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 09/12/2022 to 10/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 28.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	54.8	45.8	dB(A)
2.	L_{min}	IS 9989	39.6	33.2	dB(A)
3.	L_{eq}	IS 9989	46.52	39.46	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2212150009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Bhara
Latitude:	30°05'49.86" N
Longitude:	75°04'11.98" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/09
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 10/12/2022 to 11/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 29.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	52.6	42.6	dB(A)
2.	L _{min}	IS 9989	35.8	31.0	dB(A)
3.	L _{eq}	IS 9989	43.51	37.06	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/05	Report No.:	VEL/N/2212150010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Fatta
Latitude:	: 30°06'48.46" N
Longitude:	: 75°04'40.18" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 10/12/2022 to 11/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 29.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB(A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	53.4	43.2	dB(A)
2.	L_{min}	IS 9989	32.5	33.6	dB(A)
3.	L_{eq}	IS 9989	45.18	40.82	dB(A)
4.	CPCB Limits in dB(A) ¹ Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2212150011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Chathewala
Latitude: 30°03'57.98" N
Longitude: 75°03'55.26" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/10
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 09/12/2022 to 10/12/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 14.0°C, Max. 28.0°C
Surrounding Activity : Human, Vehicular, & Other Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	53.6	42.1	dB(A)
2.	L_{min}	IS 9989	32.5	32.5	dB(A)
3.	L_{eq}	IS 9989	44.29	38.76	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	*	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2212150012
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Manwala
Latitude:	30°20'45.12" N
Longitude:	75°53'07.00" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 11/12/2022 to 12/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 13.0°C, Max. 26.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	53.4	46.2	dB(A)
2.	L _{min}	IS 9989	32.5	34.6	dB(A)
3.	L _{eq}	IS 9989	47.18	41.70	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/08	Report No.:	VEL/N/212150013
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NH.
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Baghi Bandar
Latitude:	: 30°02'56.92" N
Longitude:	: 75°06'43.06" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/08
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 11/12/2022 to 12/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min, 13.0°C, Max, 26.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB(A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	53.1	48.2	dB(A)
2.	L _{min}	IS 9989	34.8	35.4	dB(A)
3.	L _{eq}	IS 9989	47.25	42.84	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2212150014
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Jivan Singh Wala
Latitude:	30°04'18.29" N
Longitude:	75°01'40.48" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 10/12/2022 to 11/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 29.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	54.8	44.6	dB(A)
2.	L_{min}	IS 9989	35.2	29.1	dB(A)
3.	L_{eq}	IS 9989	44.54	32.84	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: *A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/N/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2212150015
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Receipt Date: 15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Mahi Nangal
Latitude: 30°02'31.98" N
Longitude: 75°01'62.80" E
Instrument Used : Sound Level Meter
Instrument Code : VEL/S/SLM/08
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 10/12/2022 to 11/12/2022
Time of Monitoring : 06:00 AM to 06:00 AM
Ambient Temperature (°C) : Min. 14.0°C, Max. 29.0°C
Surrounding Activity : Human, Vehicular, & Other Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No any
Sampling & Analysis Protocol : IS-9989 R-2014 & CPCB Guideline
Sampling Duration : 24 Hours
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	52.1	43.5	dB(A)
2.	L_{min}	IS 9989	35.1	34.8	dB(A)
3.	L_{eq}	IS 9989	43.28	40.26	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: "A" "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/11	Report No.:	VEL/N/2212150016
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasihpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Leleana
Latitude:	: 29°50'49.83" N
Longitude:	: 75°01'15.53" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 11/12/2022 to 12/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 14.0°C, Max. 26.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	53.4	43.8	dB(A)
2.	L_{min}	IS 9989	39.0	31.2	dB(A)
3.	L_{eq}	IS 9989	46.72	39.49	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/12	Report No.:	VEL/N/2212150017
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Receipt Date:	15/12/2022

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Gehri Bhagi
Latitude:	: 30°08'21.78" N
Longitude:	: 75°57'44.11" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/12
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 11/12/2022 to 12/12/2022
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 13.0°C, Max. 26.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	56.2	42.6	dB(A)
2.	L_{min}	IS 9989	40.1	34.1	dB(A)
3.	L_{eq}	IS 9989	52.28	36.45	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 09/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Near Project Site
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.42	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	284.31	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	78.54	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	260.40	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	64.16	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.03	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	21.47	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	560.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	25.15	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.71	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.28	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.20	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/01			Report No.: VEL/GW/2212150006			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.37	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	928	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	18.2	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.1	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

**Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.5 in Feb. 2021 (Limit of Mineral Oil).



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Test Report

Sample Number: VEL/HPCL/GW/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 09/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Nasibpura
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-1)	7.86	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	218.24	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	74.82	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	221.28	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	56.64	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	7.67	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	528.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	31.28	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.65	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	4.06	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/02			Report No.: VEL/GW/2212150007			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.31	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	880	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	34.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

†Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Test Report

Sample Number: VEL/HPCL/GW/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 09/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Kot Shamiir
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.36	—	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	—	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	—	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	254.21	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	72.84	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	219.27	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	69.35	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	17.61	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	718.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	52.06	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.48	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part-34)	6.23	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/03				Report No.: VEL/GW/2212150008		
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.42	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1135	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	38.4	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

¹Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & S method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VELHPCL/GW/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 11/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Baghi Bandar
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.21	-	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	142.48	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	90.80	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	271.00	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	78.24	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	28.17	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	647.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	52.84	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.76	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	6.28	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/04					Report No.: VEL/GW/21215009	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.52	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1038	µS/cm	—	—
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	24.2	mg/L	—	—
34.	Potassium	IS 3025 (P-45)	2.6	mg/L	—	—
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	—	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

†Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 11/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Maanwala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.24	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ/LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ/LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	228.34	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	76.28	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	182.45	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	61.52	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ/LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	9.24	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	516.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	52.91	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.32	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.14	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.16	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ/LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ/LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ/LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/05				Report No.: VEL/GW/2212150010		
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.31	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	816	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	32.0	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.3	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

*Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2212150011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 10/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Jivan Singh Wala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	8.04	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	198.26	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	52.73	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	173.60	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	45.28	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.20	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	407.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	12.34	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.72	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.18	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/06			Report No.: VEL/GW/2212150011			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS-10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	640	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	10.8	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.4	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

¹ Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Test Report

Sample Number: VEL/HPCL/W/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/GW/2112150012
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 10/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Mahi Nangal
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.76	-	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	-	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	-	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	181.25	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	45.36	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	184.76	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	42.35	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.60	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	473.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	29.24	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.61	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	3.92	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/CP/W-01, Issue No.-01, 01/11/21	0.09	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/CP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/CP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/CP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/W07			Report No.: VEL/GW/2112/50012			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.18	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	740	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	25.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

**Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Test Report

Sample Number: VEL/HPCL/SW/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/SW/2212150001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 09/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Surface Water Sample
Sample Location: Chathewala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.42	--
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	12.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	--
5.	Taste	IS 3025 (P-8)	NR	--
6.	Chloride (as Cl)	IS 3025 (P-32)	73.41	mg/L
7.	Conductivity	IS 3025 (P-14)	679	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34)	16.24	mg/L
9.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L
10.	Total Dissolved Solids	IS 3025 (P-16)	409.00	mg/L
11.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.22	mg/L
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	12.91	mg/L
14.	Fluoride (as F)	APHA 4500 F D	0.62	mg/L
15.	BOD (3 Days at 27°C)	IS 3025 (P-44)	4.25	mg/L
16.	COD	IS 3025 (P-58)	25.34	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	9.25	mg/L
18.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
19.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	151.00	mg/L
20.	Calcium (as Ca)	IS 3025 (P-40)	41.86	mg/L
21.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	168.24	mg/L
22.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	11.31	mg/L
23.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.28	mg/L
24.	Sodium (as Na)	IS 3025 (P-45)	52.81	mg/L
25.	Potassium (as K)	IS 3025 (P-45)	6.1	mg/L
26.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Coliform	IS 15185:2016	Absent	Per 100ml

Note:- BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.



