DS 215 – DUBAI STRATEGIC SEWERAGE TUNNEL PROJECT – BURDUBAI (DSST-BD)

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

OCTOBER 2025

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LIST OF ABBREVIATIONS

ALARP	-	As Low as Reasonably Possible
ASME	-	American Society of Mechanical Engineers
ASR	-	Air Sensitive Receptor
°C	-	Centigrade
CEMP	-	Construction Environmental Management Plan
CLO	-	Community Liaison Officer
CO	-	Carbon Monoxide
CO_2	-	Carbon Dioxide
CP	-	Cathodic Protection
CS	-	Carbon Steel
CSR	-	Corporate Social Responsibility
dB(A)	-	Decibels
DM	-	Dubai Municipality
DECCA	-	Dubai Environment and Climate Change Authority
Dome	-	Dome International Safety & Environmental Consultants
EC	-	Environmental Clearance
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EP	-	Equator Principles
EPC	-	Engineering, procurement, and Construction
ESIA	-	Environmental and Social Impact Assessment
GHG	-	Greenhouse Gas
GIS	-	Geographic Information System
GPS	-	Global Positioning System
HSE	-	Health, Safety and Environmental
IBA	-	Important Bird Areas
IFC	-	International Finance Corporation
in	-	Inch
IUCN	-	International Union for Conservation of Nature
km	-	Kilometer
KPI	-	Key Performance Indicators
kV	-	Kilovolts
m	-	Meter
mg	-	Milligrams
MOCCAE	-	Ministry of Climate Change and Environment
MW	-	Megawatt
NCM	-	National Center of Meteorology
NSR	-	Noise Sensitive Receptor
NOC	-	No Objection Certificate
NOx	-	Oxides of Nitrogen
NTU	-	Nephelometric Turbidity Units
OEMP	-	Operation Environmental Management Plan

O&M	-	Operation and Maintenance
PM	-	Particulate Matter
ppm	-	Parts per Million
ppt	-	parts per thousand
PS	-	Performance Standard
SO_2	-	Sulphur Dioxide
TDS	-	Total Dissolved Solids
TG	-	Technical Guidance
TOR	-	Terms of Reference
TSE	-	Treated Sewage Effluent
UAE	-	United Arab Emirates
USEPA	-	United States Environmental Protection Agency
VOC	-	Volatile Organic Compounds
WB	-	World Bank
WHO	-	World Health Organization

DEFINITION OF TERMS

As Low as Reasonably Possible—To reduce a risk to a level that is as low as reasonably possible and involves balancing reduction in risk against the time, trouble, difficulty, and cost of achieving it. This level represents the point (objectively assessed) at which the time, trouble, difficulty, and cost of further reduction measures becomes unreasonably disproportionate to the additional risk reduction obtained.

Assessment Area— the physical area that the consultant and proponent have identified for assessment of potential environmental impacts.

Environmental Component / Aspect—Attribute or constituent of the environment (i.e., Air Quality; Marine Water; Waste Management; Geology, Seismicity, Soil, and Groundwater; Marine Ecology; Terrestrial Ecology; Noise; Traffic; Socio-economic) that may be impacted by the proposed policy, plan, or program.

Environmental Impact — positive or negative impact that occurs to an environmental component as a result of the proposed policy, plan, or program. This impact can be directly or indirectly caused by the policy, plan, or program's different phases (i.e., construction, operation, and decommissioning).

Hazard — any substance, physical effect, or condition with potential to harm people, property, or the environment.

Hazardous Waste—Waste that poses potential harm to human health and the environment.

Operation — the time period corresponding to any event, process, or activity that occurs during the operation phase (fully functioning). The operation phase follows the construction phase, and then terminates when the policy, plan, or program goes into the decommissioning phase.

Owner / Proponent — the agency or entity responsible for creating the policy, plan, or program.

Policy, Plan, or Program Area — the physical area within which all phases (i.e., construction, operation, and decommissioning), processes, and activities associated with the proposed policy, plan, or program will take place (boundary of project area is defined by titled property boundary). The project area is equivalent to the project site.

Policy, Plan, or Program Site — same as the Policy, Plan, or Program Area.

Solid Waste — Rubbish, debris, garbage, and other discarded solid materials resulting from the policy, plan, or program that are not classified as hazardous waste.

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1 NON-TECHNICAL SUMMARY

E.1 PROJECT DESCRIPTION

Dubai Municipality (DM) intends to implement a significant Project to enhance and expand the current sewerage system by transitioning from a pumped system to a deep gravity tunnel system (i.e., a Deep Strategic Sewerage Tunnels (DSST)). The proposed DSST system (the Project) has two main catchments: the Deira catchment, which flows to the WSTP (formerly known as Al Awir STP), and the Bur Dubai catchment, which directs flow to the JSTP. These are referred to as DSST-DR and DSST-BD, respectively. The Deira and Bur Dubai catchments are generally separated by the Dubai Creek and E44 Ras Al Khor Road. It should be noted that this Document is developed for the Bur Dubai catchment (DSST-BD) only.

The Bur Dubai Tunnel (DSST-BD) under the DSST Project consists of five (5) segments of deep tunnels based on the tunnel diameters. The main BD tunnel will include the three (3) segments, BD-01A (4m dia.), BD-02A (5m dia.) and BD-04 (6.5m dia.). The main tunnel extends from Dubai Design District/Business Bay south of Dubai Creek to the JSTP and its alignment is proposed along Al Khail Road, D63 road and E611 road. The Jebel Ali branch tunnel is connected to main tunnel at E611 road. This branch tunnel (BD-05A) will include two (2) different segments having diameters of 3.5m and 5m. This tunnel alignment is proposed along Expo Road and E311 road. The total length of these tunnels is approximately 59.085 km, with depths ranging from 32 to 120 meters. DSST-BD also includes total length of 147 km of link sewers and a terminal pump station with an ultimate capacity of 5,500 MLD.

E.12 ESIA PROCESS

Parsons has appointed Dome International Safety & Environmental Consultants to carry out the EIA study for the Project in accordance with the requirements of Dubai Environment and Climate Change Authority (DECCA). The purpose of the EIA is to identify key environmental impacts of the Project, identify the issues to be analyzed, propose an Environmental Management and Monitoring Plan (EMMP), and prepare an EIA Report covering all aspects in line with both local and federal regulations. The EIA Report for the Bur Dubai (DSST-BD) scope has been submitted to DECCA (Ref. No.: EPBI-250225-01114, DS215) and the review and approval process are ongoing at the time of development of this Report.

The implementation of the proposed Project will involve international financial lenders that require demonstration of compliance with both local and international environmental and social guidelines. Specifically, the Project needs to demonstrate that all environmental and social risks are appropriately identified, assessed, and as required, mitigated to ensure that residual impacts are within acceptable levels in line with the requirements outlined in the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social (E&S) Sustainability and the Equator Principles (EP). Therefore, this Environmental and Social Impact Assessment (ESIA) Report has been developed to demonstrate the commitment of DM and Parsons to implement the Project in compliance with local regulations, IFC PS and EP based on actual design details of the proposed facilities. This study is limited to actual works to be undertaken within the defined Project areas and excludes activities related to the manufacturing of materials (which are mainly manufactured offsite).

E.3 SUMMARY OF FINDINGS

Environmental Baseline Conditions

The DSST-BD main tunnel, which extends from Dubai Design District/Business Bay south of Dubai Creek to the JSTP, the Jebel Ali Branch, located south of the main tunnel, and the Dubai Land Branch along E611, Emirates Road, serving the eastern suburbs of Dubai. A

major part of the tunnel run parallel to Al Khail Road, E611 and Emirates Road. The surroundings of the proposed tunnel include developments near the shaft locations, as they are the only areas requiring groundwork will be involved. Table E.1 provides a summary of existing physical and environmental conditions within and in the immediate surrounding areas of the project site.

Table E.1 – Summary of Baseline Environmental and Social Conditions

Aspect	Brief Description
Physical Site conditions and surrounding land-use	The northeastern section of the proposed Bur Dubai tunnel alignment runs parallel to Al Khail Road, while the southwestern section connects to E-611, extends along Emirates Bypass Road, and terminates at the Jebel Ali Pumping Station.
Climate and Meteorology	Recorded ambient temperature was in the range 7.4 to 48.8 °C. The mean relative humidity is relatively high, ranging from 49% to 64% throughout the year. Rainfall recorded in the area is very limited, ranging from 0.3 to 21.2 mm while average wind speed recorded in the range 11 to 14 km/h. Prevailing wind is blowing from north-west directions.
Ambient Air Quality	The results of the monitoring showed that 24-hour averaging time concentrations of the measured pollutants at all the locations were within UAE/DECCA limit except AAQ-9 on day 3 showing exceedances during monitoring campaign. These exceedances are primarily due to strong winds and unpaved open desert areas. It should be noted that the recorded concentrations reflect the conditions at the time of monitoring and actual conditions may vary during the year depending on the seasonal and meteorological changes.
Odor Monitoring	The results of the monitoring showed that 24-hours continuous measurement with 30-min averaging time concentrations of the measured pollutant showing well within DECCA standards (odor threshold of 7 µg/m³ for H2S, 30 µg/m³ for NH3 (30-minute average, as per DECCA) except exceedances were observed at four locations (OMS-1, OMS-2, OMS-3, OMS-4) during monitoring campaign. The exceedances are primarily attributed to nearby sources: OMS-1 (Jebel Ali ST), OMS-3 (Imdaad Reem STP), OMS-2 (a small standing water pond and from Jebel Ali STP), and OMS-4 (greenery maintenance near a roundabout).
Ambient Noise Levels	The results of the ambient noise survey (day and nighttime) campaigns showed exceedances to the DECCA/UAE limits (see Table 4.3, noise allowable limits and results (Table 5.8 & Table 5.9)) at most of the locations. These exceedances are primarily due to vehicular traffic, as almost all of the locations are along highways, with significant movement of vehicles, including car, motorbike, trucks and lorries. In addition, noise from construction activities in the vicinity of monitoring location (NLM 24) was captured during the survey.
GW Analysis	The results of the laboratory analysis of the groundwater samples taken at the Project site, showed that the concentrations of all the parameters within the relevant Dutch standards except total hardness, sulfate, magnesium and benzene. The exceedances for minerals elements and aromatic hydrocarbons are likely due to the natural geological condition's anthropogenic activities.
Terrestrial Ecology	A terrestrial ecology survey results shown the project area is mainly composed of six (N=6) habitat types based on substrate, and flora composition. There were no major Threatened species (i.e. Vulnerable, Endangered, Critically Endangered) species recorded in the study area based on the UAE National and IUCN Red Lists. However, a few individuals of the Ghaf tree (Prosopis cineraria) were observed at the terrestrial ecology survey points TE-6; TE-8; & TE-10. Two species of the wild terrestrial mammals: Arabian gazelle (Gazella arabica) and Arabian red fox (Vulpes vulpes arabica) were reported from the project area. Arabian gazelle was the only reported terrestrial mammals classified as vulnerable based on UAE and IUCN Red Lists. During the survey period, one direct visual sighting of Hadramaut sand lizard (Mesalina adramitana) was recorded in the Sand sheets and dune with shrub cover habitat type. This species is classified as 'Least Concern' on both the IUCN and UAE National Red Lists.

In terms of surrounding land uses, the route starts from a proposed Vortex Drop Shaft (VDS-1A) that is located in Dubai Design District area in Dubai. The tunnel will subsequently traverse under the E44 and will turn southeast at the E44/D67 intersection. The tunnel will traverse undeveloped areas (mainly alongside internal roads in Mohamed Bin Rashid City, before eventually reaching D63 that it will traverse down to its intersection with E611. The tunnel will then traverse E611 down to Jebel Ali STP.

In general, the proposed tunnel will generally follow typical utility corridors that are adjacent to existing highways in Dubai (i.e., E44, D67, D63 and E611). The proposed route will not directly pass through any major residential area nor any particularly sensitive infrastructure. In terms of the proposed shafts, the general area of each site is assessed to be fully developed and disturbed and surrounded primarily by residential areas with commercial establishment and community facilities.

Area of Influence (AoI) of Potential Social Impacts

Considering the nature of the proposed Project (i.e., underground sewerage tunnel), the actual above-ground disturbance during construction will mainly occur at the location of the proposed shafts.

The following provides an overview of the Area of Influence (AoI) considered for the Project:

- During the construction phase, the AoI considers a maximum distance of 500 m from active construction sites, mainly driven by environmental releases (including dust, noise, etc.) at the locations of the above ground facilities (i.e., shafts). It should be noted that these proposed shafts are mainly located adjacent to existing roads and highways and are within the defined utilities and services corridors (i.e., there are no residential areas or any civilian land-uses to be affected). The primary impact associated with the tunnelling activity is potential damage to any underground utilities/services lines and on the foundations of any above-ground structure along the route
- During operation, the AoI would be primarily influenced by environmental releases such as odor emissions and noise generation. It should be noted that these potential releases will primarily be a concern at the location of the VDS.

Key Environmental Issues

The key environmental issue identified during Project operation is associated with the odor emission from odor control units during operation. The potential impacts of odor emission during the operation of the OCF were assessed through air dispersion modeling using AERMOD in the EIA report and the review & approval process are ongoing at the time of development of this report. Hence not discussed further. Please note that as airflow within the sewer tunnel will increase over time, the concentrations of odor-causing substances such as hydrogen sulfide (H_2S) and ammonia (NH_3) will naturally dissipate. In addition, installation of advanced biological odor control systems to handle anticipated odor loads during both the start-up and ultimate flow phases of the project. These systems will be engineered to process and neutralize odor emissions effectively, ensuring compliance with established treatment requirements. Even during peak flow conditions, when odor loads are at their highest, the systems are capable of maintaining efficient performance.

Given the progressive decrease in odour concentrations due to increased airflow, the high efficiency of the biological odour control systems, odour impacts during the Project's operational phase are expected to be minimal and effectively managed through appropriate design and mitigation measures.

Nonetheless, DM should ensure appropriate and strict implementation of the proposed mitigation measures. A comprehensive odour management plan (OMP) must be developed including contingency measures for odour control system failures or unexpected emission

during Project implementation. It is also essential that monitoring program be implemented during operation to ensure the effectiveness of the mitigation measures (see Chapter 7) for detailed monitoring program.

Any adverse impact due to the construction works include noise nuisance, increased wastes disposal, traffic disturbance due to roads closures (if any) will only be temporary in nature and by implementing the relevant control measures and monitoring plans outlined in this Report any adverse impacts will be minimized/avoided. In addition, all relevant stakeholders must be engaged to ensure the concerns of each party are understood and addressed appropriately.

In addition, the adoption and integration of advanced technologies, such as real-time monitoring tools for odor and noise, will enhance project efficiency by providing continuous data for immediate corrective actions. All OCUs shall equipped with real time monitoring systems measuring both concentration and flow and should be connected to DECCA's air quality monitoring network. Standardizing environmental protocols across projects ensures adherence to best practices. Efforts to minimize waste, use recycled materials, and employ energy-efficient solutions are essential for sustainability, reducing emissions, conserving natural resources, and meeting both project goals and regulatory requirements. Moreover, incorporating climate resilience measures into sewer system designs is crucial to address future challenges, such as extreme weather events.

Key Social Issues

In general, the overall socio-economic impact of the Project is expected to be positive, particularly in the aspect of job generation (both during construction and operation) and on the overall sewage management and sustainability initiatives of the Dubai Government. As previously noted, once fully completed, the system significantly enhance the sewerage system in the Emirate, which is expected to consequently reduce the overall carbon emissions from the sewage handling and treatment process. This will streamline operations, enhance efficiency, and reduce maintenance complexity by transitioning from a pumped system to a gravity-based system.

Also, considering its design life of 120 years, it ensures long-term sustainability and adaptability to evolving urban needs.. Additionally, it prioritizes operational simplicity, cost reduction, and integration with smart infrastructure systems, ultimately contributing to a more sustainable, efficient, and future-ready urban environment.

In addition to the above, it is to be noted that the proposed Project will not directly impact any civilian population or any other civilian related socio-economic activities. Any impact during construction is temporary and would be reversible. Land use is also not a concern since the proposed Project is underground and its construction and operation will not affect any above ground structures. Furthermore, the proposed above-ground Project components (i.e., shafts) will be mainly located in defined road-side utility corridors that are managed by the municipality.

During operation, the facilities will not have any direct interaction with any civilian infrastructure and thus, no negative socio-economic impacts are expected. The only aspect of the Project that could potentially cause social concern is the odor emissions at the location of the VDS. Nonetheless, the results of the assessment as presented in preceding Section showed that odor will not be a concern at the location of the potential receptors. This is primarily due to the fact that the VDS will be provided with appropriate odor control system with 99% efficiency.

SIA Action Plan

Table E.2 presents the ESIA Action Plan, which is based on the results of the environmental and social impacts assessment as presented in this Report. The implementation of this

Action Plan will ensure that the assumptions and limitations of the assessment will be addressed and that potential environmental and social impacts will be controlled to within acceptable levels.

Table E.2 – ESIA Action Plan

No.	Action to be taken	Action By	Timetable
ESIA-1	Develop a Construction Environmental and Social Management Plan to include all relevant recommendations of the ESIA Report.	DM/EPC Contractor	Prior to any site Activities
ESIA-3	Ensure timely implementation of the stakeholder Consultation Program	DM/EPC Contractor	As per defined schedule

2 INTRODUCTION

2.1 Project Overview

Dubai Municipality (DM) intends to implement a significant Project to enhance and expand the current sewerage system by transitioning from a pumped system to a deep gravity tunnel system (i.e., a Deep Strategic Sewerage Tunnels (DSST)). The proposed DSST system (the Project) has two main catchments: the Deira catchment, which flows to the WSTP (formerly known as Al Awir STP), and the Bur Dubai catchment, which directs flow to the JSTP. These are referred to as DSST-DR and DSST-BD, respectively. The Deira and Bur Dubai catchments are generally separated by the Dubai Creek and E44 Ras Al Khor Road. It should be noted that this Document is developed for the Bur Dubai catchment (DSST-BD) only.

The Bur Dubai Tunnel (DSST-BD) under the DSST Project consists of five (5) segments of deep tunnels based on the tunnel diameters. The main BD tunnel will include the three (3) segments, BD-01A (4m dia.), BD-02A (5m dia.) and BD-04 (6.5m dia.). The main tunnel extends from Dubai Design District/Business Bay south of Dubai Creek to the JSTP, and its alignment is proposed along Al Khail Road, D63 road and E611 road. The Jebel Ali branch tunnel is connected to main tunnel at E611 road. This branch tunnel (BD-05A) will include two (2) different segments having diameters of 3.5m and 5m. This tunnel alignment is proposed along Expo Road and E311 road. The total length of these tunnels is approximately 59.085 km, with depths ranging from 32 to 120 meters. DSST-BD also includes total length of 147 km of link sewers and a terminal pump station with an ultimate capacity of 5,500 MLD.

2.2 Project Parties

The proposed Project is a positive initiative of the Government of Dubai that is being spearheaded by Dubai Municipality (DM). Parsons Overseas Limited (POL) has been appointed by DM as consultant to develop the feasibility and preliminary designs for the Project, and to provide program management and construction supervision during the detailed design and construction phase of the Project.

Contact details of DM, the Project proponent, are provided below:

- Proponent: Dubai Municipality
- Department: Sewerage and Recycled Water Projects Department
- Address: Dubai Municipality Headquarters, Building 20, Block A
  P.O Box No. 67, Baniyas Road, Dubai, UAE

Contact details of POL, the Project engineering consultant, are provided below:

- Consultant: Parsons Overseas Limited
- Address: P.O. Box 9123, Dubai, UAE
- Contact Person: Mr. Glynn Monks, Project Director
- Telephone: +971 50 988 1257
- Email: glynn.monks@parsons.com

Dome International Safety & Environmental Consultants LLC (Dome) has been commissioned to undertake the Environmental and Social Impact Assessment (ESIA) for the Project in accordance with the IFC Performance Standards (PS) and Equator Principles (EP) guidelines. Dome is a Dubai registered company that is part of the Dome Group of companies with offices in Dubai, Abu Dhabi, Baghdad, Basra, Erbil, Sana'a, Aden, and Muscat.

Dome is an ISO 9001:2015 and ISO 14001:2015 certified company and is a registered environmental consultant with Dubai Municipality and other environmental agencies in UAE. Contact details of Dome are provided below:

- Dome International Safety & Environmental Consultants LLC

Qataiyat Road, PO Box 24652, Dubai, UAE
Tel.: + 971 4 3366 144; Email: dome@domeint.com

- Contact Person: Mr. Haytham Ahmed, Director - HSE

2.3 Environmental & Social Impact Assessment (ESIA) Requirement

2.3.1 Local Regulatory Process

Dubai Environment and Climate Change Authority (DECCA), the competent authority of Dubai for the implementation of Federal Environmental Law, categorizes projects/activities according to their type, location, sensitivity, scale, nature and their potential to cause harm to the environment. In accordance with the DECCA Guidance on the Environmental Clearance (EC) Requirements for Development, Infrastructure and Industrial Projects in the Emirate of Dubai, 2024, the proposed Project requires the submission of Revised Environmental Impact Assessment (EIA) report to obtain Environmental Clearance.

Based on this requirement, Parsons has appointed Dome International Safety & Environmental Consultants to carry out the EIA study for the Project in accordance with the requirements of DECCA. The purpose of the EIA is to identify key environmental impacts of the Project, identify the issues to be analyzed, propose an Environmental Management and Monitoring Plan (EMMP), and prepare an EIA Report covering all aspects in line with both local and federal regulations. The EIA Report for the Bur Dubai (DSST-BD) scope has been submitted to DECCA (Ref. No.: EPBI-250225-01114 DS215) and the review and approval process are ongoing at the time of development of this Report.

2.3.2 International Financial Institutions Requirements

The implementation of the proposed Project will involve international financial lenders that require demonstration of compliance with both local and international environmental guidelines. It should be noted that the DM-approved EIA Report for the Project was developed in line with local regulatory guidelines in UAE, thus, an update is essential to ensure that all relevant international environmental and social standards are addressed. Specifically, the Project needs to demonstrate that all environmental and social risks are appropriately identified, assessed, and as required, mitigated to ensure that residual impacts are within acceptable levels in line with the requirements outlined in the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social (E&S) Sustainability and the Equator Principles (EP).

Therefore, this Environmental and Social Impact Assessment (ESIA) Report has been developed to demonstrate the commitment of DM to implement the Project in compliance with local regulations, IFC PS and EP based on actual design details of the proposed facilities (see Section 3 for Project Description). This study is limited to actual works to be undertaken within the defined Project areas and excludes activties related to the manufacturing of materials and other components to be used during the construction and operation of the Project.