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Test Report

Sample Number: VEL/HPCL/SW/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpara, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/SW/2212150002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 19/12/2022
Period of Analysis: 15/12/2022 to 19/12/2022
Receipt Date: 15/12/2022
Sampling Date: 10/12/2022
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Surface Water Sample
Sample Location: Kot Fatta
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.21	—
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	23.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	—
5.	Taste	IS 3025 (P-8)	NR	—
6.	Chloride (as Cl)	IS 3025 (P-32)	51.26	mg/L
7.	Conductivity	IS 3025 (P-14)	826	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34)	5.44	mg/L
9.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L
10.	Total Dissolved Solids	IS 3025 (P-16)	527.00	mg/L
11.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.21	mg/L
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	26.84	mg/L
14.	Fluoride (as F)	APHA 4500 F D	0.42	mg/L
15.	BOD (3 Days at 27°C)	IS 3025 (P-44)	3.92	mg/L
16.	COD	IS 3025 (P-58)	20.15	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	6.24	mg/L
18.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
19.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	158.34	mg/L
20.	Calcium (as Ca)	IS 3025 (P-40)	58.31	mg/L
21.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	182.24	mg/L
22.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	3.12	mg/L
23.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.06	mg/L
24.	Sodium (as Na)	IS 3025 (P-45)	42.1	mg/L
25.	Potassium (as K)	IS 3025 (P-45)	1.0	mg/L
26.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Coliform	IS 15185:2016	Absent	Per 100ml

Note: BLQ - Below Limit of Quantification, *LOQ - Limit of Quantification, **NR - Not Reported.



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Test Report

Sample Number:	VEL/HPCL/S001	Report No.:	VEL/S0/2212150001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	09/12/2022
Sample Location:	Near Project Site	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	6.94	--
2.	Conductivity	IS 14767	0.318	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	25.42	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.38	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	42.51	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	21.33	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	26.18	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	98.47	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.84	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	18.35	%
14.	Available Nitrogen (as N)	IS:14684	152.48	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	12.65	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.29	%
17.	Organic Carbon	IS 2720 (P-22)	0.47	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.51	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.18	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	10.41	%

Note- SOI Standard Operating Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S002	Report No.:	VEL/S0/2212150002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	09/12/2022
Sample Location:	Nasibpura	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	6.51	--
2.	Conductivity	IS 14767	0.362	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	45.10	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.39	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.26	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	60.52	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	51.24	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	122.46	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.19	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.62	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.62	%
14.	Available Nitrogen (as N)	IS:14684	248.13	kg/hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	24.51	kg/hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	20.35	%
17.	Organic Carbon	IS 2720 (P-22)	0.48	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.75	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.35	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.92	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.46	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	12.44	%

Note: Soil Sample Operating Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/93	Report No.:	VEL/S0/2212150003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	09/12/2022
Sample Location:	Kot Shamir	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	8.25	--
2.	Conductivity	IS 14767	0.354	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.62	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.59	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	51.18	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	30.46	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	41.29	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	139.84	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.76	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.56	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.23	%
14.	Available Nitrogen (as N)	IS:14634	240.72	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	27.87	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	11.27	%
17.	Organic Carbon	IS 2720 (P-22)	0.45	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.76	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.58	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.86	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.28	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.23	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	20.06	%

Note: SOP - Standard Operating Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/04	Report No.:	VEL/S0/2212150004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	10/12/2022
Sample Location:	Kot Bhara	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.96	--
2.	Conductivity	IS 14767	0.379	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	34.25	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.51	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	35.64	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	47.86	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	51.26	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	138.08	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.69	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.51	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	28.62	%
14.	Available Nitrogen (as N)	IS:14684	219.28	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.47	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.76	%
17.	Organic Carbon	IS 2720 (P-22)	0.37	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.52	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.74	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.0	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.78	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.80	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	17.06	%

Note- SOP- Standard Operating Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/05	Report No.:	VEL/S0/2212150005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	09/12/2022
Sample Location:	Chathewala	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	8.27	-
2.	Conductivity	IS 14767	0.344	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	18.51	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.23	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	49.25	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.51	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	40.32	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	84.27	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.15	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.64	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.37	%
14.	Available Nitrogen (as N)	IS:14684	198.70	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	18.22	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.25	%
17.	Organic Carbon	IS 2720 (P-22)	0.38	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.73	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.74	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	4.28	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.15	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	17.40	%

Note- SOP followed Operating Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/06	Report No.:	VEL/S0/22/12150006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabe, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	10/12/2022
Sample Location:	Kot Fatta	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.62	--
2.	Conductivity	IS 14767	0.326	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	21.35	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.20	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.18	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	52.28	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	39.41	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	116.27	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.51	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	18.26	%
14.	Available Nitrogen (as N)	IS:14684	202.40	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	10.25	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	5.94	%
17.	Organic Carbon	IS 2720 (P-22)	0.32	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.65	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.54	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.42	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.51	%

Note- SOP: Standard Operating Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/07	Report No.:	VEL/S0/2212150007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	11/12/2022
Sample Location:	Baghi Bandar	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.62	-
2.	Conductivity	IS 14767	0.318	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brown	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	36.52	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.34	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	50.45	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	42.18	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	77.80	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	154.23	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.62	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.78	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	35.22	%
14.	Available Nitrogen (as N)	IS:14684	251.35	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	26.42	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	14.54	%
17.	Organic Carbon	IS 2720 (P-22)	0.54	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.58	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.72	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.13	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	18.22	%

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/08	Report No.:	VEL/S0/2212150008
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	11/12/2022
Sample Location:	Manwala	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.24	-
2.	Conductivity	IS 14767	0.324	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	36.28	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.32	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	42.81	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	51.46	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.52	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	151.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.72	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.18	%
14.	Available Nitrogen (as N)	IS:14684	251.27	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	15.34	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.18	%
17.	Organic Carbon	IS 2720 (P-22)	0.42	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.56	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.36	%

Note- SOP: Standard Operating Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/09	Report No.:	VEL/S0/2212150009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	10/12/2022
Sample Location:	Jiwan Singh Wala	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.45	-
2.	Conductivity	IS 14767	0.314	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	26.54	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.32	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	45.28	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	37.19	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	40.34	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.51	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.45	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.81	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	20.50	%
14.	Available Nitrogen (as N)	IS: 14684	238.06	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	14.21	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.04	%
17.	Organic Carbon	IS 2720 (P-22)	0.76	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.56	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.37	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.42	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.28	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	11.24	%

Note: SOP: Sampling Operating Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/10	Report No.:	VEL/S0/212150010
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Tahwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	11/12/2022
Sample Location:	Gehri Bhagi	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.36	--
2.	Conductivity	IS 14767	0.304	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	35.42	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.79	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	51.24	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	38.41	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	52.18	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.72	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.62	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.76	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.61	%
14.	Available Nitrogen (as N)	IS:14684	241.42	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	21.51	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.28	%
17.	Organic Carbon	IS 2720 (P-22)	0.61	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.68	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.72	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.25	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	25.28	%

Note- Soil is analyzed as per Standard Operating Procedure.