This ESIA Report has been prepared to satisfy the following objectives:

- Identify and assess all potential environmental (including adverse, positive and cumulative impacts) and social impacts within the Projects area of influence (AoI).
- Identify opportunities to avoid, or if not possible, define measures to minimize, mitigate, or compensate for potential adverse impacts on sensitive environmental and social receptors during Project implementation.
- Demonstrate, if required, how stakeholder engagement processes have been undertaken to keep any affected local community informed of all aspects of the Project implementation, and to integrate any feedback to develop more effective management measures.

- Demonstrate improved overall environmental and social performance through the effective use of natural resources, social networks and management systems through the development and effective implementation of an Environmental and Social Management Plan (ESMP) based on the results of the ESIA.
- Demonstrate compliance with the requirements of the local UAE and Dubai legal requirements and relevant international standards (IFC PS and EP)

This ESIA Report has been structured as follows in line with the content requirements specified in the IFC social and environmental impact assessment process:

- Non-technical (Executive) Summary
- Section 1 – Introduction
- Section 2 – Project Description
- Section 3 – ESIA Methodology and Regulatory Framework
- Section 4 – Environmental and Social Baseline
- Section 5 – Environmental and Social Impact Assessment
- Section 6 – Stakeholder Engagement and Grievance Mechanism
- Section 7 – Environmental and Social Management Plan (ESMP)

3 PROJECT DESCRIPTION

3.1 Statement of Need

The Dubai Strategic Sewerage Tunnels (DSST) program is essential to addressing the critical infrastructure needs of Dubai's rapidly growing population and urban developments. The program aims to optimize operations for DM by eliminating over 100 pump stations and STPs, centralizing the sewage flow to the Warsan and Jebel Ali Sewage Treatment Plants (WSTP and JSTP). This will streamline operations, enhance efficiency, and reduce maintenance complexity by transitioning from a pumped system to a gravity-based system. The need for this project arises from several factors:

- Aging Infrastructure: Existing sewage pump stations and related systems are outdated and in need of replacement to meet the demands of a growing city.
- Limited Expansion Opportunities: There is little available land for expanding existing pump stations or constructing new ones.
- Complex and Expensive Operations: The current system requires intricate and costly operation and maintenance, especially given its expansive nature.
- Rapid Population Growth: Dubai's continued expansion demands a more efficient and scalable sewage system that can accommodate future developments.

The DSST project is strategically designed to align with Dubai's 2045-2060 urban development master plan by catering to all future public and private developments within the projected city boundaries. With a design life of 120 years, it ensures long-term sustainability and adaptability to evolving urban needs. The project supports the city's sustainability goals by incorporating efficient resource utilization, minimizing environmental impact, and enhancing resilience against future urban challenges. Additionally, it prioritizes operational simplicity, cost reduction, and integration with smart infrastructure systems, ultimately contributing to a more sustainable, efficient, and future-ready urban environment.

Through the consolidation of the sewage flow management at WSTP and JSTP and eliminating most DM-owned pump stations, this system will simplify operations and increase the overall efficiency of the city's sewage infrastructure. The catchment system is designed to support future developments such as Dubai land and Deira Islands, while also adapting to shifts in existing communities from low-density to high-density land use.

Additionally, the DSST project aligns with the Dubai Municipality Plan objectives of city growth, excellence, and environmental sustainability. It supports the Government of Dubai "Dubai 10X Initiative", aiming to innovate and provide disruptive solutions that enhance service delivery and meet the growing demands of the city. The program's goals include upgrading aging infrastructure, reducing operational costs, and preparing the system for future urban expansion. The project is also aligned with Dubai sustainability goals, particularly in terms of water and energy efficiency. It includes initiatives to reduce water usage and contribute to the development of a more sustainable city. The reductions in sewage per capita, as part of future sustainability measures, are reflected in the flow forecasts conducted during the sensitivity analysis for the project.

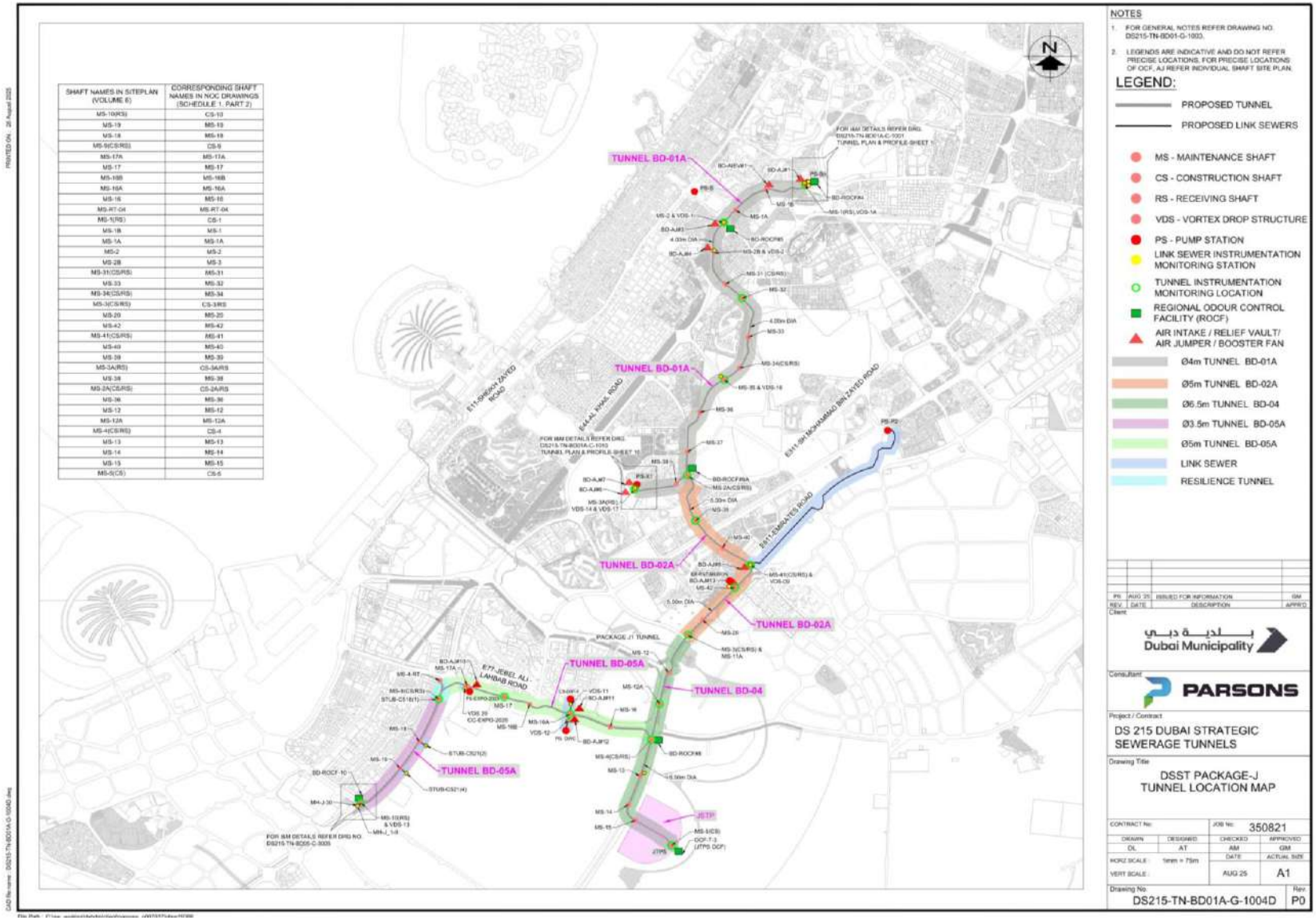
3.2 Project Location and Scale

3.2.1 Project Location and Layout

The Bur Dubai catchment (DSST-BD) is a deep tunnel designed to direct sewage flow to the Jebel Ali STP (JSTP). Various types of ground support, including shafts, will be needed at several locations, such as construction shafts (CSs), receiving shafts (RSs), maintenance shafts (MSs), and vortex drop shaft (VDS) sites.

The layout of DSST-BD, along with the proposed DSSTs, associated sewer links, and shaft locations, is shown in Figure 3.1, Figure 3.2. (also attached as part of Annex 1 of this Report).

As previously noted, DSST-BD main tunnel, which extends from Dubai Design District/Business Bay south of Dubai Creek to the JSTP, the Jebel Ali Branch, located south of the main tunnel, and the Dubai Land Branch along E611, Emirates Road, serving the eastern suburbs of Dubai. A major part of the tunnel run parallel to Al Khail Road, E611 and Emirates Road. The surroundings of the proposed tunnel include developments near the shaft locations, as they are the only areas requiring groundwork will be involved. Figure 3.3 shows tunnel locations and their surrounding land use.



SHAFT NAMES IN S/TEPLAN (VOLUME 6)	CORRESPONDING SHAFT NAMES IN NOC DRAWINGS (SCHEDULE 1, PART 2)
MS-10(RS)	CS-10
MS-19	MS-19
MS-18	MS-18
MS-9(CS/RS)	CS-9
MS-17A	MS-17A
MS-17	MS-17
MS-16B	MS-16B
MS-16A	MS-16A
MS-16	MS-16
MS-RT-04	MS-RT-04
MS-1(RS)	CS-1
MS-1B	MS-1
MS-1A	MS-1A
MS-2	MS-2
MS-2B	MS-3
MS-31(CS/RS)	MS-31
MS-33	MS-32
MS-34(CS/RS)	MS-34
MS-3(CS/RS)	CS-3/RS
MS-20	MS-20
MS-42	MS-42
MS-41(CS/RS)	MS-41
MS-40	MS-40
MS-39	MS-39
MS-3A(RS)	CS-3A/RS
MS-38	MS-38
MS-2A(CS/RS)	CS-2A/RS
MS-36	MS-36
MS-12	MS-12
MS-12A	MS-12A
MS-4(CS/RS)	CS-4
MS-13	MS-13
MS-14	MS-14
MS-15	MS-15
MS-5(CS)	CS-5

Figure 3.1 – Location of DSST-BD Tunnel

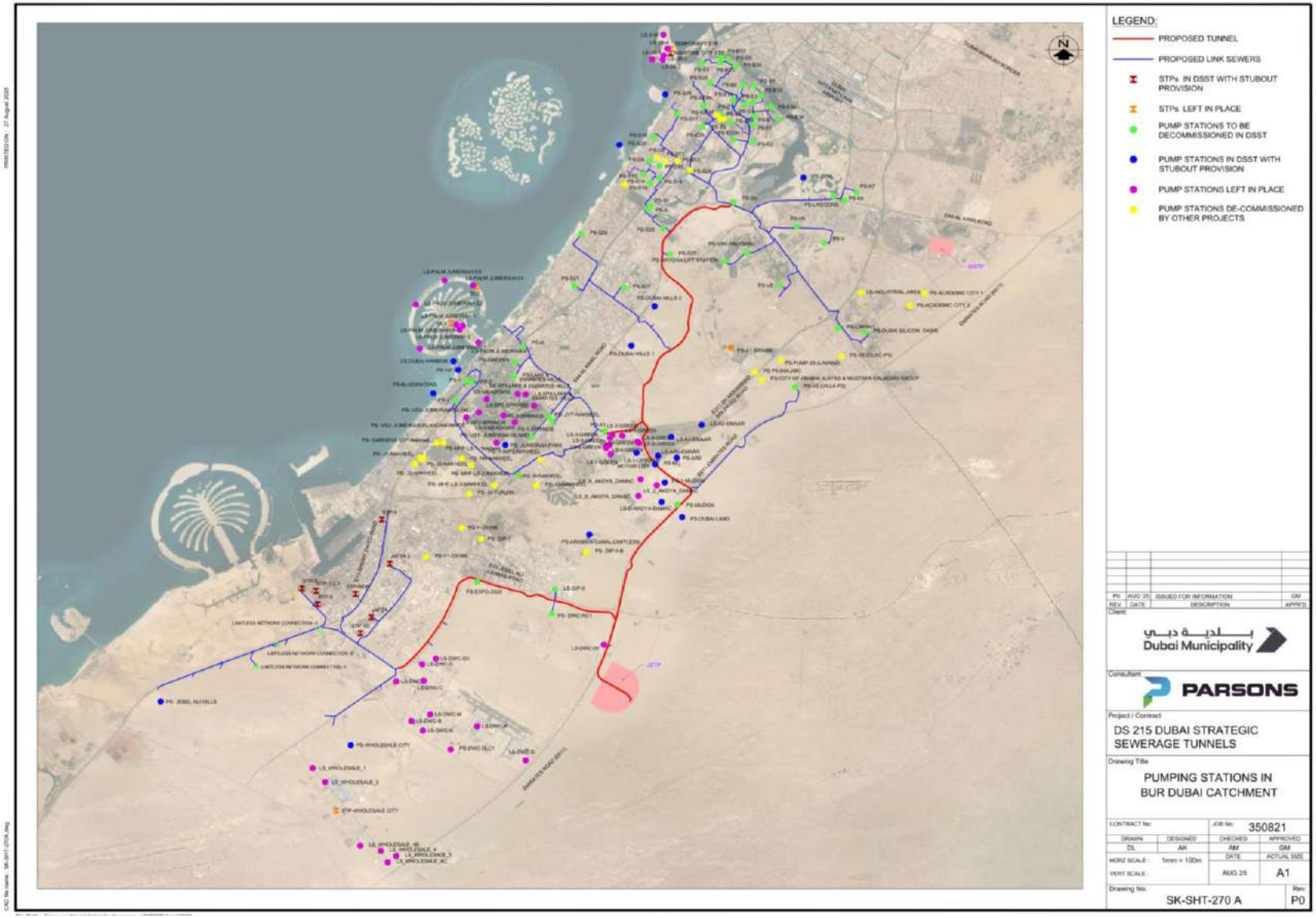


Figure 3.2 – Location of DSST-BD Link Sewers, Pump Stations (to be Decommissioned)

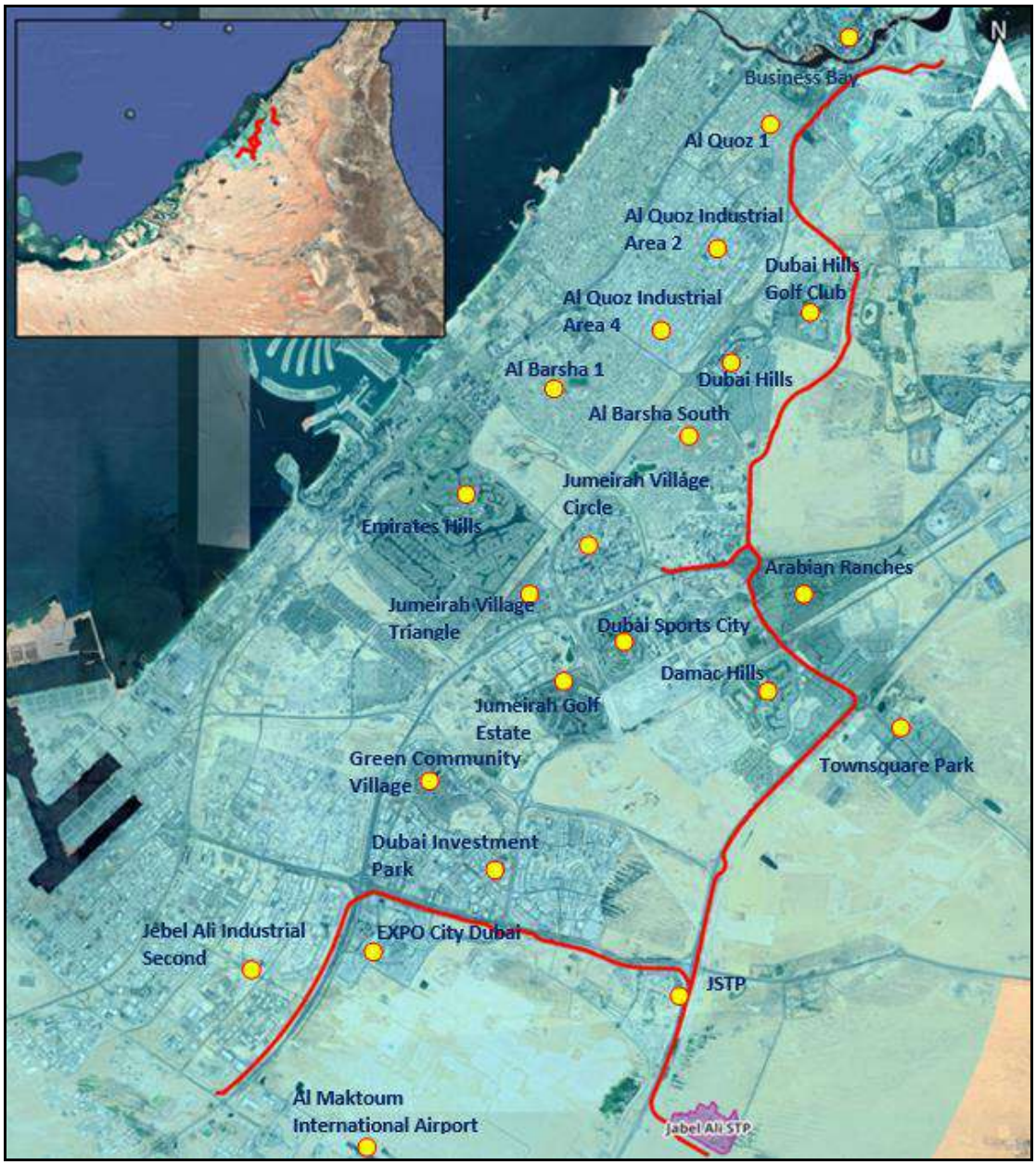


Figure 3.3 – Shaft Locations and its Surroundings

3.3 Project Activity and Descriptions

3.3.1 Existing Sewerage System

The existing system directs the sewage from Bur Dubai to JSTP via pumping stations. The system includes both major and subsidiary pump stations, with major pump station transferring flows by force main directly to the STP. There are major pump stations in the existing sewerage system. Each of these major pump stations is fed by subsidiary pump stations and gravity flows, although not all pump stations have gravity contributions. There are over 100 subsidiary pump stations owned and operated by DM. Flows from these subsidiary pump stations are transferred either directly pumped or by intermediate gravity networks to the main pump stations.

Table 3.1 – Existing Main Pump Stations

Jebel Ali Catchment	
Pumping Station (PS) Name	Station Capacity Design (Actual)
PS Sn	2400 l/s (2400 l/s)
PS S	1716 l/s (1423 l/s)
PS H	2254 l/s (1481 l/s)
PS XI	9000 l/s @ (8106 l/s)
PS V	1860 l/s
PS E	1329 l/s (1600 l/s)

Table 3.2 – Future Main Pump Stations

Jebel Ali Catchment	
Pumping Station (PS) Name	Station Capacity
PS N	3501 l/s

3.3.2 Decommissioning of Existing Facilities/Infrastructure

The decommissioning of the existing sewage pumping stations and related infrastructure will involve the following steps:

Diverting Flows to the New System (Link Sewer and Tunnel)

Flows from the existing Dubai municipality network will be safely diverted to the new link sewer and tunnel system in PPP Concession project.

Timing - The existing sewage pumping stations will remain operational during the pipeline connection works and the flow diversion and will continue to operate until minimum two years after the commissioning works of diversion works and the system. Once a smooth operation will be confirmed for the new link sewer and tunnel system, the existing pumping stations will be decommissioned.

Ensuring Uninterrupted Operation

- Sewage over-pumping may be required to ensure uninterrupted operation of the existing sewage pumping stations during the construction works.
- Temporary diversion systems may be needed to maintain the flow during this phase.

Temporary Plug Installation

- A temporary plug will be installed in the redundant existing gravity sewer network during the initial 2 years of operation of the new system. This will prevent sewage flow towards existing system.
- The temporary plug will remain in place until the permanent plug is installed after 2 years of new system operation.

Permanent Plug Installation

- Once the Dubai Municipality has notified the Project Company that the new system is fully operational, the permanent plug will be installed in the redundant sewer network. This will permanently stop any sewage flow towards existing pumping stations.

Demolition of Existing Facilities:

- Demolition of the existing sewage pumping stations can take place once the decommissioning phase is complete and the Dubai Municipality decides to proceed with it.

Figure 3.2 shows the existing main and subsidiary pumping stations and private STPs in Dubai which are related to DSST project directly or indirectly. Some of the existing pumping stations will be decommissioned under the DSST project scheme (green dots in Figure 3.2). However, for some other existing pumping stations and STPs, there will be stub-outs provided in the DSST network where network of these Pumping stations and STPs will be connected in future by the developers, when developer will implement their decommissioning of pumping station or STP. The Figure 3.4 also shows the pumping stations and TPSs for which DM has no plan to connect to DSST system, until found necessary in future. However, it is to be noted that DSST system has capacity to accommodate flows for such pumping stations and TPSs. It is to be noted that some of the DSST link sewers are already under construction through different projects (Figure 3.4). However, the concepts of decommissioning of existing pumping stations and diversion of flows to the deep tunnels remain same as followed in DSST project. It should be noted that decommissioning of existing pumping stations that will happen after 2 years of DSST system commissioning.

3.3.3 Description of the Proposed Sewerage System

The proposed Dubai Sewage System Transformation (DSST) Project will convert/eliminate the current sewerage system (i.e., existing pumping stations) and replace them with a gravity-based deep tunnel system. This upgrade will provide a sustainable, innovative, and reliable service, designed to meet the growing demands of the Emirate for future generations. The DSST project includes the construction of a deep tunnel, with a terminal pump station at the end, located at the sewage treatment plant (STP). The system is designed to collect all gravity flows immediately upstream of the connection to each subsidiary and major pump station. These flows will then be transferred to link sewers, which ultimately discharge into the main tunnel.

The DSST-BD tunnel has a varying diameter: 4.0 meters at the head of the system near Pump Station Sn, increasing to 6.5 meters at JSTP. The tunnel depths range from 32 meters to 120 meters below ground level. The Bur Dubai tunnel will start at 32 meters below ground level at the upstream end and terminate at around 120 meters at JSTP. The total length of DSST-BD tunnels is approximately 59.085 km, also includes total length of 147 km of link sewers and a terminal pump station with an ultimate capacity of 5500 MLD. A tunnel will be constructed using Tunnel Boring Machines (TBM).

The smaller diameter link sewers (less than 3.4 meters) will be shallower, generally ranging from 5 meters to 25 meters in depth (though deeper in some areas), and will be constructed using pipe jacking or micro tunnelling techniques. The tunnel design parameters are presented in Table 3.3 below.