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Test Report

Sample Number:
Name & Address of the Project:

VEL/HPCL/S0/11
M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasihpura, Tehsil-Talwandi
Sabu, Bathinda, Punjab

Sample Description:
Sample Location:
Sample Collected By:
Sampling & Analysis Protocol:

Soil Sample
Mahl Nangal
Vardan EnviroLab Representative
IS 2720, USEPA 3050B & USDA

Report No.:
Format No.:
Party Reference No.:
Reporting Date:
Period of Analysis:
Receipt Date:
Sampling Date:
Sampling Type:
Sample Quantity:
Packing Status:

VEL/S0/22/12150011
7.8 F-03
NIL
19/12/2022
15/12/2022 to 19/12/2022
15/12/2022
10/12/2022
Composite
2.0 Kg
Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.46	-
2.	Conductivity	IS 14767	0.346	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.51	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.47	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	52.10	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	41.62	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	58.91	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	128.36	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.75	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.62	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	28.45	%
14.	Available Nitrogen (as N)	IS:14684	227.11	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.38	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.21	%
17.	Organic Carbon	IS 2720 (P-22)	0.54	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.63	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.08	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.31	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.67	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.25	%

Note: SOP- Standard Operating Procedures.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCLS012	Report No.:	VEL/S0/2212150012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sahi, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	19/12/2022
		Period of Analysis:	15/12/2022 to 19/12/2022
		Receipt Date:	15/12/2022
Sample Description:	Soil Sample	Sampling Date:	11/12/2022
Sample Location:	Lalana	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.52	--
2.	Conductivity	IS 14767	0.364	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	25.31	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.45	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	71.62	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	48.24	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	41.34	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	157.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.34	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.82	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	31.45	%
14.	Available Nitrogen (as N)	IS: 14684	241.62	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	25.28	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.19	%
17.	Organic Carbon	IS 2720 (P-22)	0.62	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.94	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.75	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.72	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.82	%

Note: As per Standard Operating Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCLA/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Sabo, Bathinda, Punjab
Latitude: 30°05'46.90" N
Longitude: 75°01'00.75" E

Report No.: VEL/A/2304030001
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by : Vardan EnviroLab Representative
Sampling Location : Near Project Site
Instrument Used : RDS & FPS Sampler with all Accessories
Instrument Code : VEL/RDS/FPS/06
Instrument Calibration Status : Calibrated
Meteorological condition during monitoring : Clear Sky
Date of Monitoring : 27/03/2023 to 28/03/2023
Time of Monitoring : 09:30 AM to 09:30 AM
Ambient Temperature (°C) : Min. 14.0°C, Max. 28.0°C
Surrounding Activity : Human, Vehicular, & Other Plant Activities
Scope of Monitoring : Regulatory Requirement
Control measure if Any : No
Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS* Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	52.68	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	87.33	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	28.05	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.54	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.68	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 26/06/2022	22.06	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	16.57	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	-
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm (v/v)	-

Note 1-@ NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (38)], [Part-IV sec -3(i)](18.11.2009).
*SOP- Laboratory Standard Operating Procedure, *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°07'94.18" N
Longitude: 75°00'18.46" E

Report No.: VEL/A/2304030002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological conditions during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Nasibpura
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/08
Calibrated
Clear Sky
27/03/2023 to 28/03/2023
10:00 AM to 10:00 AM
Min. 16.0°C, Max. 33.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS* Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	44.14	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	70.78	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	21.06	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.89	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.60	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No. -01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benz(a)pyrene	VEL/ENV/STP/157, Issue No. -01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	14.44	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No. -01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- *NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3(1B)], [Part-II-sec.-3(i)] 18.11.2009.
SOP-1 Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Sabo, Bathinda, Punjab
Latitude: 30°10'20.00" N
Longitude: 75°00'70.00" E

Report No.: VEL/A/2304030003
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Kul Shamir
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/07
Calibrated
Clear Sky
27/03/2023 to 28/03/2023
10:30 AM to 10:30 AM
Min. 16.0°C, Max. 33.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS* Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	48.22	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	76.43	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	19.89	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	7.47	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.79	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	22.45	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note 1-to: NAAQS - National Ambient Air Quality Standards; Schedule-VII [Rule 5 (3)(b)], [Part-II-sec.-3(i)]18.11.2009.
*STP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification. **LOQ- Limit of Quantification. STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/A/04
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
 Latitude: 30°03'57.98" N
 Longitude: 75°03'55.26" E

Report No.: VEL/A/2304030004
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 07/04/2023
 Period of Analysis: 03/04/2023 to 07/04/2023
 Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
 Sample Collected by : Vardan EnviroLab Representative
 Sampling Location : Chathewala
 Instrument Used : RDS & FPS Sampler with all Accessories
 Instrument Code : VEL/RDS/FPS/12
 Instrument Calibration Status : Calibrated
 Meteorological condition during monitoring : Cloudy Sky
 Date of Monitoring : 28/03/2023 to 29/03/2023
 Time of Monitoring : 11:00 AM to 11:00 AM
 Ambient Temperature (°C) : Min. 18.0°C, Max. 35.0°C
 Surrounding Activity : Human & Vehicular, & Other Activities
 Scope of Monitoring : Regulatory Requirement
 Control measure if Any : No
 Sampling & Analysis Protocol : IS-5182 & CPCB Guideline
 Parameter Required : As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ² Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	42.68	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	83.26	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	25.76	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	8.01	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.70	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	17.01	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	-
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	-

Note :- 01 NAAQS - National Ambient Air Quality Standards, Schedule VII, [Rule 3(30)], (Part-II-sec.-3(i)) 18.11.2009.
 SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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- Using options does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°05'49.86" N
Longitude: 75°04'11.98" E

Report No.: VEL/A/2304030005
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Kot Bhara
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/06
Calibrated
Cloudy Sky
28/03/2023 to 29/03/2023
11:45 AM to 11:45 AM
Min. 18.0°C, Max. 35.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	35.68	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	68.24	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	21.89	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.12	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.74	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	24.69	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	µg/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppmv(v/v)	--

Note 1:- NAAQS - National Ambient Air Quality Standards; Schedule-VII [Rule 3 (3)(g)], [Part-B-sec.-3(i)]18.11.2008.
SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification. **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nashpura, Tehsil-Talwandi
Sabo, Bathinda, Punjab
Latitude: 30°06'48.46" N
Longitude: 75°04'40.18" E

Report No.: VEL/A/2304030006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Kot Fatta
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/08
Calibrated
Cloudy Sky
28/03/2023 to 29/03/2023
12:30 PM to 12:30 PM
Min. 18.0°C, Max. 35.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ⁹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	40.15	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	73.54	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	17.68	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	9.01	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.63	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzofluorene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	21.00	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- (i) NAAQS - National Ambient Air Quality Standards Schedule-VII, (Rule 3 (3)(b)), (Part-II sec - 3(i) 18.11.2009.
SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°04'18.29" N
Longitude: 75°01'40.48" E

Report No.: VEL/A/2304030007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Jiwan Singh Wala
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/07
Calibrated
Cloudy Sky
28/03/2023 to 29/03/2023
10:00 AM to 10:00 AM
Min. 18.0°C, Max. 35.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	55.36	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	79.17	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	15.86	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	7.86	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.81	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	24.86	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- (i) NAAQS - National Ambient Air Quality Standards; Schedule-VII (Table 3 (3B)), [Part-II sec.-3(i)](18.11.2009), (ii) SOP- Laboratory Standard Operating Procedure, (iii) BLQ- Below Limit of Quantification, (iv) LOQ- Limit of Quantification, STP-Standard Testing Procedure



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°29'45.12" N
Longitude: 75°53'07.00" E

Report No.: VEL/A/2304030008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Mauwala
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/12
Calibrated
Cloudy Sky
28/03/2023 to 29/03/2023
11:10 AM to 11:30 AM
Min. 18.0°C, Max. 35.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS* Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	50.23	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	85.69	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	20.47	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.57	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.66	mg/m ³	4
6.	Amonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	16.03	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- * NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 18.11.2009
SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/09
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Saba, Bathinda, Punjab
Latitude: 30°02'56.92" N
Longitude: 75°06'43.06" E

Report No.: VEL/A/2304030009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Baghi Bandar
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/08
Calibrated
Cloudy Sky
29/03/2023 to 30/03/2023
11:45 AM to 11:45 AM
Min. 18.0°C, Max. 34.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

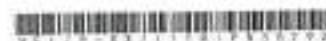
S. No.	Parameter	Protocol	Result	Unit	NAAQS ¹ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	38.47	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	78.26	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	22.87	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	9.33	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.72	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	20.32	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note 1:- NAAQS - National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(1)]18.11.2009.
*SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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- This report is with Sulfix-A Amended Report.
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- Giving opinion does not imply endorsement of the tested sample by the lab. Under no circumstances the lab accepts any liability caused by the use or misuse of the test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 29°59'49.83" N
Longitude: 75°01'15.53" E