Table 3.3 – DSST-BD Tunnel Parameters

No.	Description	No.	Length (m)	Depth (m)	
				Min.	Max.
1.	Diameter				
	3500		6,400	46	94
	4000		21,000	32	47
	5000		20,800	47	85
	6500		10,885	85	120
2.	No. of Construction Shafts (CS)	11			

3.	No. of Receiving Shafts (RS)*	6			
4.	No. of Tangential Vortex Drop – Type 4 (VDS)**	11			
5.	No. of Maintenance Shafts (MS)	22			
** Combined CS/RS counted as CS not RS* *** VDS Shafts will also serve as MS*					

3.3.3.1 Catchment Area and Details

To the south of Dubai Creek, the Bur Dubai tunnel (DSST-BD) and its associated link sewers will collect flows from a catchment that includes both heavily urbanized areas and new developments stretching along the coast towards the Abu Dhabi border and into the desert. These flows will ultimately be treated at the Jebel Ali Sewage Treatment Plant (JSTP).

It is important to note that the project design accounts for the ultimate capacity of the catchment areas, projected for 2045, when all communities in Dubai are expected to be fully developed. The catchments for the existing WSTP and JSTP were adjusted from their original boundaries, with some sub-catchments redirected from Deira (WSTP) to Bur Dubai (JSTP).

These adjustments were made to accommodate future expansions of the STPs, considering that the WSTP site has limited space for growth, while the JSTP site offers more opportunities for expansion. presents the future DSST-BD catchment. Table 3.4 summarizes the projected population and average flows in the catchment areas.

Table 3.4 – Populations and Flow Projections

No.	Description of Catchment/Type of Flows	Equivalent Population and Recommended Scenarios Flows (MLD)					
		2020	2025	2030	2035	2040	2045
1.	DSST-BD/JSTP Equivalent Population	3,050,000	4,096,000	5,554,000	7,121,000	8,887,000	11,596,000
	DSST-BD/JSTP Total Average Flows (MLD)	1,100	1,375	1,630	2,095	2,630	3,335
	Peak Flows (MLD)	1,434	1,793	2,125	2,665	3,346	4,243

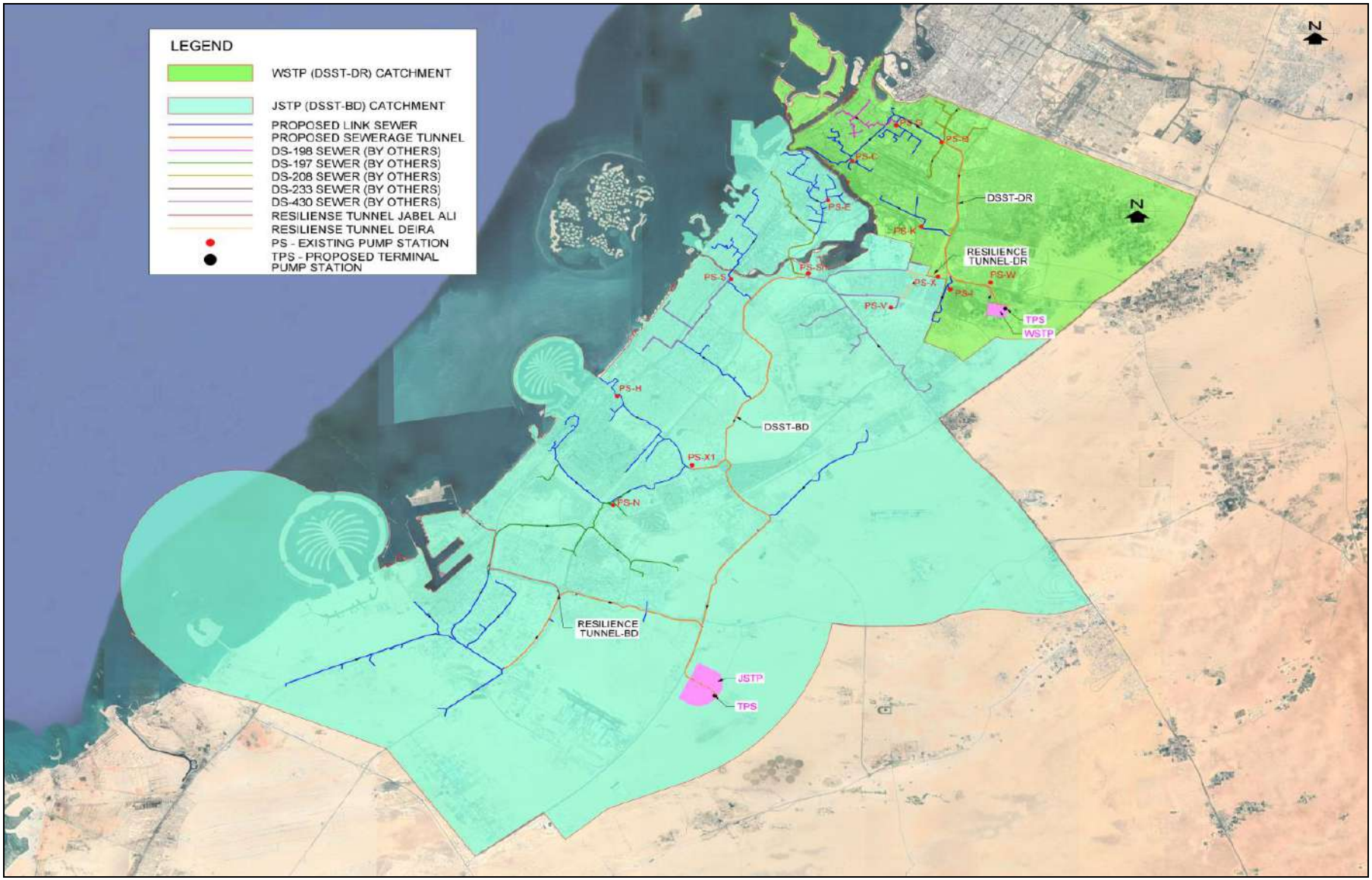


Figure 3.4 – DSST-DR and DSST-BD Catchments

3.3.3.2 Shafts

Along with the tunnels, the project will include the construction of four types of shafts, as outlined in below Table 3.5.

Table 3.5 – Types of Shafts for the Project

Shaft Type	Purpose	Internal Diameter (m)	Construction Method
Launching	Launch TBM to start tunnel section	18-22	Diaphragm Wall or Secant Pile or VSM
Retrieval	Remove TBM at end of tunnel section	12-20	
Vortex Drop	Transfer wastewater from shallow link sewers to the deep tunnel	12-20	
Maintenance	Allow access to tunnel for maintenance, (essentially a manhole)	12-18	
Pump	Serves as wet well and pump station	48-78	Diaphragm Wall

The internal diameter listed in the Table 3.6 above represents the actual shaft diameter required during construction. In some instances, shafts will serve dual purposes after construction, which may influence both the temporary and permanent shaft size requirements. For example, construction and receiving shafts are often left in place after completion to function as either vortex drop shafts or maintenance shafts. Therefore, a shaft with a diameter of 20m during construction may be reduced to a 3m or 4m diameters access shaft along with base chamber of 6 to 12m diameters and forms a maintenance shaft once construction is finished. Table 3.6 outlines the temporary and permanent shaft diameter requirements for the various shafts.

Table 3.6 – Temporary and Permanent Shaft Requirements

Shaft Type	Temporary Diameter (m)	Permanent Diameter (m)
Launching	18-22	3-4 access shaft with bottom chamber of 6 to 12m
Retrieval	12-20	3-4 access shaft with bottom chamber of 6 to 12m
Vortex Drop	12-20	5-10
Maintenance	12-18	3-4 access shaft with bottom chamber of 6 to 12m

Drop Shafts

Many interface points between the link sewers and the tunnel involve changes in elevation, with drops ranging from as small as 0.6m to as large as 37m. The DSST Project incorporates four different types of drop structures, each designed for different drop depths: a typical external drop with a tee for smaller pipes, an external drop for larger pipes, a spiral vortex drop, and a tangential vortex drop. Most of these drop structures are aligned with the tunnel. However, for larger drop depths and flows, the tangential vortex drop structures are generally connected to the tunnel via an adit connection rather than being positioned directly above the tunnel and include de-aeration chambers.

3.3.3.3 Odor Control Units

Odour control facilities (OCFs) are designed to ventilate the entire tunnel system. In addition to the OCFs located at the terminal pump station (TPS), regional OCFs along the tunnel alignment are designed to extract foul air from both the tunnel and link sewers. These OCFs are controlled by pressure transmitters that monitor the pressure within the tunnel system. The OCF fans, equipped with variable frequency drives (VFD), operate based

on the tunnel pressure, activating only when the pressure reaches a predetermined set point.

The OCFs at the TPS will operate continuously to extract foul air from the tunnel via the TPS wet well. For vortex drop structures that do not include OCFs, air jumpers (AJs) will be installed, controlled by pressure transmitters. These transmitters will activate the AJ fan, which will push foul air from the high-pressure end to the low-pressure end, downstream of the drop structures.

As previously mentioned, bio-trickling filters are preferred for this project as the optimal odor control solution due to its ability to treat a variety of odorous compounds, including H2S, NH3 and VOCs. A bio-trickling filter achieves an H2S removal efficiency of over 90% consistently, despite varying levels of H2S in the inlet.

Two staged treatment system are designed, i.e., bio-trickling filter followed by a second stage activated carbon filter (ACF); as the treated odorous air from biological treatment is further polished using ACFs to ensure the required treated air standards are achieved. The odour control system will treat the odorous air extracted from the tunnel and meet the following minimum performance criteria.

- The odour control system will achieve an overall H2S removal efficiency of >99.9% or an outlet H2S concentration of <0.1 ppmV, whichever is less, for inlet air H2S concentrations >20 ppmV.
- The odour control system will achieve outlet H2S concentration of <0.1 ppmV for inlet air concentrations <20 ppmV.
- Odour discharge of 5 OU/m3 is maintained at the plot boundary of each ROCF/OCF at 30 minutes averaging basis. The ROCF/OCF boundary to measure the odour limits will be governed by the environmental requirements of Dubai Municipality-Environment Studies Department and not by the physical plot boundary or fencing of the OCF. H2S concentration of 5 ppbV at plot boundary locations will be achieved by the OCF.
- The odour control system will achieve the mentioned removal efficiency for the following compounds at the outlet:
  - Mercaptans, R-SH – 99.5%
  - Ammonia, NH3 - 95%
  - Dimethyl Sulphide, DMS – 99.5%

For the DSST-BD tunnel, seven (7) odor control facilities (OCF) and twelve (12) air jumpers are proposed. The air handling equipment and associated facilities will be appropriately sized to ensure efficient tunnel operation, minimizing the risk of headspace pressurization, reducing corrosion, and preventing malodorous nuisances.

3.3.3.4 Terminal Pumping Station

The terminal pump station will be designed to maintain a preset water level in the wet well, rather than operating intermittently or surcharging at specific times of day. This ensures a relatively stable water level in the tunnel system, optimal operating hydraulic conditions and helps minimize the risk of odorous emissions.

The pump stations will be constructed with automatic coarse screens, wet-wells & dry wells arrangement, using vertical mixed-flow volute pumps. These pumps are the most suitable for the required heads and flows at the terminal pump stations. They will be equipped with variable frequency drives (VFDs) to accommodate the wide range of flows in the tunnel, which would not be feasible without the use of VFDs.

The DSST-BD tunnel systems include a terminal pump station (TPS), lifts sewage to the Jebel Ali Sewage Treatment Plant (JSTP). The Jebel Ali TPS is designed for a peak flow of 5500

MLD (63,660 l/s) with a head of 125 meters, utilizing a configuration of twelve (12) duty pumps and two (2) standby pumps. Layouts of JSTP (TPS) are attached as part of Annex 3 of this Report.

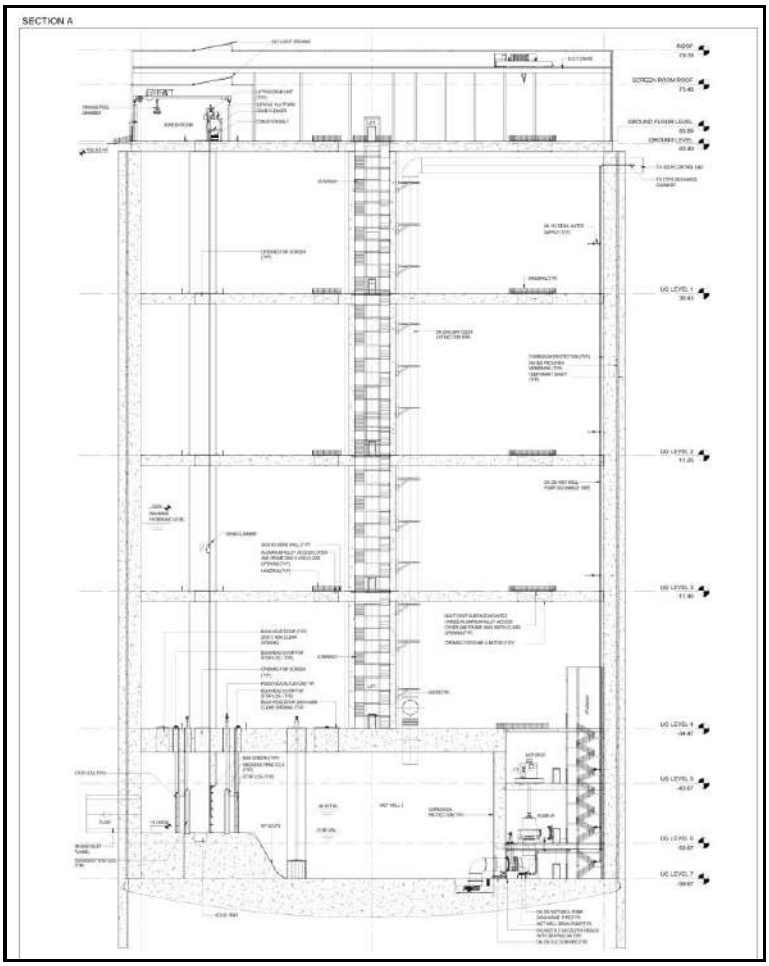


Figure 3.5 – Terminal Pumping Station (TPS) Section A

3.3.3.5 System Resiliency Analysis

A system resiliency analysis was conducted to assess the overall resilience of the DSST system in case of TPS or tunnels failures. The TPS and tunnels have been identified as the most vulnerable elements in DSST system. The tunnel system is being designed for 120-years durability taking into consideration the durability needs of handling sewage. TPS are designed with two DEWA power sources from drip and standby power generators will also be available to operate pumps under any unforeseen power outage scenario. However, even with a meticulously designed and constructed deep tunnel project that adheres to the highest engineering standards, there remains a risk of unforeseen threats that could lead to failure of any components. The following are examples of such unforeseen events that require another layer of resilience to be introduced strategically in the DSST system.

- Cybersecurity threats to automated systems or equipment.
- Acts of terrorism, sabotage, or vandalism.
- Earthquakes or seismic activity affecting tunnel or shaft stability
- Failure of monitoring or control systems during a crisis.
- Negligence by another party working near tunnels or shafts

Therefore, resiliency measures should focus on both protecting these assets (e.g., ensuring adequate standby power at the TPS) and providing a means to transfer flows between catchments, any major catastrophic failure of the tunnel happens.

Based on the hydraulic assessment, the most suitable option to prevent flooding in the event of a catastrophic failure in either of the two systems, and to provide a quick relief within 17-hour (before first sewage spillage occurs based on ultimate year flow projections), is to establish an interconnection between the two systems (Deira and Bur Dubai) as shown in Figure 3.6. This is done by proposing two resilience tunnels that will operate only under the emergency conditions of complete failure of the tunnel network system in either catchment. Deira resilience tunnel will connect the Deira sewerage network with Bur Dubai network and will activate automatically in case of such emergency event. This activation occurs when the sewage surcharges causing the tunnel sewage level to rise. This forms the first line of defence towards any sewage spillage by transferring flows between catchments.

Another connection of the DS215 system is proposed with the existing DS233 stormwater tunnel through Jebel Ali resilience tunnel. It shall be noted that the Jebel Ali resilience tunnel will not activate automatically. There are two gates provided that will be operated consciously in the extreme cases (refer to Figure 3.7) to prevent and control any possible overflow towards DS233 tunnel. Dubai Municipality will ensure leak proof design of the hydraulic gates and implement stringent O&M requirements. The activation of this resilience option is again only on the condition of a catastrophic failure between the two systems (Deira and Bur Dubai) and more than what can flow between the two systems.

The normal operations of the system in the DS215 Jebel Ali Tunnel (refer to Figure 3.7) will be at 2.5 m depth of the 5m diameter tunnel (i.e. level (-)33.0DMD) above invert level of the tunnel at (-) 35.5 DMD. The cross connection to the DS233 stormwater tunnel is at invert level (-)16.00m DMD (i.e. more than 17m above the normal operation level of the DS215 Jebel Ali Tunnel) and will never be activated under any normal operating conditions. Nonetheless there should be controls in place such that the opening of the two (2) penstocks on the Jebel Ali Resilience Tunnel is only under authorized and controlled manner (refer to Figure 3.7).

Resilience tunnels connections would provide complete sewage spillage protection for both urban catchments in the event of a failure at either downstream end of the tunnel. It shall be noted that the scope of the DS 215 Project does not include or address sewage discharge to the sea through the Jebel Ali resilience tunnel connection with DS233 tunnel.

The third resilience connection shown in Figure 3.7 will only be required in case of aggressive population growth in BD catchment beyond 12.6 million population. This third connection is not part of PPP concession project.

The EIA report discusses the potential impacts associated with the resilience tunnel development. The environmental impacts of the resilience tunnel are generally considered to be similar to those of the standard tunnel development. Both involve comparable construction techniques, environmental interactions, and associated disturbances, including tunneling, etc. As such, the EIA has already addressed the primary concerns related to tunnel development impacts, which were equally applicable to the resilience tunnel.

While resilience tunnels incorporate specific enhancements aimed at improving safety and durability, such as additional reinforcement and protection measures, these modifications do not substantially alter the overall environmental impact. The EIA accounts for these considerations, and the anticipated impacts of the resilience tunnel are aligned with those outlined for standard tunnel development.

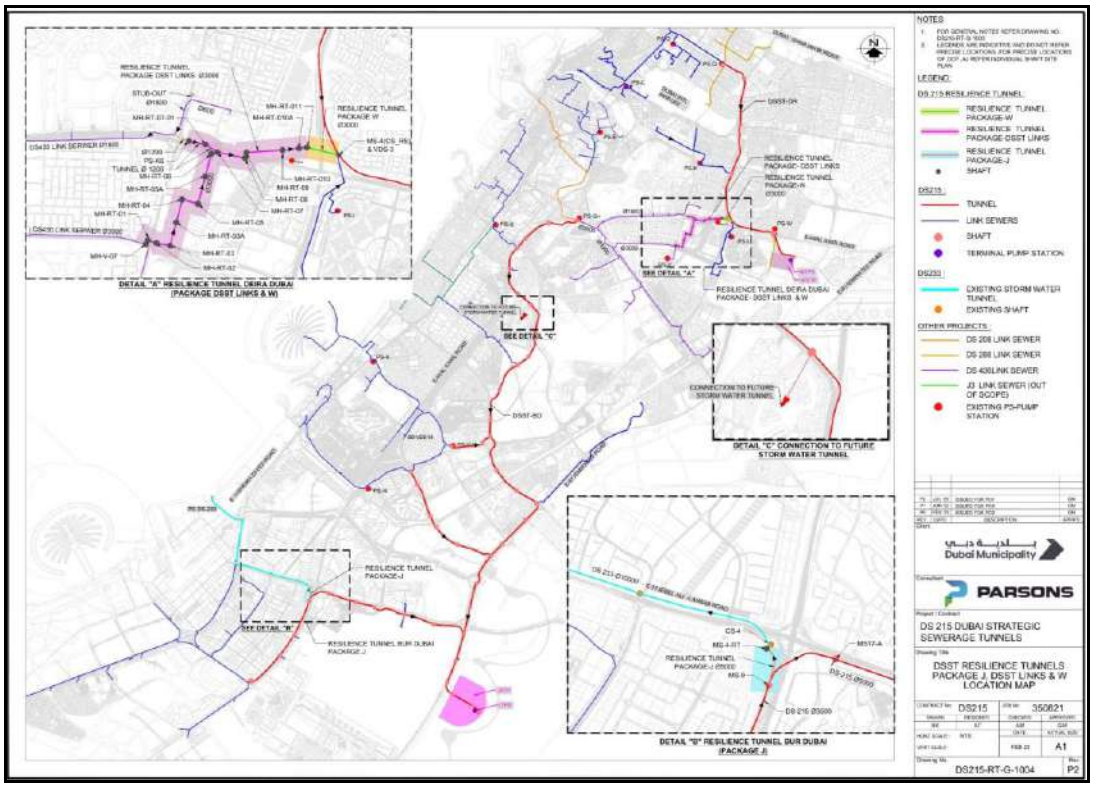


Figure 3.6 – Proposed Tunnels Interconnection for DSST System – Resilience Options

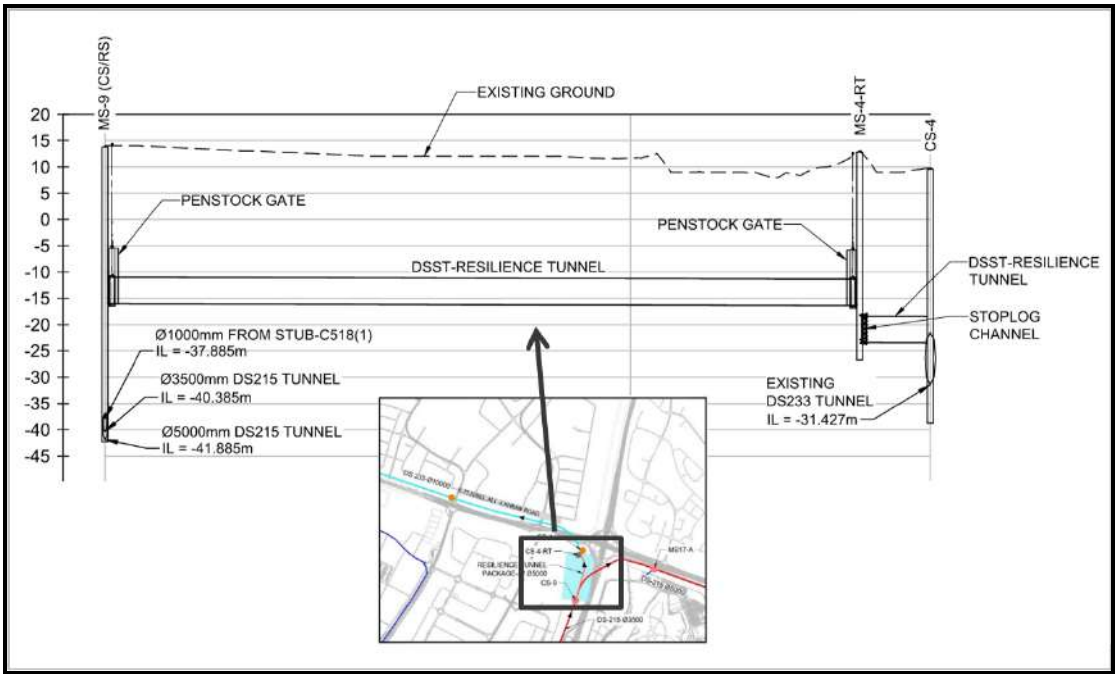


Figure 3.7 – Jebel Ali Resilience Tunnel Connection and Hydraulic Gates

3.3.3.6 System-Wide Instrumentation & Controls and Monitoring

Appropriate monitoring equipment should be installed to effectively and efficiently manage the system. The goal of the monitoring system is to provide sufficient information to:

- Provide flow and level information for each major incoming link sewer and identify flow and level or surcharge issues
- Identify water quality & quantity issues in the system and approximate location of the issue

- Provide level data in the tunnel and wet well linked to the operation of the TPS pumps
- Monitor air quality parameters for operation of the odor control units and to maintain design air pressure
- Monitor effluent flow level, air velocity, air pressure, and VOC concentrations in the tunnel headspace
- Provide flow and pressure information of the flow reaching the STPs
- Monitor parameters such as pH, ORP, COD, and temperature for water quality analysis
- Determine any leakage in the tunnel and any tunnel structural health issues
- Provide information that can be used to evaluate the status of equipment in the system

The proposed monitoring equipment will be located at the points of entry to the tunnel, at existing pump station flow diversion points within the tunnel, and at strategic locations in the link sewer to help identify any ingress or leakage.