Report No.: VEL/A/2304030010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-
Sample Collected by :
Sampling Location :
Instrument Used :
Instrument Code :
Instrument Calibration Status :
Meteorological condition during monitoring :
Date of Monitoring :
Time of Monitoring :
Ambient Temperature (°C) :
Surrounding Activity :
Scope of Monitoring :
Control measure if Any :
Sampling & Analysis Protocol :
Parameter Required :

Vardan EnviroLab Representative
Leleena
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/06
Calibrated
Cloudy Sky
29/03/2023 to 30/03/2023
10:00 AM to 10:00 AM
Min. 18.0°C, Max. 34.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS* Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	53.21	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	88.11	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	28.86	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	7.12	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.71	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	20.96	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzoflapyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	17.55	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatlie Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppmv(v/v)	--

Note :- *NAAQS - National Ambient Air Quality Standards; Schedule-VII (Rule 3(3B)), (Part-B-sec.-3(i)) 18.11.2009.
*STP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



Terms & Conditions

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- To confirm the authenticity of this certificate of analysis, please contact us through email at lab@vardan.co.in
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- The report no. with Soft-A-Accredited Report.
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- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab
Latitude: 30°02'31.98" N
Longitude: 75°01'62.80" E

Report No.: VEL/A/2304030011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by
Sampling Location
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Parameter Required

Vardan EnviroLab Representative
Mahi Nangal
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/12
Calibrated
Cloudy Sky
29/03/2023 to 30/03/2023
10:45 AM to 10:45 AM
Min. 18.0°C, Max. 34.0°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-3182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS [®] Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	33.14	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	77.26	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	24.41	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	6.33	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.82	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	26.01	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- @ NAAQS - National Ambient Air Quality Standards, Schedule-VII, [Rule 3 (3B)], [Part-II sec-3(i)] 8.11.2009.
SCP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



Terms & Conditions

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- The report no. will follow A-Amended Report.
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- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.

Page 1 of 1





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/A/12
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab
Latitude: 30°08'21.78" N
Longitude: 75°57'44.11" E

Report No.: VEL/A/2304030012
Format No.: 7.8 P-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Period of Analysis: 03/04/2023 to 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT AIR QUALITY MONITORING

General Information:-

Sample Collected by :
Sampling Location :
Instrument Used :
Instrument Code :
Instrument Calibration Status :
Meteorological condition during monitoring :
Date of Monitoring :
Time of Monitoring :
Ambient Temperature (°C) :
Surrounding Activity :
Scope of Monitoring :
Control measure if Any :
Sampling & Analysis Protocol :
Parameter Required :

Vardan EnviroLab Representative:
Gehri Bhagi
RDS & FPS Sampler with all Accessories
VEL/RDS/FPS/07
Calibrated
Cloudy Sky
29/03/2023 to 30/03/2023
11:30 AM to 11:30 AM
Min. 18.0°C, Max. 34.3°C
Human & Vehicular, & Other Activities
Regulatory Requirement
No
IS-5182 & CPCB Guideline
As per Work Order

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	NAAQS ²⁰ Limit
1.	Particulate Matter (as PM _{2.5})	IS 5182 (P-24)	44.13	µg/m ³	60
2.	Particulate Matter (as PM ₁₀)	IS 5182 (P-23)	63.58	µg/m ³	100
3.	Nitrogen Dioxide (as NO ₂)	IS 5182 (P-6)	21.79	µg/m ³	80
4.	Sulphur Dioxide (as SO ₂)	IS 5182 (P-2)	7.01	µg/m ³	80
5.	Carbon Monoxide (as CO)	IS 5182 (P-10), NDIR Method	0.79	mg/m ³	4
6.	Ammonia (as NH ₃)	VEL/ENV/STP/155, Issue No.-01, 20/06/2022	BLQ(LOQ 20.0)	µg/m ³	400
7.	Lead (as Pb)	IS 5182 (P-22)	BLQ(LOQ 0.1)	µg/m ³	1
8.	Benzene (as C ₆ H ₆)	IS 5182 (P-12)	BLQ(LOQ 0.5)	µg/m ³	05
9.	Benzo(a)pyrene	VEL/ENV/STP/157, Issue No.-01, 01/11/2021	BLQ(LOQ 0.5)	ng/m ³	01
10.	Ozone (as O ₃)	IS 5182 (P-9)	19.78	µg/m ³	180
11.	Arsenic (as As)	VEL/ENV/STP/110, Issue No.-01, 01/11/2021	BLQ(LOQ 0.1)	ng/m ³	6
12.	Nickel (as Ni)	IS 5182 (P-26)	BLQ(LOQ 5.0)	ng/m ³	20
13.	Volatile Organic Carbon (VOCs)	IS 5182 (P-11)	BLQ(LOQ 0.05)	µg/m ³	--
14.	Hydrocarbon (as Methane)	IS 5182 (P-17)	BLQ(LOQ 0.1)	ppm(v/v)	--

Note :- (i) NAAQS - National Ambient Air Quality Standards; Schedule VII, [Rule 7(1)(b)], [Part-II sec.-3(i)] 18.11.2009.
SOP- Laboratory Standard Operating Procedure. *BLQ- Below Limit of Quantification, **LOQ- Limit of Quantification, STP-Standard Testing Procedure.



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Test Report

Sample Number: VEL/HPCL/N/01
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/1304030006
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Near Project Site
Latitude:	30°05'46.90" N
Longitude:	75°01'00.75" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 27/03/2023 to 28/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 16.0°C, Max. 33.0°C
Surrounding Activity	: Human, Vehicular, & Other Plant Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	74.2	66.9	dB(A)
2.	L _{min}	IS 9989	50.8	42.5	dB(A)
3.	L _{eq}	IS 9989	57.18	46.32	dB(A)
4.	CPCB Limits in dB(A) Leq (Industrial Area)	-	75.00	70.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/02	Report No.:	VEL/N/1304030007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpara, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	07/04/2023
		Receipt Date:	03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Nasibpara
Latitude:	: 30°07'94.18" N
Longitude:	: 75°00'18.46" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Clear Sky
Date of Monitoring	: 27/03/2023 to 28/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 16.0°C, Max. 33.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	57.6	46.1	dB(A)
2.	L _{min}	IS 9989	41.4	34.5	dB(A)
3.	L _{eq}	IS 9989	51.76	41.86	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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- This test report shall not be used for publicity or advertising or media purpose without prior written permission of the laboratory.
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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/N/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2304030008
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by
Sampling Location
Latitude:
Longitude:
Instrument Used
Instrument Code
Instrument Calibration Status
Meteorological condition during monitoring
Date of Monitoring
Time of Monitoring
Ambient Temperature (°C)
Surrounding Activity
Scope of Monitoring
Control measure if Any
Sampling & Analysis Protocol
Sampling Duration
Parameter Required

Vardan EnviroLab Representative
Kot Shamir
30°10'20.00" N
75°00'70.00" E
Sound Level Meter
VEL/S/SLM/08
Calibrated
Clear Sky
27/03/2023 to 28/03/2023
06:00 AM to 06:00 AM
Min. 16.0°C, Max. 33.0°C
Human, Vehicular, & Other Activities
Regulatory Requirement
No any
IS-9989 R-2014 & CPCB Guideline
24 Hours
As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L _{max}	IS 9989	51.6	45.1	dB(A)
2.	L _{min}	IS 9989	38.2	32.8	dB(A)
3.	L _{eq}	IS 9989	47.68	40.11	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/N/04
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Saho, Bathinda, Punjab

Report No.: VEL/N/2304030009
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Kot Bhara
Latitude:	: 30°05'49.86" N
Longitude:	: 75°04'11.98" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/09
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 28/03/2023 to 29/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 35.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	50.8	41.4	dB(A)
2.	L_{min}	IS 9989	36.2	31.8	dB(A)
3.	L_{eq}	IS 9989	45.16	36.48	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note * A "decibel" is a unit in which noise is measured.