3.3.4 Project Phases

3.3.4.1 Construction Overview

This section provides a general description of the likely construction activities related to the development of proposed Project. It should be noted that as the construction contractor is yet to be assigned to the proposed Project, limited information is available at this stage on construction methodology and activities associated with the proposed works.

Construction Activities

The Project construction activities generally be divided into the following main activities:

- Site Preparation
- Establishing temporary facilities
- Dewatering works
- Shaft excavation works
- Tunnelling works
- Establishment of link sewers
- Construction of TPSs
- Site Restoration

Temporary Facilities

Temporary site facilities will be installed/operated to support construction works include:

- Site offices (porta cabins) with toilets, security and Parking
- Laydown area for the construction materials
- TBM support equipment including ventilation fans, cooling plant, generators, compressors, transformers and power supply equipment
- Heavy Duty crane
- Concrete Batching Plant
- Workshops
- Chemical Storage area
- Waste handling and storage area
- Temporary storage areas for TBM consumables and equipment, precast concrete segments, pre-casting yards and final lining concrete formwork.
- Diesel Generator

The whole area of the temporary facilities will be fenced and provided with security. Power to the offices will be provided by using temporary diesel-powered generators. Figure 3.8 depicts a typical tunnel construction and receiving shaft laydown area. The laydown area will mainly be used for storage, including an area for muck storage and tunnel segment storage. Table 3.7 estimates the working area for each shaft type, to stage heavy equipment and materials.

Table 3.7 – Working Area Requirements

Component	Working Area Required (m^2)
Tunnel Launching Shaft	20,000 - 25,000
Tunnel Receiving Shaft	12,000 – 16,000
Tunnel Vortex Drop Shaft	8,000 – 12,000
Tunnel Maintenance Shaft	8,000 – 12,000
Link Sewer Working Shaft	4,000 – 8,000
DSST-BD TSP	70,000 – 80,000



Figure 3.8 – Typical Tunnel Construction Laydown Areas

Grouting and Dewatering

As found necessary grouting & dewatering works will be carried out to ensure the excavations, headings and tunnels shall be kept free of water. It should be noted that ground water tables are subjected to tidal and weather seasonal variations or by artificial induced effects (also by sea water level variations). Therefore, reconfirmation is recommended prior to any work related to ground water regime. If no contamination is suspected, dewatered water shall be used again for dust suppression; any excess will be disposed of in accordance with NOC conditions and DECCA requirements. While carrying out dewatering, it shall be ensured that no excessive settlement is caused to the nearby structures. Moreover, suitable precautions should be taken, especially in areas with weak strata.

The nearby dewatering operations shall be continuously monitored during the construction period for their designated Alert-Action-Alarm (AAA) levels. During construction

monitoring, if it is found that the ingress of water or dewatering activities causes a breach of the AAA thresholds, dewatering activities shall be immediately halted, and corrective measures, such as grouting, shall be implemented. In some cases, this may require recharging the water table. In such instances, the dewatering well may be used as a recharge well, and the water regime shall be maintained to prevent breaches of the AAA values derived for the dewatering activities.

Launching Shaft

Construction shafts will be used to launch TBM. CS will require the most area and will be in service for at least four (4) years. A tail tunnel/starting chamber allows the entire TBM, along with its trailing gear, to be fully assembled before tunnelling begins.

To provide for the integrity of the shaft support of excavation wall, the shaft wall can be constructed with a soft eye at every TBM crossing shaft at break-in and break-out locations. This soft eye is typically reinforced with fiberglass reinforcing bars that can be cut through by the TBM. Additionally, the structure may require a collar beam installed in the shaft around the proposed break-in and break-out opening to further reinforce the shaft at these locations.

To prevent ground and groundwater inflows during break-out of the TBM, a steel/rubber/grease seal will be installed on the shaft wall circumferentially around the TBM at the break-in and break-out locations. Additionally, the ground immediately outside of the shaft at the break-in and break-out locations shall be grouted to reduce its permeability and increase its strength.







Figure 3.9 – Construction Shaft and Shaft Excavation

Receiving Shafts

The receiving shafts have many of the same requirements as the construction shafts, but they do not require as large a worksite. This is because the primary activities at the receiving shafts involve constructing the shaft and removing the TBM. As previously discussed for construction shafts a soft eye, collar beam, and grouting of the surrounding ground will be required for TBM break into of the receiving shaft. Break-out operations will take about 3 months to complete. This would include pre-treatment of the ground, construction of collar beam, break through and removal of the TBM.

Drop Structures

Drop structure will convey sewage flows from the link sewer at shallow depth towards deep tunnel or the link sewer. As a part of DSST, the following four types of drop structures are proposed. The selection of the drop structures for any particular application is based on the diameter of the link sewers and length of vertical drop. No drop structure is needed for a difference in elevation of less than 0.6m.

- Drop Manhole Type -1 (Typical External Drop)
- Drop Manhole Type -2 (Typical External Drop for large pipes)
- Drop Manhole Type -3 (Spiral Vortex Drop)
- Drop Manhole Type -4 (Tangential Vortex Drop)

ADIT Tunnels

Adit tunnels are connections from drop shafts to the main tunnel.

Maintenance Shafts

All shafts (CS/RS/MS) upon completion of construction period will be used for maintenance of system. MSs will be spaced about two (2) to three (3) km apart to provide access for future maintenance and inspections. Regular inspection of the tunnel conditions will be carried out using remote operated vehicles. Maintenance shafts will have access shaft with 4m diameter (for pipes greater than 4m diameter) and 3m (for pipes less than 4m

diameter) to allow for the passage of the man-riding basket and ventilation ducts to supply fresh air in the bottom chamber and to the tunnel invert.

Tunnel Design

The deep sewer tunnels (DSST) will be excavated using tunnel boring machines (TBMs) with personnel entry. For pipelines under 3.4 meters in diameter, remotely controlled micro-tunnelling will be used without personnel access. Pressurized face tunnelling methods are required for both link sewer and deep tunnels, as per geological and groundwater conditions. New Austrian Tunnelling Method (NATM) method or mined tunnels may be used for stub tunnels and adits.

The final selection of tunnelling machine (earth pressure balanced or slurry) will be determined by the contractors and depend on the geotechnical conditions and ability to limit disruption. The tunnel path and depth to be designed to avoid sensitive areas, and coordination with utility providers ensures that all protective measures are in place. Materials and construction methods are chosen to ensure a 120-year design life. The segmental liner will serve as the final lining, with a second pass cast-in-situ concrete along with embedded HDPE liner for corrosion resistance. Permanent shaft linings will include waterproofing and corrosion-resistant materials like HDPE/GRP.

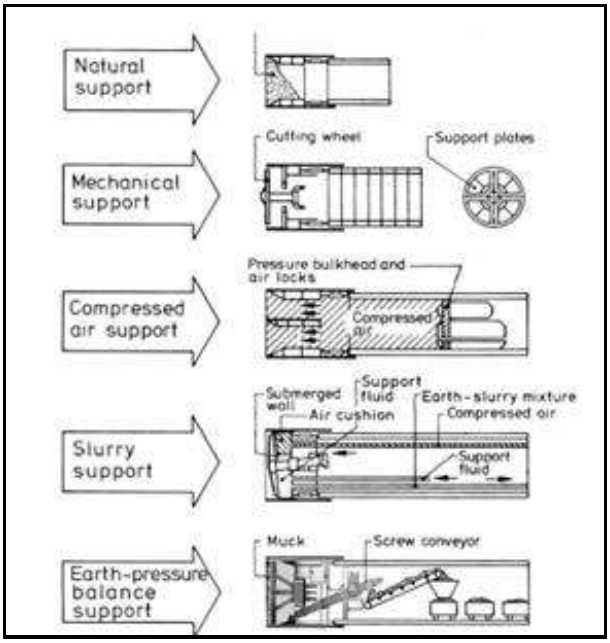


Figure 3.10 – Methods for Face Support in Shields and TBMs

Pressurized-Face Tunnel Boring Machines

The two most common pressurized face excavation method types are slurry and earth-pressure balance (EPB) TBMs. The choice between Slurry TBM and EPB TBM tunnelling methods is influenced by several factors, including grain size distribution of the excavated material; ground permeability; occurrence of obstructions, hazardous gases and contaminants; feasibility of soil separation and muck disposal; and settlement considerations. For the DSST project, either EPB or slurry machines are appropriate for the ground conditions expected to be encountered. As previously noted, the final selection will be determined by the contractor.

EPB Boring Machine

When the excavated material contains little fines, soil conditioners such as additives/polymers or ground limestone for EPB TBM can be introduced so that the permeability is reduced and excavation face can be stabilised during TBM operation.

Slurry Boring Machine

Slurry TBMs use bentonite, polymer, foam from polymer slurry to apply positive pressure to the tunnel face, counteracting earth and hydrostatic pressures. The excavated material is suspended in the slurry and pumped to a separation plant, where the material is removed, and the slurry is reconditioned and returned to the tunnel. This closed system minimizes worker exposure to harmful gases. Slurry TBMs are suitable for various ground conditions, but complex separation plants are needed for fine spoils, increasing cost and operational complexity, sometimes requiring centrifuges or filter presses. Flocculants may also be used to aid in spoil removal.



Figure 3.11 – Slurry TBM

Tunnel Liner

A watertight liner system will be necessary for both ground support and TBM advancement. This system also supports the jacks used to advance the TBM. The standard industry approach is to use precast concrete gasketed segments. The segmental liner can serve as the final tunnel lining (one-pass liner), provided it meets all durability and water-tightness requirements. A two-pass lining system is recommended for DSST Project, where a final lining has to be cast in-situ along with embedded HDPE liner within the initial segmental lining. The choice between one-pass or two-pass lining depends on tunnel size, cost, and long-term performance needs.



Figure 3.12 – Pre-Cast Concrete Segmental Lining



Figure 3.13 – EPB TBM Erecting a Pre-Cast Concrete Segment

Shaft Design

Watertight shafts in subsurface conditions are constructed using methods such as secant piles, diaphragm walls, VSM and ground freezing. Diaphragm walls and VSM technique are the most suitable for deep shafts along the DSST alignment, as secant piles have depth limitations, and ground freezing is costly and time-consuming. Diaphragm walls require shaft bottom seals or dewatering due to high groundwater pressures.

Diaphragm walls are constructed in segments using a clamshell bucket or hydro-mill, with panel lengths typically 3-5 meters. Shallow guide walls are first constructed to direct the equipment. Polymers are used to maintain excavation stability, and steel reinforcement or soldier piles are added before filling the panels with concrete via tremie methods. Proper watertight joints between panels are critical, often formed with steel piles, and a filler. Groove-type joints with water stops are most common in temporary diaphragm walls to ensure watertightness.

To prevent shaft instability and minimize groundwater impacts, it is crucial to limit groundwater inflows during shaft excavation. A grouted invert seal at the shaft bottom will control groundwater infiltration and stabilize the shaft base. Methods to control seepage include extending the shaft walls below the excavation base to create a groundwater cut-off, temporary aquifer depressurization, and shaft excavation in wet conditions followed by a tremie concrete bottom slab to resist hydrostatic pressure.

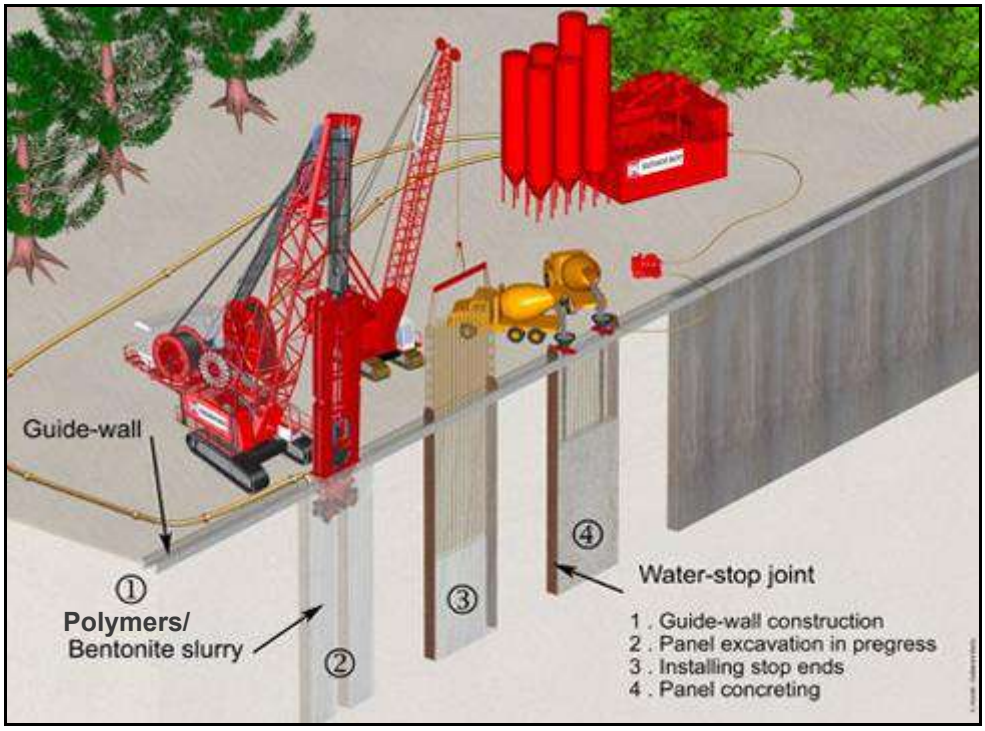


Figure 3.14 – Diaphragm Wall Construction Sequence



Figure 3.15 – Diaphragm Wall Rebar Cage Installation

Shaft Break-in and Break-out

Launching shafts will be constructed before tunnel construction begins, either intermediate TBM passing shafts can be constructed at the main construction or later upon retrieval or relaunch of TBM. Receiving shaft shall be constructed before the arrival of TBM to prevent groundwater inflows and ground loss, a break-out or break-in must stabilize conditions where the shaft excavation will be breached. The machine cannot cut through support systems like diaphragm walls or secant piles, an opening slightly larger than the machine's diameter must be made, sometimes with fiberglass reinforcement (a "soft eye"). The initial shoring around this opening must be stiffened to redistribute stress, using steel/concrete ring beams or inner concrete cylinders. Temporary support is also required around the exposed soil during break-in or break-out.

Ground improvement may be necessary outside the tunnelling machine's entrance/exit to prevent water and soil entry and ensure proper machine operation. This improvement typically extends 1.5 to 2.5 times the TBM's diameter and may involve techniques like jet grouting, permeation grouting, or ground freezing. The goal is to stabilize the soil and control groundwater infiltration. For pressurized-face TBMs, a watertight seal is needed to prevent water and soil inflow when the machine breaks out or into every shaft.



Figure 3.16 – TBM Break-In through Fiberglass Rebar



Figure 3.17 – Gasketed TBM Break-Out Seal

Link Sewer Design

Carrier pipes will be used for link sewers and tunnel pipelines. Most pipes will be constructed using trenchless methods, such as pipe jacking or microtunneling provided below.

Pipe Jacking

Pipe jacking will be used for sections too deep for open-cut methods or with pipe diameters under 3.4m, where personnel entry is not possible. There are two methods: auger boring and conventional pipe jacking. In auger boring, a steel casing is pushed behind a cutterhead and shield, with spoils removed by a rotating auger. It is typically used for pipes up to 1,500 mm in diameter and lengths of 150 meters but struggles with cobbles or boulders. Conventional pipe jacking involves an operator inside the shield using mechanical means to excavate and remove spoils with carts or a rope-and-pulley system. Both methods are limited in high groundwater or loose soils. Jacking pit widths are about 3m, with lengths of 6-12m. The staging area should be around 20m by 45m, or 9m by 25m in congested areas.



Figure 3.18 – Auger Boring

Micro-Tunnelling

Micro-tunnelling is a variation of pipe jacking that uses a micro tunnelling boring machine (MTBM) instead of an auger and cutterhead. The MTBM is laser-guided, remotely controlled, and requires no man entry, allowing precise steering and monitoring of alignment and grade. Spoils are removed via a bentonite slurry, which is pumped into the cutterhead, mixed with excavated material, and sent to a recycling plant for reuse.

Micro-tunnelling can be done with a casing (two-pass operation) or without, using the final carrier pipe as the jacking pipe (one-pass operation). It is advantageous over pipe jacking in high groundwater conditions due to the slurry's pressurized face, preventing uncontrolled inflows. The staging area and pit requirements are similar to pipe jacking, with additional space for a compact slurry plant. The operation details are given below:

The machine will be powered hydraulically. The source of hydraulic power via power pack is situated next to the control container. Initially the machine will be lowered on the jacking frame and the cutter head will be carefully pushed into the shaft seal using the hydraulic jacks. Once in position, all the services will be connected. These services connections will consist of

- Slurry circuit pipe connections
- Electrical control cables
- Power cable to the power can

Once all the connections are made the machine will be ready to advance. The first jacking pipe will be placed on the rails. Slurry pipes and control cables will be disconnected, then the next pipe will be placed and joined. After slurry pipes and control cables will be re-connected before this pipe will be pushed into the ground. The same sequence of disconnecting pipes and cables and inserting new pipes will continue up to the completion of the line. After the line is laid and completed, the annular space between the pipes and the soil/rock surround shall be cement/bentonite grouted. The operator will control all MTBM and jack operations from a cabin that will be located on the edge of the pit.

Slurry Circulation

The method used to remove the soil from MTBM is called slurry circulation. The system consists of a charge pump to send the slurry to the mixing chamber face of the MTBM through (typically) 4-inch pipe work. Then the slurry will be circulated behind the head to pick up cut soil, sand, rock fragments etc. and then pass through discharge pipe to the discharge pump that lifts the slurry.

The slurry will be discharged onto a de sander unit where the large particles and sand will be filtered and stockpiled for use as backfill material or disposal off site. Wastewater will be discharged via DM authorized waste hauler for disposal to an approved designated area.

Lubrication System

A lubricating mixture of bentonite with polymer (i.e. Bentonite slurry) will be continuously pumped into the cutting annulus through rear of the MTBM. The bentonite will seal the sand and maintain a small annulus space around it whereas the polymer will provide a high degree of lubrication and reduce the jacking force and prevent disturbance of sand around the encased pipe. It should be noted that the rate of use of bentonite slurry will depend upon the type of soil and amount of overcut.

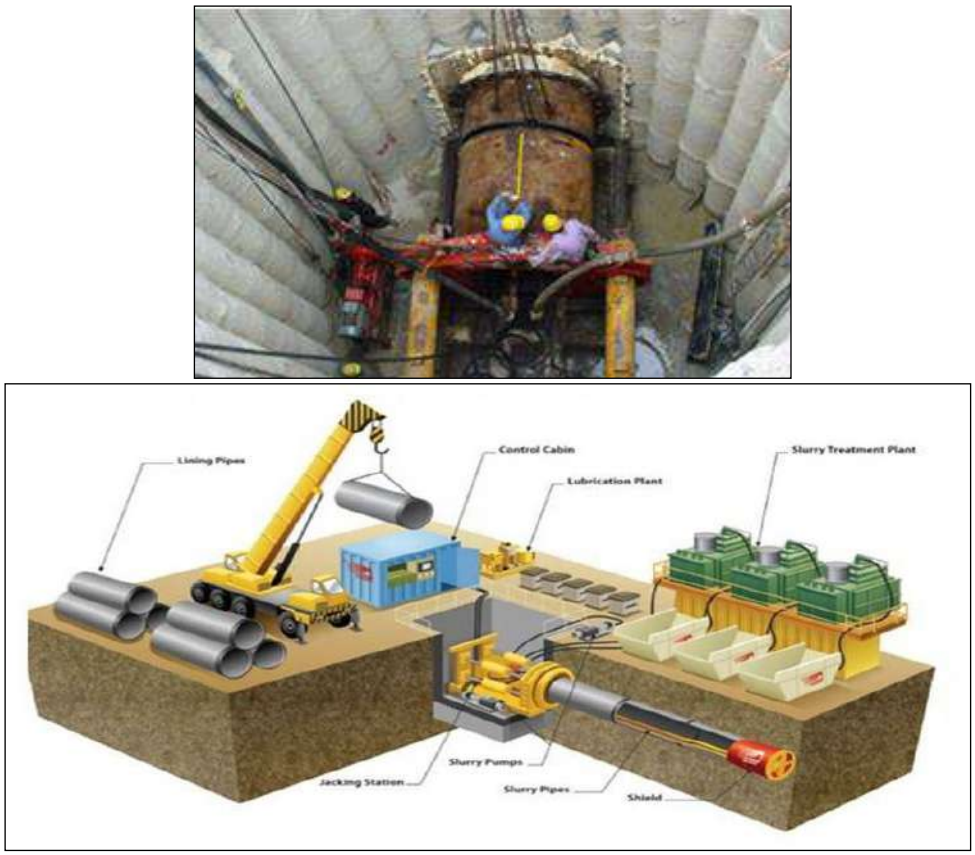


Figure 3.19 – Micro-Tunnelling Staging Area

Site Restoration

It should be noted that contractors for the tunnels and the link sewers will be responsible for restoring the site post-construction. The tunnel will be constructed deep underground will have no effect on the roads. In addition, some locations, the link sewer/tunnel will be beneath the carriageway and constructed using micro-tunnelling. The final route and access plan will be determined after obtaining approval NOC from the relevant agencies. After completion of construction works, all the working site shall be restored to their original states.