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- Laboratory is not responsible for the authenticity of photocopied test report. The test samples will be retained only for specific period.
- This report is with Suffix A-Availed Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission of the laboratory.
- Owing to negligence does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability whatsoever for the use or misuse of the test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/N/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2304030010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by :
Sampling Location :
Latitude :
Longitude :
Instrument Used :
Instrument Code :
Instrument Calibration Status :
Meteorological condition during monitoring :
Date of Monitoring :
Time of Monitoring :
Ambient Temperature (°C) :
Surrounding Activity :
Scope of Monitoring :
Control measure if Any :
Sampling & Analysis Protocol :
Sampling Duration :
Parameter Required :

Vardan EnviroLab Representative
Kot Fatta
30°06'48.46" N
75°04'40.18" E
Sound Level Meter
VEL/S/SLM/06
Calibrated
Cloudy Sky
28/03/2023 to 29/03/2023
06:00 AM to 06:00 AM
Min. 18.0°C, Max. 35.0°C
Human, Vehicular, & Other Activities
Regulatory Requirement
No any
IS-9989 R-2014 & CPCB Guideline
24 Hours
As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	52.7	44.7	dB(A)
2.	L_{min}	IS 9989	34.1	32.3	dB(A)
3.	L_{eq}	IS 9989	43.55	38.78	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/06	Report No.:	VEL/N/2304030011
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	07/04/2023
		Receipt Date:	03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Chathewala
Latitude:	: 30°03'57.98" N
Longitude:	: 75°03'55.26" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/10
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 28/03/2023 to 29/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 35.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	54.1	41.5	dB(A)
2.	L_{min}	IS 9989	36.4	31.8	dB(A)
3.	L_{eq}	IS 9989	46.78	36.59	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/07	Report No.:	VEL/N/2304030012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	07/04/2023
		Receipt Date:	03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Manwala
Latitude:	: 30°20'45.12" N
Longitude:	: 75°53'07.00" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 28/03/2023 to 29/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 35.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	51.2	47.6	dB(A)
2.	L_{min}	IS 9989	37.8	34.2	dB(A)
3.	L_{eq}	IS 9989	49.26	40.57	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/08
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2304030013
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Baghi Bandar
Latitude:	: 30°02'56.92" N
Longitude:	: 75°06'43.06" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/08
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 29/03/2023 to 30/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 34.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	54.3	47.6	dB(A)
2.	L_{min}	IS 9989	35.7	33.2	dB(A)
3.	L_{eq}	IS 9989	46.12	41.71	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number:	VEL/HPCL/N/09	Report No.:	VEL/N/2304030014
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	07/04/2023
		Receipt Date:	03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Jiwani Singh Wala
Latitude:	: 30°04'18.29" N
Longitude:	: 75°01'40.48" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/07
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 28/03/2023 to 29/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 35.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	52.3	48.7	dB(A)
2.	L_{min}	IS 9989	38.1	31.2	dB(A)
3.	L_{eq}	IS 9989	42.68	39.04	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/N/10
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2304030015
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by

Sampling Location

Latitude:

Longitude:

Instrument Used

Instrument Code

Instrument Calibration Status

Meteorological condition during monitoring

Date of Monitoring

Time of Monitoring

Ambient Temperature (°C)

Surrounding Activity

Scope of Monitoring

Control measure if Any

Sampling & Analysis Protocol

Sampling Duration

Parameter Required

Vardan EnviroLab Representative
Mahi Nangal
30°02'31.98" N
75°01'62.80" E
Sound Level Meter
VEL/S/SLM/08
Calibrated
Cloudy Sky
29/03/2023 to 30/03/2023
06:00 AM to 06:00 AM
Min. 18.0°C, Max. 34.0°C
Human, Vehicular, & Other Activities
Regulatory Requirement
No any
IS-9989 R-2014 & CPCB Guideline
24 Hours
As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	53.4	42.2	dB(A)
2.	L_{min}	IS 9989	34.8	31.9	dB(A)
3.	L_{eq}	IS 9989	45.33	39.46	dB(A)
4.	CPCB Limits in dB(A) Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Test Report

Sample Number: VEL/HPCL/N/11
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/N/2304030016
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 07/04/2023
Receipt Date: 03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Leleana
Latitude:	: 29°59'49.83" N
Longitude:	: 75°01'15.53" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/06
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 29/03/2023 to 30/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 34.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	57.6	46.3	dB(A)
2.	L_{min}	IS 9989	37.3	30.5	dB(A)
3.	L_{eq}	IS 9989	51.04	40.12	dB(A)
4.	CPCB Limits in dB(A) ¹ Leq (Residential Area)	-	55.00	45.00	dB(A)

Note: * A "decibel" is a unit in which noise is measured.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/N/12	Report No.:	VEL/N/2304030017
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	07/04/2023
		Receipt Date:	03/04/2023

Sample Description: AMBIENT NOISE LEVEL MONITORING

General Information:-

Sample Collected by	: Vardan EnviroLab Representative
Sampling Location	: Gehri Bhagi
Latitude:	: 30°08'21.78" N
Longitude:	: 75°57'44.11" E
Instrument Used	: Sound Level Meter
Instrument Code	: VEL/S/SLM/12
Instrument Calibration Status	: Calibrated
Meteorological condition during monitoring	: Cloudy Sky
Date of Monitoring	: 29/03/2023 to 30/03/2023
Time of Monitoring	: 06:00 AM to 06:00 AM
Ambient Temperature (°C)	: Min. 18.0°C, Max. 34.0°C
Surrounding Activity	: Human, Vehicular, & Other Activities
Scope of Monitoring	: Regulatory Requirement
Control measure if Any	: No any
Sampling & Analysis Protocol	: IS-9989 R-2014 & CPCB Guideline
Sampling Duration	: 24 Hours
Parameter Required	: As per Work Order

TEST RESULTS

S. No.	Parameters	Protocol	Test Result dB (A)		Unit
			Day Time (6:00 am to 10:00 pm)	Night Time (10:00 pm to 06:00 am)	
1.	L_{max}	IS 9989	58.3	49.6	dB(A)
2.	L_{min}	IS 9989	41.5	36.8	dB(A)
3.	L_{eq}	IS 9989	51.68	42.02	dB(A)
4.	CPCB Limits in dB(A) ⁷ Leq (Residential Area)	-	55.00	45.00	dB(A)

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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/GW/01	Report No.:	VEL/W/2304010806
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpara, Tehsil- Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Ground Water Sample	Sampling Date:	27/03/2023
Sample Location:	Near Project Site	Sample Quantity:	2.0 Ltr. + 250 ml
Sample Collected By:	Vardan EnviroLab Representative	Sampling Type:	Grab
Parameter Required:	As per Work Order	Preservation:	Refrigerated
Sampling & Analysis Protocol:	APHA 23 rd Edition 2017 & IS:3025		

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.29	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	272.13	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	70.24	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	251.48	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	60.36	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	23.54	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	542.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	21.68	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.62	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	4.48	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.18	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Page 1 of 2





Test Report

Sample No.: VEL/HPCL/GW/01				Report No.: VEL/W/2304010006			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012		
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source	
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002	
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation	
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0	
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L	5.0	15.0	
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5	
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3	
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation	
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation	
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation	
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation	
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation	
31.	Conductivity	IS 3025 (P-14)	901	µS/cm	--	--	
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation	
33.	Sodium	IS 3025 (P-45)	21.4	mg/L	--	--	
34.	Potassium	IS 3025 (P-45)	2.1	mg/L	--	--	
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample		
36.	E. coli	IS 15185:2016	Absent	Per 100ml	--		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

** Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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- Giving opinion does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/W/2304010007
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 27/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Nasibpura
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.58	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	210.56	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	71.36	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	214.66	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	51.26	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	7.90	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	532.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	22.68	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.61	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	3.59	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.16	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/02			Report No.: VEL/W/2304010007			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.24	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	857	µS/cm	-	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	33.5	mg/L	-	--
34.	Potassium	IS 3025 (P-45)	1.2	mg/L	-	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