3.3.4.2 Construction Equipment

Various equipment will be deployed at the site during the Project implemented. The following construction equipment/machineries are expected to be deployed on site:

- Tunnel Boring Machine and supporting gantries
- Compressors
- Sump Pumps
- Tower Crane, crawler cranes and shaft Gantry Crane
- Concrete/grout batching plant for tunnel excavation and lining activities
- Conveyor
- Ventilation fans
- Dump trucks
- Flat Trailer
- Bobcat
- Vibrator
- Tankers
- Pickup
- Temporary Diesel Generators

Manpower

A maximum of about 1500-2000 construction personnel (i.e., at peak construction), including senior management, engineers, supervisors, safety officers, operators, assistants and construction labourers are expected to be deployed during the Project's construction phase. No temporary accommodation camp will be built as part of the Project. Construction contractor shall plan for the accommodate of construction workers.

Potable Water Supply

DEWA's Water Transmission Planning Guidelines for Development Projects, Update 2023, prohibit to supply water to any construction sites, therefore each of the construction contractor will supply sweet water at the site during construction via tankers. The maximum demand will be at peak construction. Considering a maximum demand of 150 litres per capita per day (as per DEWA Water Transmission Planning Guidelines for Development Projects, 2023), the daily demand will be 300 m3/day of potable water will be required at peak construction. Potable water will be stored in tanks located near to respective temporary site offices. Separate tankers to supply water for sprinkling and for other construction activities.

Power Supply

It is expected that the temporary power supply for the site offices and construction will mostly come from DEWA. If approved, diesel generators will be used only for emergencies; otherwise, they will provide the required electrical power. The generators will be refuelled as needed by the power provider via tankers. At the casting yard and launching shaft sites, the construction contractor shall install their own power substations to meet the TBM launching and operational power demands.

Sewage

Temporary site offices will be provided with temporary holding tanks for the storage of sewage to be hauled regularly by a licensed third party for disposal into a DM approved disposal/treatment facility. The maximum daily sewage generation per capita is 120 Liters/day (DM Sewerage Design Guidelines - Sewerage and Recycled Water Projects Department, Waste and Sewerage Agency). At peak construction, about 240 m^3/day of sewage will be generated. It should be noted that this sewage generation is not really attained during actual construction it could be less than expected. However, the temporary tanks will be provided with sensors to signal when hauling is required.

Stormwater Management

Temporary storm drainage will be installed at each site to ensure proper drainage. If there is more than a 25% chance of a storm, stormwater management practices will be implemented to reduce erosion and prevent sediment entry. These practices include silt fences, fiber rolls, sandbags, and other approved measures. Stormwater will be captured in retention ponds or discharged to the existing system. Flood protection, such as berms, will be installed around tunnel inlets and link sewers before a major storm.

Waste management

Wastes during the Project construction will comprise mainly of removing and disposing of the excavated material (known as "muck")), excess debris, slurry, spoiled construction waste materials, concrete, concrete washout, off-cut construction steel, pipes, and wooden material, empty containers, and used packaging materials, including hazardous wastes, such as empty paint/oil/thinner containers.

Other sources of waste will include domestic waste, both solid and liquid, from the construction workers deployed on site during the construction phase. Effluents discharges will mainly include sewage, dewatering, excess water, concrete wash water, hydrotest water, slurry, cleaning, flushing wastewater etc . It should be noted that no equipment's washing or maintenance activities on-site. Handling and disposal of these wastes is discussed in Section 6, while control measures to limit their impact on the environment are discussed in Chapter 7 of this Report.

Air emissions (combustion gases (NOx, SO_2, CO and particulates), dust) will be primarily generated from the proposed construction works (i.e., use of heavy equipment's, excavation works for shaft construction, movement of vehicles over unpaved roads, tunnel works etc.,). Additionally, fugitive emissions from chemical storage, odors from sanitary facilities and temporary site areas, and waste handling areas are also expected. Noise will also be generated during the proposed Project activities would be mainly generated from operation of construction equipment's.

3.3.4.3 Commissioning

Hydrotesting

Prior to operation, the sewerage tunnel and TPS shall be inspected for leaks and the integrity of pipes, tunnels, and pressure systems. Any necessary corrections will be made before certification for safe use. Water used in this process will be recycled or replenished to account for any losses during testing, ensuring the required volume for subsequent examinations. The used hydrotest water will be disposed of offsite by a DM-approved contractor.

Cleaning and Flushing

After hydrotesting, all the pipelines shall be cleaned to remove debris, construction materials, or sediment within the tunnel prior to operation. The used water for cleaning and flushing will be disposed offsite through DM approved contractor. If any plan to discharge/dispose into approved location, a separate DM approval shall be obtained.

3.3.4.4 Operation Phase

Operation and Maintenance

The operation will involve continuous monitoring through on-site personnel (link sewers) or Supervisory Control and Data Acquisition (SCADA) and IoT systems (Tunnel, TPS MEICA equipment). Operations will be 24/7. The tunnels and link sewers will have maintenance shafts and manholes for access to pipes. Maintenance manholes are spaced 2 to 3 km apart, with some intervals up to 3.2 km due to land availability.

Maintenance shafts, 3 to 4 meters in diameter, are accessible via man-riding baskets lowered by crane. Entry should occur during low flow periods, possibly at night or by diverting flows. The tunnel lining is designed for a 120-year lifespan against corrosion, and HDPE lining is used in shafts, while polymer concrete is used in the rest of the tunnel. In the early years of the DSST system, annual maintenance is recommended for the entire length of the tunnels. Maintenance will be carried out within the site boundaries for the TPS and odor control facilities, as well as for the tunnel and link sewers.

Regular tunnel inspections will use a multi-sensor system with video surveillance technology survey and LiDAR for 2D cross-sections and 3D modeling, and sonar for below-water-line imaging. Pipe penetrating radar (PPR) can detect defects within the tunnel.



Figure 3.20 – Pipe Penetrating Radar

Waste

Operational phase waste will primarily come from maintenance activities and staff/workers. Coarse bar screens to protect the wet well and pumps from debris. Wastes will be collected in skips or conveyed to bulk skips for removal and disposal at a licensed waste site through DM licensed hauler. Solid wastes, such as plastics, stones, paper, rags, and metals, will be regularly collected at the TPSs and disposed of by a licensed contractor. No additional solid waste is expected from the operation of DSST-BD.

Utilities

The TPS will receive main power from DEWA and emergency power from diesel generators/dual fuel turbines. The Jebel Ali terminal pump station power demand is 151.63 MW will be supplied through a new substation by DEWA.

Manpower

The operational and maintenance teams are required to work a shift pattern which provides 24/7/366 coverage. Average number of staff will work per shift will be 17- 23.

3.4 Project Status and Schedule

All construction activities will commence upon receipt of necessary construction NOCs and Environmental Clearance from DECCA. The preliminary NOC design details are given in Table 3.8.

For the tunnel section (ref: BD-05A) (see Figure 3.21), the NOC was originally submitted in 2019, and NOC obtained in June 2022 (see Figure 3.22) below under the original reference of Main Tunnel NOC Package 7). The revalidation was undertaken in 2023, under reference BD-05A. During this process, Etihad Rail initially provided No Objection under application 171012023-2285, but this was then withheld by RTA ROW in January 2025 as the Etihad Rail High Speed Rail alignment was identified to occupy the same corridor as the DSST tunnel for Package J (ref BD-05A) and the conflicts between the two infrastructure projects are to be resolved. Detailed discussions have taken place between Dubai Municipality and Etihad Rail's High Speed Rail team to coordinate both infrastructure projects within the same corridor. This has culminated in agreement in July 2025 between both project teams on the interfacing and coordination requirements. The consequential CAPEX impacts are the subject of Higher Authority decisions before the final NOC is approved and released.

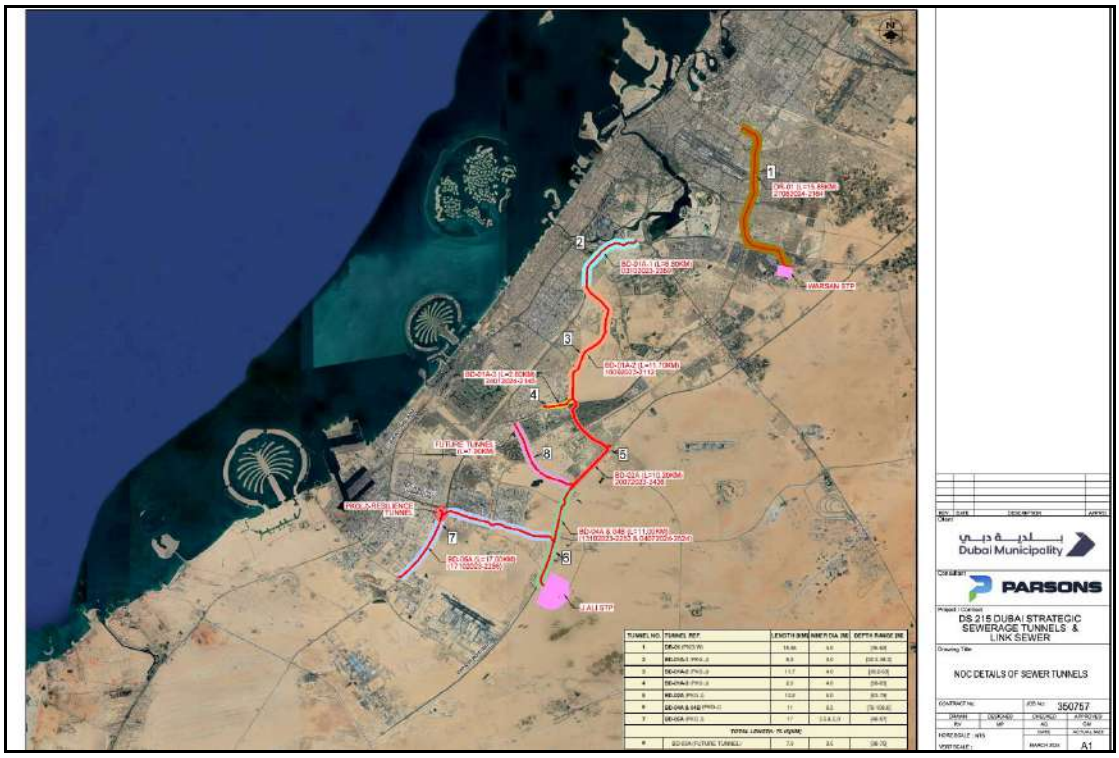
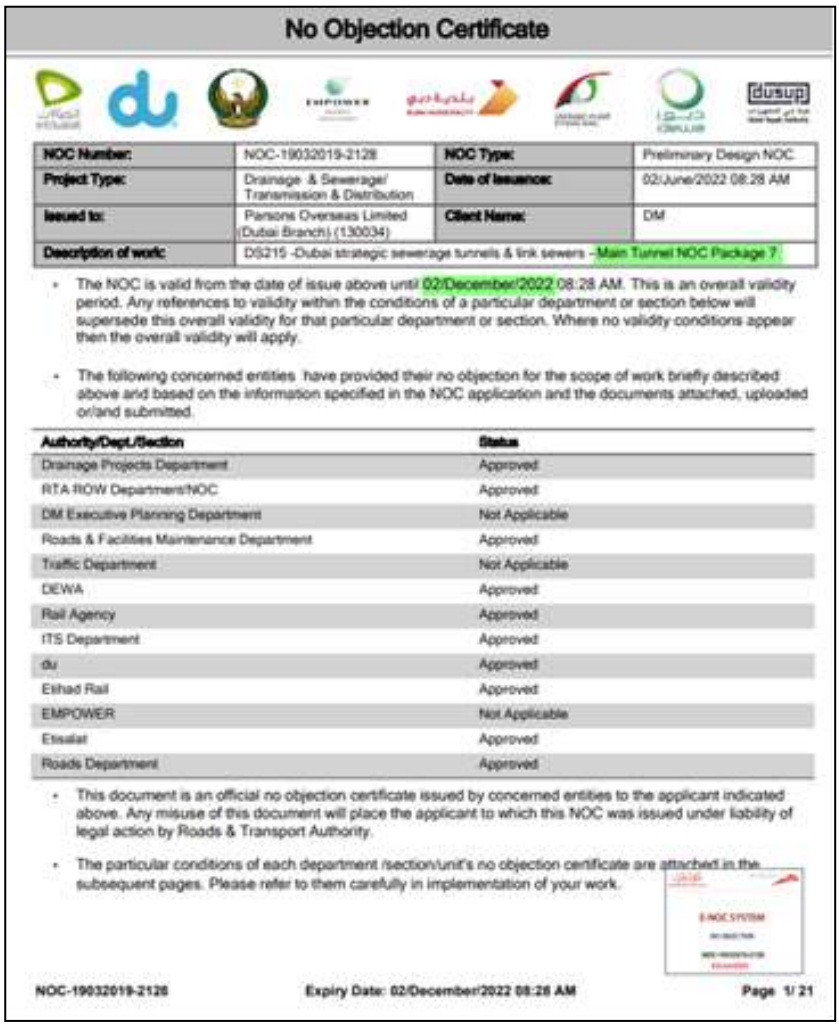


Figure 3.21 – Sewer Tunnels NOC Details



No Objection Certificate

NOC Number:	NOC-19032019-2128	**NOC Type:**	Preliminary Design NOC
Project Type:	Drainage & Sewerage/ Transmission & Distribution	**Date of Issuance:**	02/June/2022 08:28 AM
Issued to:	Parsons Overseas Limited (Dubai Branch) (130034)	**Client Name:**	DM
Description of work:	DS215 -Dubai strategic sewerage tunnels & link sewers - Main Tunnel NOC Package 7		

- The NOC is valid from the date of issue above until 02/December/2022 08:28 AM. This is an overall validity period. Any references to validity within the conditions of a particular department or section below will supersede this overall validity for that particular department or section. Where no validity conditions appear then the overall validity will apply.
- The following concerned entities have provided their no objection for the scope of work briefly described above and based on the information specified in the NOC application and the documents attached, uploaded or/and submitted.

Authority/Dept./Section	Status
Drainage Projects Department	Approved
RTA ROW Departments/NOC	Approved
DM Executive Planning Department	Not Applicable
Roads & Facilities Maintenance Department	Approved
Traffic Department	Not Applicable
DEWA	Approved
Rail Agency	Approved
ITS Department	Approved
du	Approved
Etihad Rail	Approved
EMPOWER	Not Applicable
Etisalat	Approved
Roads Department	Approved

- This document is an official no objection certificate issued by concerned entities to the applicant indicated above. Any misuse of this document will place the applicant to which this NOC was issued under liability of legal action by Roads & Transport Authority.
- The particular conditions of each department /section/unit's no objection certificate are attached in the subsequent pages. Please refer to them carefully in implementation of your work.

NOC-19032019-2128 Expiry Date: 02/December/2022 08:28 AM Page 1/ 21

Figure 3.22 – NOC Extract

Table 3.8 – Preliminary Design NOC Details – Tunnels and Link Sewers

PD NOC Reference	Package	Asset Type	Shaft Ref		Expiry Date
			From	To	
03102023-2359	BD-01A-1	Tunnel	CS-1	limit of BD-01A-2	31-Jul-2025
16092023-2112	BD-01A-2	Tunnel	Limit of BD-01A-1	CS-2A/RS	31-Jul-2025
24012024-2146	BD-01A-3	Tunnel	CS-3A/RS	CS-2A/RS	31-Jul-2025
20072023-2436	BD-02A	Tunnel	CS-2A/RS	CS-3/RS	31-Jul-2025
13102023-2253	BD-04A	Tunnel	CS-3/RS	CS-5	06-Aug-2025
04072024-2524	BD-04B	Tunnel	Part of BD-04A for realignment		31-Jul-2025
17102023-2285	BD-05A	Tunnel	VDS-13	CS-4	In process
03062025-2561	J-Resilience	Tunnel	CS-9	CS4 (DM SW tunnel)	In process
13022024-2161	LS-05A	Link Sewer	MH-PS-P2	MH-DL-33	Expired
04022025-2393					Revalidation in process
10062024-2129	LS-6	Link Sewer	PS-LS_DIP_II PS-DWC-RC-DCA PS-EXPO_2020 MH-J_1-12A	MS-16A MS-16A MS-17A-R MS-18	22-Jul-2025

NOC's Current Status are given below.

- NOC application 17102023-2285 has been recently reactivated (still subject to DM-Etihad Rail final agreement)
- NOC application 03062025-2561 has been recently approved (valid till 01/April/2026)
- NOC application 04022025-2393 is an NOC revalidation application and it can be reactivated after agreeing with E.R. for the NOC revalidation conditions.

Please note that any link sewers / tunnels NOC application status (in process / timed out (to be reactivated) / approved / approved-expired & under revalidation) is subject to continuous update.

4 LEGAL FRAMEWORK AND ESIA METHODOLOGY

4.1 Legal Framework

This Chapter reviews relevant environmental and social laws and regulations of UAE, the Emirate of Dubai and international guidelines and standards, which are relevant to the Project. Compliance with international environmental and social guidelines [specifically the ESIA guidelines of International Finance Corporation (IFC) and Equator Principles (EP)] are required by the Project lenders. This Chapter does not aim to present an exhaustive detail of legal requirements, but to focus on the main legal and policy references that guide the Project implementation.

4.1.1 Local Environmental Regulation

The principal Federal Law covering environmental protection in the UAE is Federal Law No. (24) of 1999 for the Protection and Development of the Environment and the need to undertake an environmental study for the proposed Project is required under this Federal Law. The administration of Federal Law No. (24) in each Emirate of the UAE is carried out by the designated "Competent Authority", which is responsible for developing environmental regulations that implement the requirements as set out in the Federal Law. In the Emirate of Dubai, the "Competent Authority" is Dubai Environment and Climate Change Authority (DECCA), who has set specific EIA study requirements to be enforced that ensure integration of environmental assessment and sustainability principles at all levels of planning and execution of government and private developments. For this Project, as previously noted, the acquisition of the Environmental Clearance (EC) has been initiated and in process at the time of the development of this Report.

4.1.1.1 UAE Federal Environmental Regulations

Federal Law No. (24) established the framework for environmental protection in the UAE and has the following key objectives:

- The protection of the environment and the preservation of the quality and natural balance thereof.
- The control of all kinds of pollution, and the avoidance of any immediate or long term damages or adverse effects resulting from the plans and programs of economic, agricultural, industrial or constructional development or other development programs aiming at ameliorating life standards, and the coordination between the Agency and the competent authorities and pertinent bodies for the protection of the environment and the preservation of the quality and natural balance thereof, as well as the consolidation of the environmental awareness and the principles of pollution control.
- The development of natural resources and the preservation of biological diversity within the state and their best exploitation for the benefit of present and future generations.
- The protection of the society, the human health as well as the health of other living beings from all activities and acts which are harmful to the environment or which constitute an impediment to the legal use of the environmental milieu.
- The protection of the state from the harmful effects of activities undertaken outside the region or State.
- This implementation of obligations provided for in international or regional conventions ratified or joined by the state and regarding the protection of the environment, the control of pollution and preservation of natural resources.

Federal environmental regulations have been established under Federal Law No. 24 and are applicable throughout the UAE. Of particular relevance to the Project are:

- Ministerial (Cabinet) Decree No. (12) of 2006, which contains the following standards
  - Maximum allowable emission limits of air pollutants emitted from stationary sources;
  - Maximum allowable emission limits of air pollutants emitted from hydrocarbon fuel combustion sources;
  - Ambient Air Quality Standards (Air Pollution Limits in the Ambient Air); and
  - Allowable Limits of Noise Levels in Different Areas
- Regulations for the Assessment of Environmental Effects of Establishments
- Regulation for Handling Hazardous Materials, Hazardous Wastes and Medical Wastes
- Law No. 12 of 2018 on Integrated Waste Management in UAE

4.1.1.2 Regulation for the Assessment of Environmental Effects of Installations

This Regulation requires an environmental impact assessment be carried out for certain projects before a license to develop/operate the project is issued by the Competent Authority. The procedures for applying for an Environmental License and the information requirements are specified in the Regulation. The requirement for an EIA falls within the requirements of this Federal Law No. (24) Regulation.

This Regulation specifies the following must be included in any assessment:

- A complete description of the project in its preliminary phases;
- A statement of the objectives of the project;
- A description of the current environmental situation that may be affected by the project, if executed;
- A review of the expected interaction between the project and the environment in all phases of the project (preliminary, construction, operation);
- An analysis of the expected environmental consequences of the project, including use of power;
- Details or procedures to be taken to protect the environment and an assessment of their efficiency;
- A review of the consequences of not executing the project; and
- A commitment to the continual observation and control of environmental impacts resulting from the project.

4.1.1.3 Regulation for Handling Hazardous Materials, Hazardous Wastes and Medical Wastes

This Regulation sets out the requirements for the storage, handling and transport of hazardous materials and hazardous wastes in the UAE. No hazardous material or waste may be handled or transported without a license issued by the Competent Authority. The Regulation prohibits the import of any hazardous chemicals listed in Annex 1 of the Regulations into the UAE, for trade or multi-use purposes, unless prior approval is obtained from the Concerned Authority.

Under this Regulation any organization generating hazardous wastes are required to:

- Endeavour to reduce the amount of such waste by developing technologies, adopting production processes and selecting products or raw materials, which are less damaging to the environment;
- Construct and operate waste treatment units at source, wherever possible, subject to the approval of such units by the Competent Authority;
- Classify and quantify the wastes being generated;

- Provide designated, safe storage areas for waste, which prevents any risk to the public;
- Ensure hazardous waste is properly stored in leak proof containers;
- Clearly mark hazardous waste storage containers, identifying their contents and associated hazards to ensure proper handling and treatment;
- Establish a program for collection of hazardous waste so that it is not stored for long periods; and
- Maintain records of waste generation including, a full description of the waste, including its physical and chemical characteristics and hazards, quantities, sources, collection rates and periods, transport and treatment methods and name of the licensed waste contractor.

4.1.1.4 Regulation for the Protection of Air from Pollution

The relevant standards stipulated in this regulation are provided in Table 4.1 to Table 4.3.

Table 4.1 – Air Pollutants Emission Limits for Stationary Sources

Substance	Symbol	Sources	Max. Allowable Emission Limits (mg/Nm^3)
Visible Emissions	-	Combustion sources Other sources	250 none
Carbon Monoxide	CO	All sources	500
Nitrogen Oxides (expressed as nitrogen dioxide)	NO_x	Combustion sources Material producing industries Other sources	See Table 3.2 1500 200
Sulphur Dioxide	SO_2	Combustion sources Material producing industries Other sources	500 2000 1000
Sulphur Trioxide Including Sulphuric Acid Mist (expressed as Sulphur Trioxide)	SO_3	Material producing industries Other sources	150 50
Total Suspended Particles	TSP	Combustion sources Cement industry Other sources	250 50 150
Ammonia and Ammonium Compounds (expressed as ammonia)	NH_3	Material producing industries Other sources	50 10
Benzene	C_6H_6	All sources	5
Iron	Fe	Iron and steel foundries	100
Zinc and its compounds (expressed as Zinc)	Zn	Electroplating/Galvanizing Industries	10
Lead and its Compounds (expressed as lead)	Pb	All sources	5
Antimony and its Compounds (expressed as antimony)	Sb	Material producing industries Other sources	5 1
Arsenic and its Compounds (expressed as arsenic)	As	All sources	1
Cadmium and its Compounds (expressed as cadmium)	Cd	All sources	1
Mercury and its Compounds	Hg	All sources	0.5

Substance	Symbol	Sources	Max. Allowable Emission Limits (mg/Nm^3)
(expressed as mercury)			
Nickel and its Compounds (expressed as nickel)	Ni	All sources	1
Copper and its Compounds (expressed as copper)	Cu	All sources	5
Hydrogen Sulphide	H_2S	All sources	5
Chloride	Cl^-	Chlorine works Other sources	200 10
Hydrogen Chloride	HCl	Chlorine works Other sources	200 20
Hydrogen Fluoride	HF	All sources	2
Silicon Fluoride	SiF_4	All sources	10
Fluoride and its Compounds Including HF and SiF4 (expressed as fluoride)	F^-	Aluminium smelters Other sources	20 50
Formaldehyde	CH_2O	Material producing industries Other sources	20 2
Carbon	C	Odes production Waste incineration	250 50
Total Volatile Organic Compounds (expressed as total organic carbon (TOC))	VOC	All sources	20
Dioxins and Furans		All sources	1 (ng TEQ/m^3)

Source: Regulations for the Protection of Air from Pollution (Ministerial Decree No. 12 of 2006)

Note 1 – The concentration of any substance specified in the first column emitted from any source specified in the third column shall not at any point before the admixture with air, smoke or other gases, exceed the limits specified in the fourth column.

Note 2 – Nm^3 means normal cubic meter, being that amount of gas when dry, occupies a cubic meter at a temperature of 25°C and at an absolute pressure of 760 millimeters of mercury (1 atm).

Note 3 – The limit of visible emissions does not apply to emission of water vapour and reasonable period for cold start, shutdown or emergency.

Note 4 – The measurement for TSP emitted from combustion sources should be @ 12% reference CO_2.

Note 5 – The total heavy metals must not exceed 5 mg/Nm^3.

Note 6 – VOC limit is unburned hydrocarbons (uncontrolled).

Note 7 – The emission limit for all substances exclude Dioxins and Furans are conducted as a daily average value.

Table 4.2 – Ambient Air Quality Standards

Substance	Symbol	Max. Allowable Limits (µg/Nm^3)	Averaging Time
Sulphur Dioxide	SO_2	350	1 hour
		150	24 hour
		60	1 year
Carbon Monoxide	CO	30 (mg/Nm^3)	1 hour
		10 (mg/Nm^3)	8 hour
Nitrogen Dioxide	NO_2	400	1 hour
		150	24 hour
Ozone	O_3	200	1 hour
		120	8 hour
Total Suspended Particles	TSP	230	24 hour
		90	1 year
Particulate Matter (with 10 microns or less in diameter)	PM_{10}	150	24 hour
Lead	Pb	1	1 year

Source: Regulations for the Protection of Air from Pollution (Ministerial Decree No. 12 of 2006)

Table 4.3 – Allowable Limits of Noise Levels in Different Areas

Area Classification	Allowable Limits for Noise Level, dB(A) *	
	Day (7 a.m. – 8 p.m.)	Night (8 p.m. – 7 a.m.)
Residential Areas with Light Traffic	40 - 50	30 – 40
Residential Areas in Downtown	45 - 55	35 – 45
Residential Areas which include some Workshops & Commercial Business or Residential Areas near the Highways	50 - 60	40 – 50
Commercial Areas & Downtown	55 - 65	45 – 55
Industrial Areas (Heavy Industry)	60 - 70	50 – 60

Source: Regulations for the Protection of Air from Pollution (Ministerial Decree No. 12 of 2006)
* dB(A) means decibels A-weighted. dB(A) is used for determining the sound exposure to humans

4.1.1.5 Law No. 12 of 2018 on Integrated Waste management in UAE

This Law aims to regulate the process of waste management and unify the mechanisms and methods of safe disposal thereof, through the application of best practices and techniques available, to protect the environment and minimise harm to human health. The provisions of this Law apply to waste from their production, separation, collection, transport, storage, reuse, recycling, treatment and disposal inside the country including free zones (excluding nuclear and radioactive waste).

4.1.1.6 Cabinet Resolution No. 26 of 2014 on National Regime of Ozone Depleting Substances

The UAE Cabinet Resolution No.26 of 2014 concerning the National Regime of Ozone Depleting Substances consists of 21 articles and two Annexes that aims at providing rules for import, export, and re-export the ozone depleting substances, as well as equipment and products containing them. It establishes that:

- for such these trading activities, a facility needs to be registered with the authorized authority and has to obtain a permit;
- the Minister of Environment and Water, in order to protect the ozone layer, can limit, reduce or prevent impacting activities, according to Montreal Protocol;
- the competent authority shall regulate and determine the quantity and quotas allowed to be imported
- the facility shall submit an annual report to the competent authority
- the competent authority regulates the release of controlled substances into the atmosphere; (vi) it is prohibited to dispose these substances and related products without a prior approval from the competent authority.
- Annex 1 of the regulation lists the products containing controlled substances, while Annex 2 contains the schedule for complete disposal of controlled substances and ozone depleting substances and equipment (full compliance by year 2030).

4.1.1.7 Other Federal Laws and Regulations

- Federal Decree No. (13) of 2003, “Agreement for Protection of Wildlife and its Natural Habitat in the GCC Countries”
- Article 43 specified, “It is prohibited in accordance with the Executive Order to undertake any activity contributing directly or indirectly, to damaging, disturbing the natural properties or polluting the soil in any way that may affect its productivity”
- Article (39 – 41) defines, “Protection of drinking water & underground water”
- Article (63, 64, 65, 66) defines “Works, activities and acts prohibited in the reserve areas, which may cause the deterioration or damage of the natural environment, harm to the wild or marine life, or affect their esthetic value”

- Article 42 specified, “The competent authorities shall take into account the environmental factors and standards set by the Agency in coordination with the competent authorities and the pertinent bodies upon the preparation and implementation of the plans for land use determining the construction, agricultural and industrial areas, reserves, and others"
- Article (71 – 90) defines, “Liability and Compensation for Environmental Damages”

4.1.2 Emirate of Dubai Environmental Regulations and Standards

The Dubai Environment and Climate Change Authority (DECCA) is the principal regulatory authority (“Agency”) for environmental matters in Dubai. Environmental regulations and standards for environmental control have been developed in Dubai by DECCA in response to UAE Federal Law No. 24 of 1999. The project complies with DECCA standards, ensuring alignment with Emirate-specific regulations and mitigation requirements. Various technical guidelines and information bulletins as published by DECCA, of which the most important/relevant to the project EIA study are:

- DECCA Guidance on Environmental Clearance (EC) and Requirements for Development, Infrastructure and Industrial Projects in the Emirate of Dubai (2024), (DECCA GU01-GECR Version 17)

4.1.2.1 Local Order No. 61 of 1991 – Environmental Protection Regulations in the Emirate of Dubai, its Rules of Implementation

This local order issued by the Dubai Municipal Council serves as the implementing rules and regulations of environmental law at a local level.

- Article 75 specified, “It shall be the duty of the occupier of any premises or persons operating mechanical devices or drivers of public or private transportation vehicles, house owners or supervisors of worshipping place, to adopt the best practicable means of ensuring the emission of noise from those premises does not exceed a reasonable level. The level is considered reasonable if it does not exceed 55 decibels during the period 7 am to 8 pm and 45 dB during the period 8 pm to 7am. Table 4.3 lists the corresponding allowable noise limits for different receptor areas.
- Article 85 specified, “Any work acts, activities or procedures which may destroy, damage or deteriorate the natural environment or damage wildlife, marine flora and fauna or affect the aesthetic standard in the protected area as, shall be prohibited, particularly the following:”
  - Hunting, transporting, killing or disturbing marine or wildlife or carry out any work, which may destroy them.
  - Hunting, removal or transporting of any creature or organic materials such as molluscs, coral reefs, rocks, or sand for any purpose.
  - Destroying or transporting of plants from protected areas.
  - Damaging or disfiguring geological or geographical formations of the habitat or breeding place of flora, fauna and Aves.
  - Introducing non-indigenous species to the protected areas.
  - Polluting the land, water, or atmosphere of the protected area by any mean.
  - Constructing buildings, structures, roads, or use motorized vehicles, or undertake any agricultural, industrial or trade activities in the conservation area, or undertake any activities, acts, or works in the areas surrounding the protected area, unless by a permit from the competent authority, according to conditions, rules and procedures specified by a decision issued by the Director of Municipality

Administrative Order No. 211 of 1991 on the Issue of Executive Regulations for the Local Order No. 61/1991

In addition to the Ministerial Decree No. 12 of 2006, DECCA has published ambient air quality standards and allowable emission limits from stationary sources that are presented in Table 4.4 and Table 4.5, respectively

Table 4.4 – DM Air Quality Objectives

Indicator	Averaging Time	ppb	(µg/Nm^3)
Carbon monoxide (CO)	1 Hour	20 x 10^3	23 x 10^3
Nitrogen dioxide (NO_2)	1 Hour 24 Hours	150 60	290 110
Oxidants (as Ozone, O_3)	1 Hour	80	160
Respirable dust (PM_{10})	1 Hour 24 Hours	- -	300 150
Sulphur Dioxide (SO_2)	1 Hour 12 Months	130 20	350 50
Benzene (C_6H_6)	1 Hour	20	50
Lead (Pb)	3 Months	-	1
Fluoride as hydrogen fluoride (HF)	24 Hours 3 Months	3.5 0.6	3 0.5

Table 4.5 – DM Allowable Emission Limits from Stationary Sources

Waste	Sources to which limit is applicable	Emission limits
Visible emissions(a)	Combustion sources	Ringlemann 1 or 20% opacity
	Other sources	No visible emissions
Total particulate matter(b)	All combustion sources	0.25 g/Nm^3
	Large sources	0.1 g/Nm^3
Sulphuric acid mist and sulphur trioxide	All sources	0.1 g/Nm^3 as SO_3
Sulphur dioxide	All fuel burning sources	0.50 g/Nm^3
Hydrogen sulphide	All sources	5 mg/Nm^3
Oxides of nitrogen(c)	Fuel burning units having a gross heat input above 100,000 MJ, excluding glass furnaces	0.35 g/Nm^3 for gaseous fuels 0.5 g/Nm^3 for liquid fuels
	Gas turbines for power generation	0.07 g/Nm^3 for gaseous fuels
	Power generation by other fuels	0.15 g/Nm^3
Carbon monoxide	All stationary sources	1.5 g/Nm^3
Lead and its compounds	All stationary sources	10 mg/Nm^3 as Pb
Fluorine compounds	Aluminium smelters	0.02 g/Nm^3
Chlorine and chlorine compounds	All other sources	0.05 g/Nm^3
Metal fumes in total	All stationary sources	0.2 g/Nm^3 as Cl_2
Iron oxide fume	All stationary sources	10 mg/Nm^3 (d)
	Iron and foundries steel	0.1 g/Nm^3

(a) Does not apply to emissions of water vapour and a reasonable period for cold start-up, shutdown or emergency operation
(b) Gas volumes calculated to12% CO_2
(c) @ 7% O_2 reference. Not applicable to small units less than 30 MW and @ 15 % O_2 Reference
(d) Excluding iron oxide fume

DECCA Adopted Odor Quality Standards

All emissions to the air environment shall comply with the limits provided in the Cabinet Decree No. (12) of 2006. The ambient concentration of the below odorous gases shall not exceed the below limits.

Table 4.6 – DECCA Odor Quality Standards

Parameter	Standard Limit	Source of Standard Limit
H_2S	7 µg/m^3 (30-min averaging)	WHO
NH_3	30 µg/m^3 (30-min averaging)	NIH, US
Dimethyl disulphide	56 µg/m^3 (10-min averaging)	Ontario's Ambient Air Quality Criteria
Dimethyl sulphide	30 µg/m^3 (10-min averaging)	
Methyl mercaptan	13 µg/m^3 (10-min averaging)	
Ref: DECCA Guidance on Environmental Clearance (EC) and Requirements for Development, Infrastructure and Industrial Projects in the Emirate of Dubai (2024), (DECCA GU01-GECR Version 17)		

4.1.2.2 Local Order No. (15) of 2008 on the Protection of Groundwater in the Emirate of Dubai

This Law aims to protect the groundwater in the emirate of Dubai from pollution, drain and salinization and in order to maintain strategic stock of the groundwater for meeting emergencies.

- Article 5 specified, "No Person shall be allowed to drill a Well in the Emirate for extraction of Groundwater or to increase the depth or diameter of a Well or to make any change to it or to the equipment and instruments installed on it without obtaining license for the same from the Municipality in accordance with the requirements and conditions specified by the Implementing Regulations of this Law".
- Article 13 specified, a person shall not, without prior written approval of the Municipality:
  - Use Groundwater for sale or trade in Groundwater for irrigation of commercial agricultural products.
  - Store any hazardous materials or exercise any activity on the ground or underground near the Groundwater or within the Water Basin areas.
- Article (14) specified, the following shall not be allowed within the Water Basin areas, the Impact Areas and the Restricted Areas:
  - Throwing, compiling or burial of any materials, designated by the Municipality, which would change the natural or chemical properties of the Groundwater.
  - Establishing cemeteries or burying dead animals.

4.1.2.3 Local Order No. (8) of 2002 Regarding Sewage, Irrigation, & Water Drainage in The Emirate of Dubai

- Article 38 specified, "No constructions, barriers, drillings or excavations, plantation of trees should be done on locations which are likely to affect the safety of the public irrigation water network or cause any leakage or defect thereon, and no part of such a network or supplement may be buried, covered or hided".
- Article 22 specified, "All persons are prohibited from opening, burying, covering, or hiding any manholes or inspection chambers connected with the public sewage network, and from making any constructions or barriers or planting any trees in positions which are likely to affect the safety of the public sewage network or hinder the maintenance work thereof".

4.1.2.4 Local Order No. (7) of 2002 Concerning Waste Disposal Sites in the Emirate of Dubai

- Section 4.2 specified, the following Prohibition of Import, Export and Disposal of Waste.

- Disposal of waste into sites other than the sites designated by DM authority for that type of waste.
- Import of any waste into the Emirate of Dubai for final disposal.

- Export of any type of waste to outside the Emirate of Dubai without a prior written permit from relevant authority

4.1.2.5 Technical Guideline on Wildlife Handling Management (May 2024)

This Technical Guideline requires for the management and conservation which is, but not limited to the, translocation, capture, rescue, release and/or restoration of wildlife, terrestrial and marine, in the Emirate of Dubai that will be reintroduced, displaced, and/or its behaviour will be potentially affected by the changes in its habitat – actual or adjacent - by any activities impacted by or from major projects and non-major projects in or adjacent to declared protected and/or classified ecologically sensitive areas.

4.1.3 General National and Local Social Legislation

The UAE Constitution, which was permanently adopted in July 1996, provides details of social pillars of the country, and highlights the importance of public rights, responsibilities, and freedoms. It guarantees equality and protection of labor and human rights in the country as outlined in the following provisions:

- Article 14 provides that equality, social justice, safety, security, and equal opportunities for all citizens shall be the pillars of the society.
- Article 21 states that private property shall be protected.
- Article 24 provides that the basis of the national economy is social justice.
- Article 25 provides that all persons are equal before the law without discrimination between the citizens in regard to race, nationality, religious belief, or social status.
- Article 26 provides that personal liberty is guaranteed to all citizens.
- Article 28 provides that an accused shall be presumed innocent until proven guilty in a legal and fair trial.
- Article 124 provides that the federal authorities, before concluding any international treaty or agreement that may affect the position of any emirate, shall seek the opinion of the said emirate in advance and in case of difference of opinion, the matter shall be referred for decision to the Federal Supreme Court.

Table 4.7 provides a summary of the applicable UAE regulations, laws, and programs pertinent to social risk management, including labor and human rights protection.

Table 4.7 – Summary of Relevance of UAE Social, Labor and Human Rights Regulations

Year	Law/ Decree	Relevant Provisions	Relevance to the Project
2022	Articles 22 and 26 of Cabinet Resolution No. 1 of 2022	Articles in relation to the Implementation of Federal Decree Law No. 33 of 2021	▪ Article (22), Safety, Protection and Health Care of Workers. ▪ Article (26), Rules on Grave Danger
2022	Ministerial Resolution No. 44 of 2022	Occupational Health and Safety and Labour Accommodation	▪ Provides specific provision on occupational health and safety and welfare requirements in regard to labor accommodation.
2022	Administrative Decision No. 28 of 2022	Occupational Health and Safety and Labour Accommodation	▪ Provides specific provision in regard to minimum requirements and ensuring occupational health and safety and labor accommodations.
2021	Federal Decree-Law No. 33	Regulation of Employment Relationship and its amendments (UAE Labor Law)	▪ Covers matters related to working hours, overtime, leaves, vacation, and public holidays, employing juveniles, employee records, safety standards, minimum wage, termination of employment, end of service gratuity payments, work injuries amongst others. ▪ Grants new types of leave and tackles issues

Year	Law/ Decree	Relevant Provisions	Relevance to the Project
			related to harassment, bullying, physical violence, and psychological abuse against employees. ▪ Prohibits forced labor and discrimination on the basis of gender, race, color, sex, religion, national or social origin or disability. ▪ Spells out employers' obligations towards employees.
2021	Federal Decree-Law No. 47	Unified General Rules of Labor in the United Arab Emirates	▪ This law came into force as of February 2, 2022. The law repeals the Federal Law No.8 of 1980 (UAE Labor Code). The law sets and unifies the general rules of labor in the UAE. The law adopts the principles of equality and non-discrimination at the workplace and draws up general employment conditions in the UAE.
2012	Federal Decree No. 73	State's accession to the Convention against torture and other cruel, inhuman or degrading treatment or punishment of 1984	▪ This decree ratifies the Convention against torture and other cruel, inhuman or degrading treatment or punishment, especially by those in higher positions and high societal status.
2006	Federal Law No. 29	Rights of People of Determination as amended	▪ This law states the right of people with disabilities for social welfare, education, work, and other services.
2006	Federal Law No. 51	Combating Human Trafficking Crime as amended	▪ This law provides the legal framework for handling human trafficking cases.
2006	Council of Ministers' Decision No. 12	Regulation on Protection of Air from Pollution	▪ Sets the requirements and limits for emissions from industries and all associated equipment and processes. Also sets the acceptable ambient limits for air and noise quality which generate a nuisance to social receptors.
2005	Federal Law No. 21	Traffic Law	▪ Reflects the relevant provisions involving the use of road vehicles on the public road network.
2004	Decree No. 38	State's accession to the Convention on the Elimination of all Forms of Discrimination Against Women	▪ This decree ratifies the Convention on the Elimination of all Forms of Discrimination Against Women including the workplace.
1985	Federal Law No. 5	UAE Civil Code as amended	▪ This law draws up the civil rights of nationals and foreigners in the UAE. Key clauses relevant to the Project are: ▪ Ownership of assets and other in-kind rights are governed by the local legislation (Article 18) ▪ State-specific regulations govern contacts and agreements between different parties (Articles 19 and 20)) ▪ The law of the UAE applies to all people, including those who are stateless and those who hold multiple nationalities (Article 24) ▪ Different kind of rights and means to prove the person's right (Articles 107-112) ▪ Framework for the sale of vacant space and lands (Articles 580 and 581).

4.1.4 Relevant International Guidelines and Regulations

4.1.4.1 International Conventions

The UAE is signatory to a number of regional and international conventions and protocols concerned with environmental protection. International protocols, standards, and guidelines applicable to the Project include the following:

- Montreal Protocol on Ozone Depleting Substances (1987)
- Kyoto Protocol on cutting down the emission of CO_2 and other GHGs (1997)
- United Nations Framework Convention on Climate Change (1992)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Basel Convention on Transboundary Movement of Hazardous Waste (1992)
- Convention on Biological Biodiversity (1992)
- Paris Agreement (International Treaty on Climate Change (2015)
- International Convention for the Prevention of Pollution from Ships (MARPOL 1973/78 Convention)

4.1.4.2 World Bank EHS Guidelines

The World Bank Group EHS Guidelines are primarily technical reference documents containing examples of Good International Industry Practice (GIIP). The guidelines contain the performance levels and measures that are normally considered acceptable for Projects in Non-Designated Countries, as well as being achievable in new facilities at reasonable costs by existing technology. The World Bank Group has two (2) sets of guidelines, as follows:

- The General EHS Guidelines – contain information on cross-cutting EHS issues potentially applicable to all industry sectors. This guideline is further divided as:
  - Environmental;
  - Occupational Health and Safety;
  - Community Health and Safety;
  - Construction; and
  - Decommissioning.
- Industry Sector EHS Guidelines – contain information on industry-specific impacts and performance indicators, plus a general description of industry activities. The main sectors include Agribusiness/ Food Production, Chemicals, Forestry, General Manufacturing, Infrastructure, Mining, Oil and Gas and Power. For this Project, the relevant requirements outlined in the EHS Guidelines for Water and Sanitation apply.

4.1.4.3 IFC Performance Standards (PS)

The IFC Performance Standards (PS) on Environmental and Social Sustainability outlines general requirements to manage environmental and social risks and impacts of a Project in order to enhance development opportunities. The PS provides guidance for project proponents on how to identify and manage or avoid environmental and social risks to implement a particular project in a sustainable manner, including the need for stakeholder engagement and disclosure. The IFC PS has been adopted by most international financial institutions for use in project review and investment decision process. Table 4.8 lists the IFC PS, its objectives and applicability to the proposed Project.