**Amendment No.1 in June 2013 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/03
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd,
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/W/2304010008
Format No.: T.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 27/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Kot Shambir
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.62	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	259.59	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	64.32	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	209.33	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	71.49	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	24.08	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	711.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	41.65	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.56	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.23	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Test Report

Sample No.: VEL/HPCL/GW/03			Report No.: VEL/W/2304010008			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.40	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1112	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	31.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.0	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

**Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Doem & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:
Name & Address of the Project:

VEL/HPCL/GW/04
M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-
Talwandi Saba, Bathinda, Punjab

Report No.:
Format No.:
Party Reference No.:
Reporting Date:
Period of Analysis:
Receipt Date:
Sampling Date:
Sample Quantity:
Sampling Type:
Preservation:

VEL/W/2304010009
7.8 F-03
NIL
05/04/2023
01/04/2023 to 05/04/2023
01/04/2023
29/03/2023
2.0 Ltr. + 250 ml
Grab
Refrigerated

Sample Description:
Sample Location:
Sample Collected By:
Parameter Required:
Sampling & Analysis Protocol:

Ground Water Sample
Baghi Bandar
Vardan EnviroLab Representative
As per Work Order
APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.13	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	316.48	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	76.26	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	248.00	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	73.68	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	30.67	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	612.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	46.23	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.78	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part-34)	6.02	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.12	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Page 1 of 2





Test Report

Sample No.: VEL/HPCL/GW/04			Report No.: VEL/W/2304010009			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.36	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.005	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	1068	µS/cm	-	-
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	20.5	mg/L	-	-
34.	Potassium	IS 3025 (P-45)	2.7	mg/L	-	-
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

**Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/GW/05
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Sample Description: Ground Water Sample
Sample Location: Maanwala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

Report No.: VEL/W/1304010010
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 29/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.65	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	211.54	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	62.87	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	171.69	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	54.23	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	13.29	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	502.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	58.62	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.87	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	5.87	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.21	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/05				Report No.: VEL/W/2304010010		
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.22	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	835	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	34.0	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.8	mg/L	--	--
35.	Total Coliforms	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml		

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

†Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPC/L/GW/06
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Sample Description: Ground Water Sample
Sample Location: Jiwan Singh Wala
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

Report No.: VEL/W/2304010011
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 29/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.66	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	186.55	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	48.36	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	166.03	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	40.21	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.01	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	401.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	18.36	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.66	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	4.55	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.13	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/GW/06			Report No.: VEL/W/2304010011			
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-43)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.001)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/L	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	623	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	12.8	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	1.1	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	
36.	E. coli	IS 15185:2016	Absent	Per 100ml	--	

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.

†Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Boron & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/W/07
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/W/2304010012
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 29/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Ground Water Sample
Sample Location: Mahi Nangal
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500 -2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
1.	pH (at 25°C)	IS 3025 (P-11)	7.69	--	6.5 to 8.5	No Relaxation
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen	5	15
3.	Turbidity	IS 3025 (P-10)	BLQ(LOQ 1.0)	NTU	1	5
4.	Odour	IS 3025 (P-5)	Agreeable	--	Agreeable	Agreeable
5.	Taste	IS 3025 (P-8)	Agreeable	--	Agreeable	Agreeable
6.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	172.56	mg/L	200	600
7.	Calcium (as Ca)	IS 3025 (P-40)	41.23	mg/L	75	200
8.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	171.33	mg/L	200	600
9.	Chloride (as Cl)	IS 3025 (P-32)	40.17	mg/L	250	1000
10.	Cyanide (as CN)	IS 3025 (P-27)	BLQ(LOQ 0.02)	mg/L	0.05	No Relaxation
11.	Magnesium (as Mg)	APHA 3500 Mg B	16.93	mg/L	30	100
12.	Total Dissolved Solids	IS 3025 (P-16)	466.00	mg/L	500	2000
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	23.69	mg/L	200	400
14.	Fluoride (as F)	APHA 4500 F D	0.54	mg/L	1.0	1.5
15.	Nitrate (as NO ₃)	IS 3025 (Part -34)	3.25	mg/L	45	No Relaxation
16.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.15	mg/L	1.0	No Relaxation
17.	Aluminium (as Al)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.03	0.2
18.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.5	2.4
19.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	No Relaxation



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample No.: VEL/HPCL/W/07					Report No.: VEL/W/2304010012	
S. No.	Parameter	Test-Method	Result	Unit	Limits of IS:10500-2012	
					Requirement (Acceptable Limit)	Permissible limit in the Absence of Alternate Source
20.	Phenolic Compounds	IS 3025 (P-4)	BLQ(LOQ 0.0004)	mg/L	0.001	0.002
21.	Mineral Oil	IS 3025 (P-39) Clause 6	BLQ(LOQ 0.05)	mg/L	1.0	No Relaxation
22.	Anionic Detergents (as MBAS)	IS 3025 (P-68)	BLQ(LOQ 0.05)	mg/L	0.2	1.0
23.	Zinc (as Zn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.28	mg/L	5.0	15.0
24.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.05	1.5
25.	Manganese (as Mn)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.01)	mg/L	0.1	0.3
26.	Cadmium (as Cd)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.003	No Relaxation
27.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
28.	Selenium (as Se)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.011)	mg/L	0.01	No Relaxation
29.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L	0.01	No Relaxation
30.	Mercury (as Hg)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.0005)	mg/l	0.001	No Relaxation
31.	Conductivity	IS 3025 (P-14)	723	µS/cm	--	--
32.	Ammonia (as NH ₃)	IS 3025 (P-34)	BLQ(LOQ 0.1)	mg/L	0.5	No Relaxation
33.	Sodium	IS 3025 (P-45)	22.1	mg/L	--	--
34.	Potassium	IS 3025 (P-45)	2.5	mg/L	--	--
35.	Total Coliform	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--
36.	E. coli	IS 15185:2016	Absent	Per 100ml	Shall not be detectable in any 100 ml sample	--

*BLQ-Below Limit of Quantification, **LOQ- Limit of Quantification.
** Amendment No.1 in June 2015 (Limits of Iron & Arsenic) and Amendment No.2 in Sept. 2018 (Limit of Borecs & IS method of Total Coliform & E.coli) & Amendment No.3 in Feb. 2021 (Limit of Mineral Oil).



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/01	Report No.:	VEL/S0/2304010001
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	27/03/2023
Sample Location:	Near Project Site	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.46	—
2.	Conductivity	IS 14767	0.325	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Salty	—
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	—
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	30.24	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.38	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.65	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	20.35	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	28.14	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	92.58	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	5.06	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.80	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	16.87	%
14.	Available Nitrogen (as N)	IS:14684	147.15	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	10.87	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	14.02	%
17.	Organic Carbon	IS 2720 (P-22)	0.46	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.47	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.15	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.40	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	18.06	%

Note: STP- Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/02	Report No.:	VEL/S0/2304010002
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	27/03/2023
Sample Location:	Nasibpura	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.54	--
2.	Conductivity	IS 14767	0.348	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silly	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	42.47	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.24	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	37.41	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	55.42	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	50.78	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	118.33	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.46	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.81	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	23.07	%
14.	Available Nitrogen (as N)	IS:14684	268.08	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.74	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	17.26	%
17.	Organic Carbon	IS 2720 (P-22)	0.47	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.57	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.70	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.65	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.47	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.42	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	16.42	%

Note- STP: Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/03	Report No.:	VEL/S0/2304010003
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	27/03/2023
Sample Location:	Kot Shamir	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.78	-
2.	Conductivity	IS 14767	0.346	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	26.22	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.46	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	46.23	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	33.87	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	43.75	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	131.38	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.68	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	17.54	%
14.	Available Nitrogen (as N)	IS:14684	231.47	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	25.33	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	11.06	%
17.	Organic Carbon	IS 2720 (P-22)	0.39	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.78	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.53	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.81	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.00	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.46	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.43	%