Table 4.8 – IFC Performance Standards (PS) and Objectives

IFC Standard	Objectives and Key Requirements	ESIA Scope and Approach
Performance Standard 1: Assessment and Management of	Establishes the importance of: ▪ Integrated assessment to identify the environmental and social risks and	▪ The ESIA was developed in line with the requirements of the IFC PS1, considering

IFC Standard	Objectives and Key Requirements	ESIA Scope and Approach
Environmental and Social Risks and Impacts	opportunities of projects. ▪ Effective community engagement. ▪ Management of environmental and social performance throughout the Project life. It requires project proponents to: ▪ Conduct Environmental and Social Assessment process. ▪ Establish and maintain ESMS	the results of the ongoing EIA study as per local regulatory process. ▪ Project proponent shall establish and maintain ESMS in line with PS1 requirements and recommendations of the ESIA.
Performance Standard 2: Labor and Working Conditions	Recognizes the importance of the protection of workers' fundamental rights throughout project implementation.	▪ Project proponents shall adopt/develop and implement labor and working conditions policies, including development of labor protection schemes such as Grievance Mechanism, in line with relevant local and international regulations. ▪ The ESIA, as applicable, covered relevant aspects as part of socio-economic assessment, including occupational health and safety aspects
Performance Standard 3: Resource Efficiency and Pollution Prevention	▪ Provides general guidance on a project level to resource efficiency and pollution prevention. ▪ Requires project proponents to apply technically and financially feasible resource efficiency and pollution prevention principles and techniques (Good International Industry Practice, GIIP).	▪ ESIA considered relevant GIIP and BAT requirements as part of environmental and social assessment process in line with PS3 requirements. ▪ Project proponent shall consider GIIP/BAT in design and equipment /materials selection process.
Performance Standard 4: Community Health, Safety, and Security	Recognizes the potential impacts of a project to communities and requires: ▪ Evaluate the risks and impacts to the health and safety of the Affected Communities. ▪ Provide security to safeguard its personnel and property.	▪ ESIA assessed risks related to community health, safety, and security in line with PS4 requirements. ▪ Project proponents shall consider community health, safety and security in design, construction, operation, and decommissioning.
Performance Standard 5: Land Acquisition and Involuntary Resettlement	Recognizes the potential negative environmental and social effect of land acquisition and requires project proponents to: ▪ Consider feasible alternative project designs to avoid or minimize physical and/or economic displacement. ▪ Compensation in case unavoidable. ▪ Stakeholder Engagement ▪ Develop Resettlement Action Plan (RAP), as required.	▪ PS5 is not applicable to the Project (i.e., underground sewage network) and the location of proposed shafts are within areas allocated for public infrastructure. ▪ There will be no communities or residential to be directly affected by any Project component (i.e., no resettlement).

IFC Standard	Objectives and Key Requirements	ESIA Scope and Approach
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	▪ Recognizes the need to ensure the protection of biodiversity and sustainable management of natural resources. ▪ Requires assessment of biodiversity and ecosystems services impacts as part of ESIA, including the need for biodiversity offset (in case of unavoidable loss), the need for Biodiversity Action Plan, etc.	▪ ESIA assessed biodiversity and ecosystems services impacts of the proposed Project.
Performance Standard 7: Indigenous Peoples	▪ Identify Indigenous Peoples within project area and assess risks and impacts.	▪ PS7 is not applicable to the Project (i.e., underground sewage network) and the location of proposed shafts are within areas allocated for public infrastructure. ▪ There will be no communities or residential to be directly affected by any Project component.
Performance Standard 8: Cultural Heritage	▪ Recognizes the importance of protecting cultural heritage in project design and execution	▪ The ESIA covered potential cultural and archaeological impacts. ▪ Project components in Project proponent shall consider protection of cultural heritage during design, construction, operation, and decommissioning.

4.1.4.4 Equator Principles (EP4)

As defined by Equator Principles Organization (EP4, July 2020), the "EPs is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making". The following are the key elements of EP:

- Project is reviewed and categorized by relevant Equator Principles Financial Institution (EPFI) based on the magnitude of its potential impacts and risks in accordance with the screening criteria of International Finance Corporation (IFC).
- Conduct social and environmental assessments on projects assessed as being Category A or Category B, to address the relevant social and environmental impacts and risks of the project.

Table 4.9 lists the Equator Principles, its objectives / key requirements and applicability to the proposed Project.

Table 4.9 – Equator Principles (EP) and Objectives

Equator Principle	Objectives and Key Requirements	ESIA Scope and Approach
Principle 1 – Review and Categorization	Projects must be categorized based on the magnitude of potential environmental and social impacts, based on the IFC categorization process.	▪ The Project is categorized as "Category A" based on its nature and potential impacts. This categorization is based on the ongoing local EIA study.

Equator Principle	Objectives and Key Requirements	ESIA Scope and Approach
Principle 2 – Environmental and Social Assessment	Outlines the need for an adequate, accurate and objective presentation and assessment of environmental and social risks of a project. Requires all Category A and, as appropriate, Category B projects are required to undertake an Environmental and Social Impact Assessment (ESIA) which should include assessments of human rights impacts and climate change risks.	▪ The ESIA involved comprehensive assessment of the environment and social risks associated with the implementation of the Project. It also covered climate change risks (including GHG assessment). ▪ Project proponents shall ensure that implementation of the Project will ensure protection of fundamental human rights.
Principle 3 – Applicable Environmental and Social Standards	Projects located in non-designated countries (such as UAE), the assessment process is required to evaluate compliance with the IFC PS and WBG EHS Guidelines	▪ ESIA involved assessment against both local and international environmental and social legislations (particularly IFC PS and WBG EHS Guidelines). It should be noted, nonetheless, that the local environmental governance in Dubai and UAE as whole is generally comparable with international norms.
Principle 4 – Environmental and Social Management System and Equator Principles Action Plan	▪ Requires all Category A and Category B projects to have an ESMS and an environmental and social management plan (ESMP). ▪ If any applicable environmental and social standards are not met, an EP Action Plan (EPAP) will be developed.	▪ ESIA involved the development of Project-specific ESMP. ▪ Project proponent shall establish and maintain ESMS in line with PS1 requirements and recommendations of the ESIA.
Principle 5 – Stakeholder Engagement	Requires all Category A and Category B projects to demonstrate effective stakeholder engagement as an ongoing process in a structured and culturally appropriate manner with affected communities and other stakeholders.	▪ The stakeholder engagement process generally involved consultations and acquisition of permits or "No Objection Certificates or NOCs" from relevant government and private entities, particularly the relevant DM departments and sections.
Principle 6 – Grievance Mechanism	Requires all Category A and, as appropriate, Category B projects to establish effective grievance mechanisms to receive and facilitate resolution of concerns and grievances in relation to environmental and social performance.	▪ The Project proponent has an existing Grievance Mechanism that has been adopted for the Project.
Principle 7: Independent Review	An independent review of the environmental and social assessment documentation to be carried out by an independent consultant to assist due diligence and assess Equator Principles compliance.	▪ This aspect is applicable during the due diligence process of the Project lender.
Principle 8: Covenants	Requires covenant in financing documentation assuring compliance with both local and international legislation. Projects that are not in compliance with the relevant environment and social covenant, are required to reestablish compliance within a specified period.	▪ This aspect is applicable during the due diligence process of the Project lender.

Equator Principle	Objectives and Key Requirements	ESIA Scope and Approach
Principle 9: Independent Monitoring and Reporting	All category A and, as appropriate, category B are required to appoint or retain qualified and experienced external experts (or an Independent Environmental and Social Consultant) to verify monitoring information.	▪ This aspect is applicable during the due diligence process of the Project lender and the aspect of the specific requirements to be issued after the Financial Close to be implemented during Project execution. ▪ The ESIA developed appropriate environmental/social monitoring plans and reporting guidelines.
Principle 10: Reporting and Transparency	Requires project proponents for Category A and Category B projects: ▪ At a minimum, a summary of the ESIA (including a summary of human rights and climate change risks and impacts where relevant) is to be made accessible and available online. ▪ Publicly report total annual GHG emissions (for projects emitting over 100,000 tons CO_2e annually). ▪ Share commercially non-sensitive biodiversity data with the Global Biodiversity Information Facility and relevant national and global data repositories.	▪ These aspects are applicable during the due diligence process of the Project lender and aspects of the specific requirements to be issued after the Financial Close to be implemented during Project execution. ▪ The ESIA, nonetheless, has developed an appropriate environmental and social reporting program. In addition, the environmental and social data collected as part of the local EIA study has been shared with DM.

4.2 ESIA Methodology

Considering the involvement of lenders for this Project and the necessity to address potential social issues, the ESIA was in accordance with the UAE Federal Law No. (24) of 1999 for the Protection and Development of the Environment, the relevant local regulations, and guidelines of DM and relevant ESIA guidelines of IFC and EP.

The key aspect in addressing the requirements of international guidelines is to ensure that relevant social and socio-economic impacts associated with the implementation of the Project are appropriately covered. As previously noted, the EIA study for the Project in accordance with the local regulatory procedures of DECCA has already been initiated and was ongoing at the time of development of this Report, Ref. No.: EPBI-250225-01115 DS215, see details in Section 2.3.1). The data used in the EIA were utilized as the basis in undertaking the ESIA in compliance with the relevant ESIA guidelines of IFC and EP.

The ESIA requirements of IFC (which was also referred to in EP) are outlined in the PS1 (Assessment and Management of Environmental and Social Risks and Impacts, 1st January 2012). IFC PS1 aims to ensure that an integrated assessment to identify the environmental and social risks and opportunities of projects and effective community engagement are undertaken to ensure appropriate management of environmental and social performance throughout the Project implementation.

The ESIA process comprises a number of distinct but interrelated stages, which are carried out in a logical sequence, as follows (see Figure 4.1 and details in the following subsections):

- Collection and review of available information and review of regulatory requirements.
- Project screening and scoping
- Collection of environmental and social baseline data.
- Assessment of impacts and significance and development of mitigation measures.
- Formulation of environmental and social management and monitoring plans.

- Development of ESIA Report to document the entire assessment process.

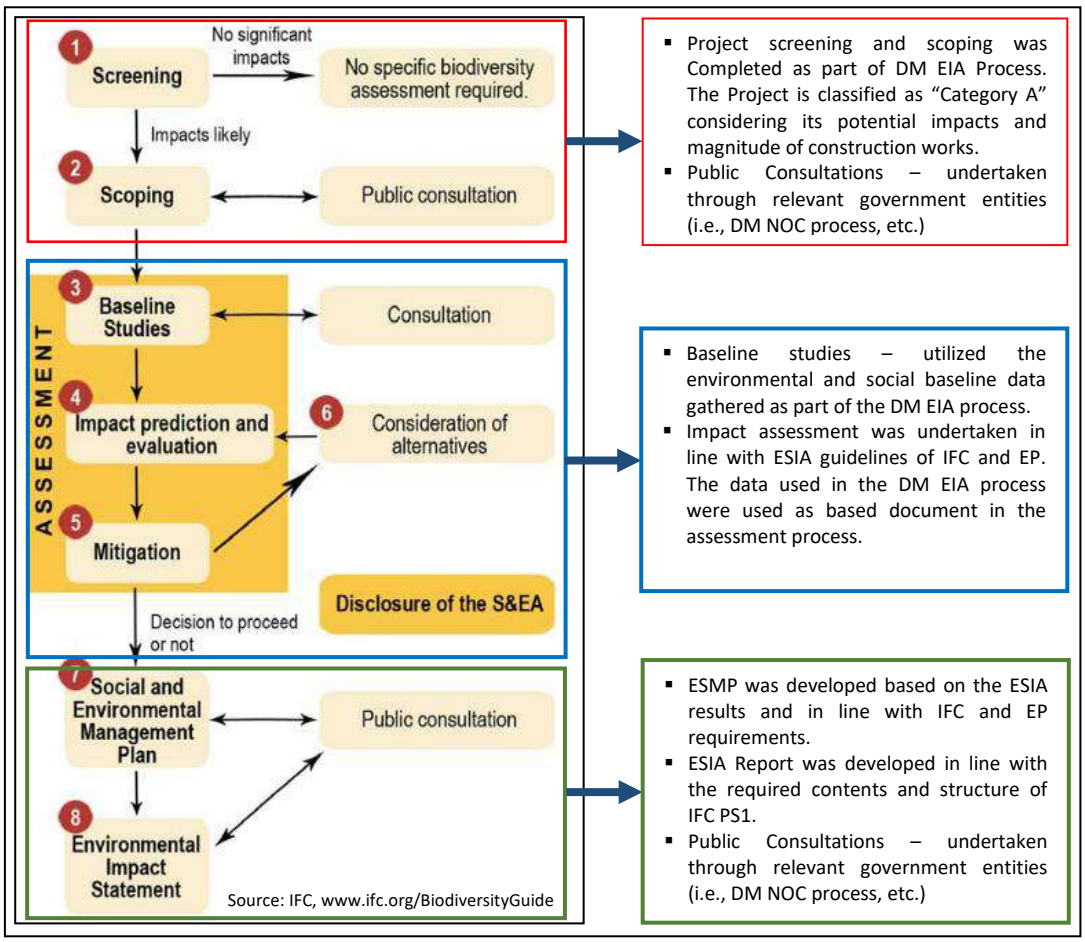


Figure 4.1 – Overview of ESIA Execution Methodology

4.2.1 Project Screening and Scoping Process

The initial environmental and social screening and scoping for the Project was undertaken in line with the EIA standards and procedures of DECCA. As previously noted, in accordance with the DECCA latest Guidance on the Environmental Clearance (EC) Requirements for Development, infrastructure and Industrial Projects in the Emirate of Dubai, 2024, the proposed Project requires a full Environmental Impact Assessment (EIA) study to secure an Environmental Clearance (EC). This initial project screening and scoping process, including the actual completion of EIA study in line with DECCA requirements, provides sufficient basis for the development of ESIA in line with IFC and EP guidelines. Thus, no further scoping exercise was undertaken for the Phase VI component.

In terms of environmental and social categorization, the proposed Project is categorized as a "Category A" project, which are "projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented".

In terms of stakeholder consultations, consultation with DECCA was undertaken as part of the local EIA study execution. As previously noted, DECCA is the competent environmental authority in the Emirate of Dubai. Consultation with DECCA was undertaken through the environmental permitting process, and involved coordination between different departments.

4.2.2 Environmental and Social Baseline Data

Defining the environmental and social baseline conditions is a vital part of the overall ESIA process. An appropriately defined baseline conditions will enable differentiation of impacts from the existing conditions and of the implementation of any proposed development.

This also allows identification of feasible options that can be taken into consideration in each stage of Project implementation process to ensure that key environmental assets and social components are protected, and appropriate corrective or remediation measures are implemented, in case the existing environmental conditions is already degraded.

For this Project, the ESIA study primarily utilized the Project-specific environmental and social baseline data gathered in December 2024 as part of the local EIA process, which included:

- 24-hr ambient air quality monitoring at five (5) locations along the route for PM_{10} and TSP.
- 24-hr ambient odor monitoring at five (5) locations along the route for sulphur compounds (including H2S, methyl mercaptans, DMS and DMDS) and ammonia.
- Ambient noise monitoring at 15 locations along the route (covering daytime and nighttime periods)
- Groundwater quality survey at seven (7) locations along the route.
- Terrestrial ecology surveys primarily focus on the area allocated for the proposed shafts (where above-ground works will take place).

In addition, a Project specific site walkthrough assessment was undertaken to identify existing physical site conditions, existing land-uses and identification of relevant stakeholders along the proposed route. The Project-specific information was supplemented through review of publicly available information and in-house data from previous projects undertaken by Dome in the areas.

4.2.3 Environmental and Social Impact Assessment

The assessment of environmental and social impacts will be in line with both local and IFC/EP guidelines and based on the quantification of changes in the receiving environment caused by the development Project, followed by an assessment of the overall significance of these changes, compared with the baseline conditions.

Wherever possible, impact predictions were quantified. Where quantitative assessment is not possible or practicable, impact assessment was based on expert professional judgment. The impact assessment covered both the construction and operational phase of the Project and will include direct and indirect, adverse, and beneficial, short, and long term, and temporary and permanent impacts. The cumulative impacts of the Project, when combined with other existing and proposed activities, were also considered. Impacts were considered at local, regional, and national scales, as appropriate.

The study identified all the environmental and social components, which are likely to be affected by the Project, and provided rationalization for the key indicators selected. This was undertaken by defining Project Area of Influence (AoI). The AoI is generally defined as the "geographic area within which the physical elements, aspects, and facilities and construction and operational activities of a business activity are likely to generate social risks and impacts.'

Accordingly, it is the area outside the operational boundary of the facility that is occupied by the civilian population that could potentially be affected (directly or indirectly) by the operation of a proposed Project.

In the context of the proposed Project, the AoI was based on direct or physical impact (such as change in land-use) and environmental-based social impacts (i.e., noise, traffic impacts, including air traffic, etc.). As previously noted, the proposed Project will involve construction of underground sewerage network and thus, direct impacts to any communities are not expected. Thus, the extent of the AoI is mainly driven by the environmental-based social impacts during the Project implementation.

Thus, the AoI was mainly based on the results of the environmental impact assessment, particularly the extent of influence of the identified environmental effects. The AoI also considered indirect impacts, such as potential effect on future land-uses, traffic related impacts, etc.

For each of the environmental and social issues/indicators within the defined AoI, Project activities that have the potential to adversely influence them were identified. The nature of these impacts including their magnitude, probability of occurrence, frequency, extent, duration, and seasonal timing were also assessed and described.

4.2.4 Environmental and Social Management

An ESMP is defined by WB as "an instrument that details (a) the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and (b) the actions needed to implement these measures"1. Based on WB procedures, a borrower should specifically define the following in the ESMP:

- Identify the set of responses to potentially adverse impacts.
- Determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.

For this Project, the ESMP was developed as part of this ESIA Report (see Chapter 7). The ESMP outlines the requirements to be followed by the Project developer and contractors, including any additional environmental permitting that may be required during actual implementation of each individual contract.

[1] The World Bank Environmental and Social Framework (2017)

5 ENVIRONMENT AND SOCIAL BASELINE

5.1 Description of the Existing Ambient Air Quality Conditions

5.1.1 General Climatic Conditions

The climate of the UAE, including the general Dubai area can be divided into two principal seasons: the cool winter season, which extends from December to March and the hot summer season from June to September. The months of April to May and October to November are transitional months.

The mean maximum temperature for Dubai is around 40°C. Temperatures vary to a great extent and can fall to as low as 5°C. In the summer months, normal temperatures generally exceed 40°C, and can reach up to 50°C in the desert area. Rainfall is highly episodic and is not evenly distributed within or between years (frequently in December and January). Humidity is highest along the coastal fringe and decreases inland as the influence of the sea decreases.

Table 5.1 show the monthly temperature, relative humidity, rainfall, and wind speed as measured Dubai International Airport weather station of the UAE National Center of Meteorology (NCM)[2]. The recorded ambient temperature in the station was in the range 7.4 °C to 48.8 °C. The mean relative humidity is comparable with similar inner desert areas, which ranges from 49% to 64%. Rainfall recorded in the area is very limited, ranging from 0.7 to 22 mm.

Table 5.1 – Monthly Average Meteorological Data for Dubai International Airport, 1974 to 2024 (UAE-NCM)

Month	Temperature (°C)			Relative Humidity (%)			Rainfall (mm)	Wind Speed (km/h)	
	Max.	Mean	Min.	Mean Max.	Mean	Mean Min.	Mean totals	Mean	Max.
Jan	31.8	19.6	7.7	80	64	44	18.5	12	59
Feb	37.5	20.7	7.4	80	63	42	19.7	13	57
Mar	41.3	23.3	10.1	79	60	37	22	14	59
Apr	43.5	27.2	12.8	73	52	30	7.8	13	72
May	47	31.3	15.7	69	49	27	0.7	14	63
Jun	47.9	33.5	20.7	75	54	29	0	14	52
Jul	48.5	35.3	20.4	72	53	31	0.7	14	67
Aug	48.8	35.5	24	72	52	30	0	14	56
Sep	46.1	33.1	22	78	57	31	0	12	41
Oct	42.6	29.9	14.4	78	59	33	1	11	61
Nov	38.1	25.5	10.1	77	60	38	5	11	61
Dec	33.2	21.6	8.2	79	64	44	14.5	11	56

There is no site-specific data available in terms of wind direction in the Project site. However, it can be assumed that the prevailing wind direction in the area is generally similar to other areas in Dubai, which generally blows from northwest direction (see Figure 5.1 for the wind roses based on Dubai International Airport data).

[2] NCM is a specialized center for meteorological and seismic services under the Ministry of Presidential Affairs, UAE (www.ncm.ae).

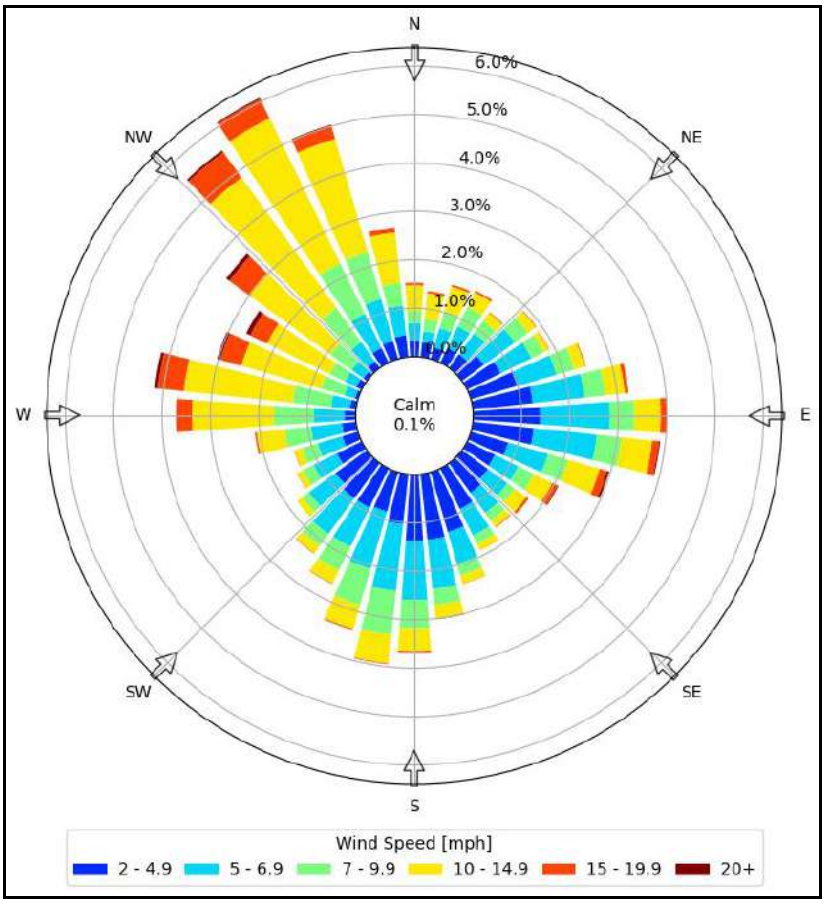


Figure 5.1 – Wind Rose Diagram for Dubai (Year 2020 to 2024)

5.1.2 Existing Ambient Air Quality Conditions

The available air quality and odor monitoring data related to Project site is from the baseline study carried out as a part of the existing EIA prepared for the whole (DS215 A&B DSST, Bur Dubai & Deira) Project in 2018. The results of the AQM (24 hrs averaging) showed that measured pollutants were within relevant DECCA/UAE limit. However, there were multiple exceedances of odor (H_2S) observed during survey period. Considering that these existing data is relatively old, an updated air quality and odor monitoring was undertaken as part of the EIA study.