Note: STP- Standard Test Procedure



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/04	Report No.:	VEL/S0/2304010004
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasihpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
		Sampling Date:	28/03/2023
		Sampling Type:	Composite
		Sample Quantity:	2.0 Kg
		Packing Status:	Temp Scaled

Sample Description:	Soil Sample
Sample Location:	Kot Bhara
Sample Collected By:	Vardan EnviroLab Representative
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	IS 2720 (P-26)	7.66	-
2.	Conductivity	IS 14767	0.338	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	31.48	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.52	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	38.45	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	44.13	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	58.02	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	130.48	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.73	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.35	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.19	%
14.	Available Nitrogen (as N)	IS: 14684	198.44	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	17.69	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	10.76	%
17.	Organic Carbon	IS 2720 (P-22)	0.32	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.68	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.24	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.13	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.17	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.06	%

Note- STP- Standard Testing Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/05	Report No.:	VEL/S0/2304010005
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd, Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	28/03/2023
Sample Location:	Chathewala	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	8.21	-
2.	Conductivity	IS 14767	0.316	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	18.72	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.36	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	40.77	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	36.24	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	48.11	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	80.87	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.01	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.60	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	17.78	%
14.	Available Nitrogen (as N)	IS:14684	204.52	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	14.48	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	8.35	%
17.	Organic Carbon	IS 2720 (P-22)	0.35	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.66	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.81	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	4.01	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.66	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ L0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.78	%

Note- STP- Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/06	Report No.:	VEL/S0/2304010006
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nashpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	28/03/2023
Sample Location:	Kot Fatta	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.32	—
2.	Conductivity	IS 14767	0.312	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	—
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	—
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	24.47	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.22	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	37.68	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	59.01	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	35.37	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	113.29	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.24	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.66	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	20.78	%
14.	Available Nitrogen (as N)	IS:14684	212.58	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	9.14	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	9.26	%
17.	Organic Carbon	IS 2720 (P-22)	0.39	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.65	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.79	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.01	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 0.5)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	13.06	%

Note- STP- standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:	VEL/HPCL/S0/07	Report No.:	VEL/S0/2304010007
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Saba, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	29/03/2023
Sample Location:	Baghi Bandar	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.89	-
2.	Conductivity	IS 14767	0.310	mS/cm
3.	Soil Texture	VEL/STP/EN/84, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.89	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.26	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.14	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	40.89	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	72.35	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	135.87	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.89	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	30.88	%
14.	Available Nitrogen (as N)	IS:14684	247.35	kg/hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	21.79	kg/hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	15.36	%
17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.35	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.69	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.40	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.68	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.37	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	20.87	%

Note: STP - Standard Testing Procedure.



Terms & Conditions

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- Giving opinion does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of its test report.





Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:
Name & Address of the Project:

VEL/HPCL/S0/08
M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Saba, Bathinda, Punjab

Report No.:
Format No.:
Party Reference No.:
Reporting Date:
Period of Analysis:
Receipt Date:
Sampling Date:
Sampling Type:
Sample Quantity:
Packing Status:

VEL/S0/2304010008
7.8 F-03
NIL
05/04/2023
01/04/2023 to 05/04/2023
01/04/2023
28/03/2023
Composite
2.0 Kg
Temp Sealed

Sample Description:
Sample Location:
Sample Collected By:
Sampling & Analysis Protocol:

Soil Sample
Manwala
Vardan EnviroLab Representative
IS 2720, USEPA 3050B & USDA

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.36	--
2.	Conductivity	IS 14767	0.357	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	--
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	--
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.30	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	35.81	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	51.46	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.52	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	151.28	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.54	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.70	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	24.18	%
14.	Available Nitrogen (as N)	IS:14684	251.27	kg/hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	15.34	kg/hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.18	%
17.	Organic Carbon	IS 2720 (P-22)	0.41	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.62	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.84	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.56	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.64	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	16.58	%

Note: STP/EN/108 is a new procedure.



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- The report no. with Surfs A-Approved Report.
- This test report will not be used for publicity or advertising or media purpose without prior written permission of the laboratory.
- Giving opinions does not imply endorsement of the tested sample by the lab. Under no circumstances, the lab accepts any liability caused by the use or misuse of the test report.





Test Report

Sample Number:	VEL/HPCL/50/09	Report No.:	VEL/S4/2304010009
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	28/03/2023
Sample Location:	Jiwan Singh Wala	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.68	-
2.	Conductivity	IS 14767	0.322	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	29.06	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.42	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	48.66	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.48	%
9.	Sodium (as Na)	VEL/STP/EN/02, Issue No.- 01, 01/11/2021	43.11	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	123.48	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.24	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.64	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	19.58	%
14.	Available Nitrogen (as N)	IS:14684	228.48	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	12.69	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	13.55	%
17.	Organic Carbon	IS 2720 (P-22)	0.37	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.71	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.50	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.33	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.04	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.56	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	14.92	%

Note: STP is as per Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:
Name & Address of the Project:

VEL/HIPCL/S0/10
M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Sabu, Bathinda, Punjab

Report No.:
Format No.:
Party Reference No.:
Reporting Date:
Period of Analysis:
Receipt Date:
Sampling Date:
Sampling Type:
Sample Quantity:
Packing Status:

VEL/S0/2304010010
7.8 F-03
NIL
05/04/2023
01/04/2023 to 05/04/2023
01/04/2023
29/03/2023
Composite
2.0 Kg
Temp Sealed

Sample Description:
Sample Location:
Sample Collected By:
Sampling & Analysis Protocol:

Soil Sample
Gehri Bhagi
Vardan EnviroLab Representative
IS 2720, USEPA 3050B & USDA

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25°C)	IS 2720 (P-26)	7.23	-
2.	Conductivity	IS 14767	0.339	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty Loam	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Red	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	34.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.58	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.39	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	34.24	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	50.78	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	120.29	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	6.03	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.77	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	22.18	%
14.	Available Nitrogen (as N)	IS:14684	256.38	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	18.77	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	11.55	%
17.	Organic Carbon	IS 2720 (P-22)	0.45	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.60	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.77	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.61	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.89	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.29	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	19.36	%

Note: STP/EN/03, Issue No.- 01, 01/10/2021



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Vardan EnviroLab

Laboratory; Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number:
Name & Address of the Project:

VEL/HPCL/S0/11
M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi
Sabu, Bathinda, Punjab

Report No.:
Format No.:
Party Reference No.:
Reporting Date:
Period of Analysis:
Receipt Date:
Sampling Date:
Sampling Type:
Sample Quantity:
Packing Status:

VEL/S0/2304010011
7.8 F-03
NIL
05/04/2023
01/04/2023 to 05/04/2023
01/04/2023
29/03/2023
Composite
2.0 Kg
Temp Sealed

Sample Description:
Sample Location:
Sample Collected By:
Sampling & Analysis Protocol:

Soil Sample
Mahi Nangal
Vardan EnviroLab Representative
IS 2720, USEPA 3050B & USDA

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-26)	7.63	-
2.	Conductivity	IS 14767	0.341	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Brownish	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	28.46	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.36	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	47.78	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	39.25	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	61.22	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	126.68	%
11.	Iron as (Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	2.35	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.74	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	30.58	%
14.	Available Nitrogen (as N)	IS:14684	235.47	kg/hect.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	17.69	kg/hect.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	7.56	%
17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.54	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.76	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.35	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	3.87	mg/kg
22.	Molybdenum (as MO)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.79	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	16.08	%

Note: STP - Standard Testing Procedure.



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Test Report

Sample Number:	VEL/HPCL/S0/12	Report No.:	VEL/S0/2304010012
Name & Address of the Project:	M/s Hindustan Petroleum Corporation Ltd. Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabu, Bathinda, Punjab	Format No.:	7.8 F-03
		Party Reference No.:	NIL
		Reporting Date:	05/04/2023
		Period of Analysis:	01/04/2023 to 05/04/2023
		Receipt Date:	01/04/2023
Sample Description:	Soil Sample	Sampling Date:	29/03/2023
Sample Location:	Lalana	Sampling Type:	Composite
Sample Collected By:	Vardan EnviroLab Representative	Sample Quantity:	2.0 Kg
Sampling & Analysis Protocol:	IS 2720, USEPA 3050B & USDA	Packing Status:	Temp Sealed

TEST RESULTS

S. No.	Parameter	Test-Method	Result	Unit
1.	pH (at 25 °C)	IS 2720 (P-20)	7.72	-
2.	Conductivity	IS 14767	0.361	mS/cm
3.	Soil Texture	VEL/STP/EN/64, Issue No.- 01, 01/11/2021	Silty	-
4.	Color	VEL/STP/EN/67, Issue No.- 01, 01/11/2021	Yellowish Brown	-
5.	Water holding capacity	VEL/STP/EN/86, Issue No.- 01, 01/11/2021	27.69	%
6.	Bulk density	VEL/STP/EN/59, Issue No.- 01, 01/11/2021	1.42	gm/cc
7.	Chloride (as Cl)	VEL/STP/EN/69, Issue No.- 01, 01/11/2021	68.02	%
8.	Calcium (as Ca)	VEL/STP/EN/72, Issue No.- 01, 01/11/2021	44.26	%
9.	Sodium (as Na)	VEL/STP/EN/62, Issue No.- 01, 01/11/2021	37.58	%
10.	Potassium (as K)	VEL/STP/EN/61, Issue No.- 01, 01/11/2021	143.59	%
11.	Iron (as Fe)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.78	mg/kg
12.	Organic Matter	IS 2720 (P-22)	0.75	%
13.	Magnesium (as Mg)	VEL/STP/EN/72, Issue No. 01, 01/11/2021	34.12	%
14.	Available Nitrogen (as N)	IS:14684	232.87	kg./hec.
15.	Available Phosphorus	VEL/STP/EN/73, Issue No.- 01, 01/11/2021	20.57	kg./hec.
16.	Zinc (as Zn)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	15.02	%
17.	Organic Carbon	IS 2720 (P-22)	0.43	%
18.	Lead (as Pb)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.00	mg/kg
19.	Cadmium (as Cd)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.79	mg/kg
20.	Chromium (as Cr)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.51	mg/kg
21.	Copper (as Cu)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	1.35	mg/kg
22.	Molybdenum (as Mo)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	0.55	mg/kg
23.	Nickel (as Ni)	VEL/STP/HW/03, Issue No.- 01, 01/10/2021	BLQ (LOQ 1.0)	mg/kg
24.	Moisture Content	VEL/STP/EN/108, Issue No.- 01, 01/11/2021	15.66	%

Note: Soil Standard Testing Procedure.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/SW/01
 Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
 Bio Refinery, Village-Nasibpura, Tehsil-
 Talwandi Sabo, Bathinda, Punjab

Sample Description: Surface Water Sample
 Sample Location: Chathewala
 Sample Collected By: Vardan EnviroLab Representative
 Parameter Required: As per Work Order
 Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

Report No.: VEL/SW/2304010001
 Format No.: 7.8 F-03
 Party Reference No.: NIL
 Reporting Date: 05/04/2023
 Period of Analysis: 01/04/2023 to 05/04/2023
 Receipt Date: 01/04/2023
 Sampling Date: 28/03/2023
 Sample Quantity: 2.0 Ltr. + 250 ml
 Sampling Type: Grab
 Preservation: Refrigerated

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.63	--
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	15.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	--
5.	Taste	IS 3025 (P-8)	NR	--
6.	Chloride (as Cl)	IS 3025 (P-32)	76.22	mg/L
7.	Conductivity	IS 3025 (P-14)	693	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34)	14.69	mg/L
9.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.34	mg/L
10.	Total Dissolved Solids	IS 3025 (P-16)	424.00	mg/L
11.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.26	mg/L
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	10.36	mg/L
14.	Fluoride (as F)	APHA 4500 F D	0.69	mg/L
15.	BOD (3 Days at 27°C)	IS 3025 (P-44)	3.68	mg/L
16.	COD	IS 3025 (P-58)	23.92	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	8.15	mg/L
18.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
19.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	141.00	mg/L
20.	Calcium (as Ca)	IS 3025 (P-40)	48.66	mg/L
21.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	160.48	mg/L
22.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	4.76	mg/L
23.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	2.88	mg/L
24.	Sodium (as Na)	IS 3025 (P-45)	57.55	mg/L
25.	Potassium (as K)	IS 3025 (P-45)	3.3	mg/L
26.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Coliform	IS 15185:2016	Absent	Per 100ml

Note: BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.



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Vardan EnviroLab

Laboratory: Plot No. 82A, Sector - 5, IMT Manesar, Gurugram - 122051 (Hr)
ISO 9001 | ISO 14001 | ISO 45001

Test Report

Sample Number: VEL/HPCL/SW/02
Name & Address of the Project: M/s Hindustan Petroleum Corporation Ltd.
Bio Refinery, Village-Nasibpura, Tehsil-Talwandi Sabo, Bathinda, Punjab

Report No.: VEL/SW/2304010002
Format No.: 7.8 F-03
Party Reference No.: NIL
Reporting Date: 05/04/2023
Period of Analysis: 01/04/2023 to 05/04/2023
Receipt Date: 01/04/2023
Sampling Date: 28/03/2023
Sample Quantity: 2.0 Ltr. + 250 ml
Sampling Type: Grab
Preservation: Refrigerated

Sample Description: Surface Water Sample
Sample Location: Kot Fatta
Sample Collected By: Vardan EnviroLab Representative
Parameter Required: As per Work Order
Sampling & Analysis Protocol: APHA 23rd Edition 2017 & IS:3025

TEST RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH (at 25°C)	IS 3025 (P-11)	7.46	-
2.	Colour	IS 3025 (P-4)	BLQ(LOQ 1.0)	Hazen
3.	Turbidity	IS 3025 (P-10)	20.0	NTU
4.	Odour	IS 3025 (P-5)	Agreeable	-
5.	Taste	IS 3025 (P-8)	NR	-
6.	Chloride (as Cl)	IS 3025 (P-32)	51.66	mg/L
7.	Conductivity	IS 3025 (P-14)	311	µS/cm
8.	Nitrate (as NO ₃)	IS 3025 (P-34)	5.89	mg/L
9.	Iron (as Fe)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.30	mg/L
10.	Total Dissolved Solids	IS 3025 (P-10)	511.00	mg/L
11.	Lead (as Pb)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
12.	Boron	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	0.28	mg/L
13.	Sulphate (as SO ₄)	IS 3025 (P-24)	21.39	mg/L
14.	Fluoride (as F)	APHA 4500 F D	0.38	mg/L
15.	BOD (3 Days at 27°C)	IS 3025 (P-44)	2.47	mg/L
16.	COD	IS 3025 (P-58)	17.35	mg/L
17.	Free Ammonia (as NH ₃)	IS 3025 (P-34)	5.57	mg/L
18.	Arsenic (as As)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
19.	Total Hardness (as CaCO ₃)	IS 3025 (P-21)	142.35	mg/L
20.	Calcium (as Ca)	IS 3025 (P-40)	51.16	mg/L
21.	Alkalinity (as CaCO ₃)	IS 3025 (P-23)	174.39	mg/L
22.	Magnesium (as Mg)	APHA 3500 Mg B Calculation Method	3.57	mg/L
23.	Copper (as Cu)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	3.11	mg/L
24.	Sodium (as Na)	IS 3025 (P-45)	47.6	mg/L
25.	Potassium (as K)	IS 3025 (P-45)	1.3	mg/L
26.	Total Chromium (as Cr)	VEL/STP/ICP/W-01, Issue No.-01, 01/11/21	BLQ(LOQ 0.002)	mg/L
27.	Total Coliform	IS 15185:2016	Absent	Per 100ml

Note: BLQ-Below Limit of Quantification, *LOQ-Limit of Quantification, **NR- Not Reported.



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