5.1.2.1 Ambient Air Quality Survey

The results of the monitoring showed that 24-hours averaging time concentrations of the measured pollutants at all the locations were within UAE/DECCA limit except AAQ-9 on day 3 showing exceedances during monitoring campaign (see Table 5.2Table 5.2). These exceedances are primarily due to strong winds and unpaved open desert areas. It should be noted that the recorded concentrations reflect the conditions at the time of monitoring and actual conditions may vary during the year depending on the seasonal and meteorological changes.

Table 5.2 – Ambient Air Quality Monitoring Results

Days	Units	Average Concentration (24-hours Averaging Time)																			
		AAQ-1		AAQ-2		AAQ-3		AAQ-4		AAQ-5		AAQ-6		AAQ-7		AAQ-8		AAQ-9		AAQ-10	
		PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP	PM_{10}	TSP
Day 1	µg/m³	39.7	50.0	46.1	69.0	31.1	40.8	38.4	55.3	26.6	34.6	24.8	31.8	31.9	50.2	47.5	80.5	23.2	35.0	25.6	31.6
Day 2	µg/m³	35.3	44.2	41.2	60.5	23.3	30.8	30.4	46.2	28.8	36.9	29.0	35.4	44.3	63.4	49.7	77.3	37.1	48.8	32.5	38.4
Day 3	µg/m³	120.7	136.8	77.7	107.2	42.9	50.4	63.5	84.6	55.6	65.8	51.2	57.4	99.9	124.0	95.0	131.7	544.2	562.0	52.4	60.6
Day 4	µg/m³	54.1	66.8	64.1	95.3	32.4	40.3	41.9	61.5	30.6	38.1	24.3	29.4	33.1	48.9	47.0	79.8	32.6	43.2	33.9	48.8
Day 5	µg/m³	22.5	30.7	44.9	68.7	23.3	32.2	31.1	50.1	26.9	35.1	19.0	24.2	34.6	56.2	43.8	76.8	20.1	29.9	36.4	47.9
Day 6	mg/m³	17.9	26.5	32.5	54.7	16.5	22.1	27.1	44.7	20.9	29.1	30.2	43.1	46.8	82.8	53.1	99.0	32.5	51.4	48.8	63.5
Day 7	µg/m³	13.2	19.4	41.9	68.1	20.3	29.0	21.5	35.3	34.0	50.6	29.1	38.6	40.6	67.9	68.4	119.6	28.3	41.8	54.1	77.8
Detection Limit/Range	µg/m³	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000	0.01/ 1.6000
DECCA/UAE Standard (24-Hours Averaging Time)	µg/m³	150	230	150	230	150	230	150	230	150	230	150	230	150	230	150	230	150	230	150	230

Table 5.3 – Odor Monitoring Results (H2S and NH3)

No.	OMS-1				OMS-2				OMS-3			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
1	11/11/2024	16:00	75.83	196.33	12/11/2024	18.00	188.40	282.60	13/11/2024	18.30	30.00	255.17
2	11/11/2024	16:30	261.67	264.00	12/11/2024	18.30	12.83	208.67	13/11/2024	19.00	10.17	155.17
3	11/11/2024	17:00	147.83	284.83	12/11/2024	19.00	0.17	167.17	13/11/2024	19.30	13.00	115.83
4	11/11/2024	17:30	27.83	269.67	12/11/2024	19.30	0.00	140.00	13/11/2024	20.00	14.00	100.00

No.	OMS-1				OMS-2				OMS-3			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
5	11/11/2024	18:00	65.0	247.50	12/11/2024	20.00	0.00	123.00	13/11/2024	20.30	12.00	93.00
6	11/11/2024	18:30	781.17	213.83	12/11/2024	20.30	0.00	109.17	13/11/2024	21.00	15.50	87.50
7	11/11/2024	19:00	2211.33	183.67	12/11/2024	21.00	0.00	98.50	13/11/2024	21.30	12.83	80.00
8	11/11/2024	19:30	2473.67	155.00	12/11/2024	21.30	0.00	88.00	13/11/2024	22.00	8.50	76.00
9	11/11/2024	20:00	1649.83	133.17	12/11/2024	22.00	0.00	82.67	13/11/2024	22.30	8.50	71.00
10	11/11/2024	20:30	418.83	107.00	12/11/2024	22.30	0.17	73.50	13/11/2024	23.00	18.33	66.50
11	11/11/2024	21:00	199.17	92.00	12/11/2024	23.00	6.83	72.0	13/11/2024	23.30	19.17	57.00
12	11/11/2024	21:30	166.33	86.33	12/11/2024	23.30	11.33	73.00	14/11/2024	0.00	22.83	60.00
13	11/11/2024	22:00	44.17	79.67	13/11/2024	0.00	12.50	71.00	14/11/2024	0.30	20.00	49.00
14	11/11/2024	22:30	24.67	66.00	13/11/2024	0.30	11.33	62.00	14/11/2024	1.00	22.83	39.00
15	11/11/2024	23:00	22.00	57.67	13/11/2024	1.00	14.00	58.33	14/11/2024	1.30	23.50	40.00
16	11/11/2024	23:30	23.67	49.50	13/11/2024	1.30	30.50	55.83	14/11/2024	2.00	24.33	40.50
17	12/11/2024	0:00	25.67	47.50	13/11/2024	2.00	68.83	51.00	14/11/2024	2.30	21.00	35.00
18	12/11/2024	0:30	24.00	40.00	13/11/2024	2.30	47.83	45.00	14/11/2024	3.00	21.00	31.00
19	12/11/2024	1:00	30.5	37.00	13/11/2024	3.00	44.50	41.00	14/11/2024	3.30	21.00	27.50
20	12/11/2024	1:30	28.6	35.00	13/11/2024	3.30	82.67	39.00	14/11/2024	4.00	21.00	25.50
21	12/11/2024	2:00	22.5	28.00	13/11/2024	4.00	34.33	36.33	14/11/2024	4.30	22.00	21.50
22	12/11/2024	2:30	26.67	27.00	13/11/2024	4.30	24.00	33.33	14/11/2024	5.00	20.00	16.50
23	12/11/2024	3:00	26.63	24.50	13/11/2024	5.00	25.00	27.00	14/11/2024	5.30	21.83	17.00
24	12/11/2024	3:30	33.5	22.50	13/11/2024	5.30	27.00	28.00	14/11/2024	6.00	18.00	12.83
25	12/11/2024	4:00	33	19.00	13/11/2024	6.00	29.00	28.50	14/11/2024	6.30	15.00	13.00
26	12/11/2024	4:30	27.00	9.33	13/11/2024	6.30	28.50	22.50	14/11/2024	7.00	13.00	16.50

No.	OMS-1				OMS-2				OMS-3			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
27	12/11/2024	5:00	30.5	8.00	13/11/2024	7.00	31.00	21.50	14/11/2024	7.30	15.00	20.50
28	12/11/2024	5:30	32.00	8.00	13/11/2024	7.30	31.50	29.00	14/11/2024	8.00	11.33	25.00
29	12/11/2024	6:00	34.50	4.50	13/11/2024	8.00	25.83	29.50	14/11/2024	8.30	5.83	28.00
30	12/11/2024	6:30	33.50	1.67	13/11/2024	8.30	20.00	19.50	14/11/2024	9.00	3.50	26.00
31	12/11/2024	7:00	33.00	2.83	13/11/2024	9.00	201.33	27.17	14/11/2024	9.30	3.83	38.67
32	12/11/2024	7:30	30	16.50	13/11/2024	9.30	273.33	58.00	14/11/2024	10.00	6.50	67.17
33	12/11/2024	8:00	24.67	11.67	13/11/2024	10.00	54.17	116.00	14/11/2024	10.30	10.50	112.67
34	12/11/2024	8:30	22.00	0.00	13/11/2024	10.30	28.17	191.50	14/11/2024	11.00	22.50	178.00
35	12/11/2024	9:00	20.5	0.00	13/11/2024	11.00	23.67	281.83	14/11/2024	11.30	18.00	256.00
36	12/11/2024	9:30	21.5	3.67	13/11/2024	11.30	20.33	369.33	14/11/2024	12.00	18.00	340.67
37	12/11/2024	10:00	56.6	44.83	13/11/2024	12.00	16.17	437.67	14/11/2024	12.30	12.17	424.17
38	12/11/2024	10:30	57.67	129.17	13/11/2024	12.30	7.33	479.33	14/11/2024	13.00	6.83	495.17
39	12/11/2024	11:00	50.83	256.83	13/11/2024	13.00	9.50	535.33	14/11/2024	13.30	5.83	585.83
40	12/11/2024	11:30	110.8	380.83	13/11/2024	13.30	1.00	565.00	14/11/2024	14.00	0.17	627.00
41	12/11/2024	12:00	138.3	526.33	13/11/2024	14.00	13.50	641.33	14/11/2024	14.30	1.67	649.83
42	12/11/2024	12:30	181..3	654.50	13/11/2024	14.30	3.67	673.17	14/11/2024	15.00	2.17	647.33
43	12/11/2024	13:00	106.3	750.33	13/11/2024	15.00	0.50	625.00	14/11/2024	15.30	6.33	615.17
44	12/11/2024	13:30	58.5	853.00	13/11/2024	15.30	0.50	555.17	14/11/2024	16.00	10.50	560.83
45	12/11/2024	14:00	295.3	818.00	13/11/2024	16.00	1.83	495.17	14/11/2024	16.30	18.17	488.83
46	12/11/2024	14:30	178.3	750.50	13/11/2024	16.30	5.00	433.17	14/11/2024	17.00	19.50	412.83
47	12/11/2024	15:00	396.3	626.00	13/11/2024	17.00	7.00	378.17	14/11/2024	17.30	23.00	330.00
48	12/11/2024	15:30	169.33	526.33	13/11/2024	17.30	14.00	332.00	14/11/2024	18.00	25.00	275.25

No.	OMS-7				OMS-8				OMS-9				OMS-10			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
1	26/11/2024	13.30	0.06	0.47	27/11/2024	15.00	0.07	0.70	28/11/2024	16.30	0.09	0.39	29/11/2024	17.30	0.10	0.39
2	26/11/2024	14.00	0.07	0.56	27/11/2024	15.30	0.07	0.72	28/11/2024	17.00	0.09	0.36	29/11/2024	18.00	0.09	0.33
3	26/11/2024	14.30	0.08	0.68	27/11/2024	16.00	0.06	0.76	28/11/2024	17.30	0.10	0.43	29/11/2024	18.30	0.09	0.30
4	26/11/2024	15.00	0.08	0.75	27/11/2024	16.30	0.07	0.76	28/11/2024	18.00	0.09	0.38	29/11/2024	19.00	0.09	0.28
5	26/11/2024	15.30	0.07	0.72	27/11/2024	17.00	0.07	0.73	28/11/2024	18.30	0.09	0.32	29/11/2024	19.30	0.09	0.26
6	26/11/2024	16.00	0.07	0.68	27/11/2024	17.30	0.07	0.65	28/11/2024	19.00	0.09	0.31	29/11/2024	20.00	0.09	0.25
7	26/11/2024	16.30	0.07	0.62	27/11/2024	18.00	0.08	0.61	28/11/2024	19.30	0.09	0.29	29/11/2024	20.30	0.09	0.25
8	26/11/2024	17.00	0.08	0.58	27/11/2024	18.30	0.07	0.52	28/11/2024	20.00	0.09	0.25	29/11/2024	21.00	0.09	0.24
9	26/11/2024	17.30	0.07	0.51	27/11/2024	19.00	0.07	0.45	28/11/2024	20.30	0.08	0.23	29/11/2024	21.30	0.09	0.24
10	26/11/2024	18.00	0.08	0.47	27/11/2024	19.30	0.07	0.42	28/11/2024	21.00	0.09	0.24	29/11/2024	22.00	0.09	0.23
11	26/11/2024	18.30	0.08	0.42	27/11/2024	20.00	0.06	0.37	28/11/2024	21.30	0.09	0.25	29/11/2024	22.30	0.09	0.22
12	26/11/2024	19.00	0.08	0.38	27/11/2024	20.30	0.06	0.34	28/11/2024	22.00	0.09	0.24	29/11/2024	23.00	0.09	0.22
13	26/11/2024	19.30	0.08	0.36	27/11/2024	21.00	0.07	0.32	28/11/2024	22.30	0.09	0.22	29/11/2024	23.30	0.09	0.22
14	26/11/2024	20.00	0.08	0.33	27/11/2024	21.30	0.07	0.30	28/11/2024	23.00	0.09	0.21	30/11/2024	0.00	0.09	0.22
15	26/11/2024	20.30	0.08	0.30	27/11/2024	22.00	0.07	0.30	28/11/2024	23.30	0.09	0.21	30/11/2024	0.30	0.09	0.22
16	26/11/2024	21.00	0.08	0.29	27/11/2024	22.30	0.07	0.28	29/11/2024	0.00	0.09	0.21	30/11/2024	1.00	0.09	0.22
17	26/11/2024	21.30	0.08	0.28	27/11/2024	23.00	0.07	0.25	29/11/2024	0.30	0.09	0.21	30/11/2024	1.30	0.09	0.22
18	26/11/2024	22.00	0.08	0.28	27/11/2024	23.30	0.07	0.24	29/11/2024	1.00	0.09	0.21	30/11/2024	2.00	0.09	0.21
19	26/11/2024	22.30	0.07	0.26	28/11/2024	0.00	0.08	0.23	29/11/2024	1.30	0.09	0.22	30/11/2024	2.30	0.09	0.22
20	26/11/2024	23.00	0.07	0.26	28/11/2024	0.30	0.08	0.22	29/11/2024	2.00	0.09	0.20	30/11/2024	3.00	0.09	0.21
21	26/11/2024	23.30	0.08	0.24	28/11/2024	1.00	0.08	0.21	29/11/2024	2.30	0.08	0.20	30/11/2024	3.30	0.09	0.22
22	27/11/2024	0.00	0.09	0.23	28/11/2024	1.30	0.07	0.18	29/11/2024	3.00	0.09	0.20	30/11/2024	4.00	0.09	0.22

No.	OMS-7				OMS-8				OMS-9				OMS-10			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
23	27/11/2024	0.30	0.09	0.23	28/11/2024	2.00	0.07	0.19	29/11/2024	3.30	0.09	0.21	30/11/2024	4.30	0.09	0.22
24	27/11/2024	1.00	0.09	0.23	28/11/2024	2.30	0.07	0.20	29/11/2024	4.00	0.09	0.20	30/11/2024	5.00	0.09	0.22
25	27/11/2024	1.30	0.08	0.23	28/11/2024	3.00	0.08	0.19	29/11/2024	4.30	0.09	0.21	30/11/2024	5.30	0.09	0.21
26	27/11/2024	2.00	0.09	0.22	28/11/2024	3.30	0.08	0.19	29/11/2024	5.00	0.09	0.21	30/11/2024	6.00	0.09	0.20
27	27/11/2024	2.30	0.09	0.22	28/11/2024	4.00	0.08	0.19	29/11/2024	5.30	0.09	0.20	30/11/2024	6.30	0.09	0.21
28	27/11/2024	3.00	0.09	0.22	28/11/2024	4.30	0.08	0.19	29/11/2024	6.00	0.09	0.21	30/11/2024	7.00	0.09	0.21
29	27/11/2024	3.30	0.09	0.21	28/11/2024	5.00	0.08	0.19	29/11/2024	6.30	0.08	0.21	30/11/2024	7.30	0.09	0.23
30	27/11/2024	4.00	0.09	0.21	28/11/2024	5.30	0.08	0.19	29/11/2024	7.00	0.08	0.21	30/11/2024	8.00	0.09	0.24
31	27/11/2024	4.30	0.10	0.21	28/11/2024	6.00	0.08	0.19	29/11/2024	7.30	0.08	0.21	30/11/2024	8.30	0.22	0.09
32	27/11/2024	5.00	0.08	0.20	28/11/2024	6.30	0.08	0.19	29/11/2024	8.00	0.08	0.20	30/11/2024	9.00	0.20	0.08
33	27/11/2024	5.30	0.08	0.21	28/11/2024	7.00	0.08	0.20	29/11/2024	8.30	0.09	0.17	30/11/2024	9.30	0.18	0.08
34	27/11/2024	6.00	0.08	0.20	28/11/2024	7.30	0.08	0.21	29/11/2024	9.00	0.09	0.17	30/11/2024	10.00	0.18	0.08
35	27/11/2024	6.30	0.08	0.21	28/11/2024	8.00	0.07	0.22	29/11/2024	9.30	0.09	0.19	30/11/2024	10.30	0.20	0.09
36	27/11/2024	7.00	0.08	0.20	28/11/2024	8.30	0.07	0.20	29/11/2024	10.00	0.09	0.22	30/11/2024	11.00	0.23	0.09
37	27/11/2024	7.30	0.08	0.21	28/11/2024	9.00	0.07	0.19	29/11/2024	10.30	0.09	0.26	30/11/2024	11.30	0.28	0.09
38	27/11/2024	8.00	0.07	0.22	28/11/2024	9.30	0.07	0.19	29/11/2024	11.00	0.09	0.29	30/11/2024	12.00	0.33	0.09
39	27/11/2024	8.30	0.06	0.20	28/11/2024	10.00	0.07	0.22	29/11/2024	11.30	0.09	0.33	30/11/2024	12.30	0.36	0.09
40	27/11/2024	9.00	0.06	0.18	28/11/2024	10.30	0.07	0.27	29/11/2024	12.00	0.09	0.38	30/11/2024	13.00	0.40	0.09
41	27/11/2024	9.30	0.07	0.24	28/11/2024	11.00	0.08	0.37	29/11/2024	12.30	0.09	0.42	30/11/2024	13.30	0.46	0.09
42	27/11/2024	10.00	0.07	0.31	28/11/2024	11.30	0.09	0.48	29/11/2024	13.00	0.09	0.47	30/11/2024	14.00	0.51	0.09
43	27/11/2024	10.30	0.07	0.41	28/11/2024	12.00	0.09	0.55	29/11/2024	13.30	0.09	0.48	30/11/2024	14.30	0.52	0.09
44	27/11/2024	11.00	0.07	0.50	28/11/2024	12.30	0.09	0.61	29/11/2024	14.00	0.09	0.51	30/11/2024	15.00	0.52	0.09
45	27/11/2024	11.30	0.07	0.59	28/11/2024	13.00	0.09	0.64	29/11/2024	14.30	0.09	0.51	30/11/2024	15.30	0.52	0.09

No.	OMS-7				OMS-8				OMS-9				OMS-10			
	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)	Day	Time	H_2S(µg/m³) (Limit =7)	NH_3 (µg/m³) (Limit =30)
46	27/11/2024	12.00	0.07	0.68	28/11/2024	13.30	0.09	0.64	29/11/2024	15.00	0.09	0.50	30/11/2024	16.00	0.52	0.09
47	27/11/2024	12.30	0.07	0.79	28/11/2024	14.00	0.09	0.62	29/11/2024	15.30	0.09	0.49	30/11/2024	16.30	0.51	0.09
48	27/11/2024	13.00	0.06	0.91	28/11/2024	14.30	0.08	0.54	29/11/2024	16.00	0.09	0.47	30/11/2024	17.00	0.49	0.09
Detection Limit Range µg/m³			0.01/0.14000	0.04/0.7000			0.01/0.14000	0.04/0.7000			0.01/0.14000	0.04/0.7000			0.01/0.14000	0.04/0.7000

Table 5.4 – Odor Monitoring Results (C2H6, C2H6S2, CH4S)

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
1	11/11/2024	16.00	22.00	20.00	3.00	12/11 /2024	17:40	9.3	8.4	3.06	13/11 /2024	18:10	3	2	0
2	11/11/2024	16.10	22.80	21.50	3.10	12/11 /2024	17:50	11	7.9	2.1	13/11 /2024	18:20	1.61	15.46	0.42
3	11/11/2024	16.20	21.00	18.90	3.20	12/11 /2024	18:00	15.3	7.6	1.9	13/11 /2024	18:30	2.54	14.36	0
4	11/11/2024	16.30	21.50	19.00	3.70	12/11 /2024	18:10	19.2	9.4	1.6	13/11 /2024	18:40	5.6	13.24	0
5	11/11/2024	16.40	21.00	18.50	4.20	12/11 /2024	18:20	22.9	11.26	0.8	13/11 /2024	18:50	6.2	11.96	0
6	11/11/2024	16.50	20.50	18.00	4.10	12/11 /2024	18:30	20.1	12.6	0.6	13/11 /2024	19:00	8.77	9.32	0.45
7	11/11/2024	17.00	20.00	18.00	4.00	12/11 /2024	18:40	18.3	14.56	0.9	13/11 /2024	19:10	7.24	8.36	0.62
8	11/11/2024	17.10	19.50	17.50	4.30	12/11	18:50	16.3	13.9	0.4	13/11	19:20	8.48	7.45	0.91

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
9	11/11/2024	17.20	18.50	16.50	2.50	12/11 /2024	19:00	12.8	13.45	0	13/11 /2024	19:30	7.6	8.31	1.1
10	11/11/2024	17.30	16.00	14.00	2.66	12/11 /2024	19:10	17.5	14.82	0	13/11 /2024	19:40	9.1	7.49	1.29
11	11/11/2024	17.40	12.50	11.00	2.33	12/11 /2024	19:20	16.94	14.21	0	13/11 /2024	19:50	11.34	8.21	2.64
12	11/11/2024	17.50	11.00	9.50	2.10	12/11 /2024	19:30	18.34	15.02	0.68	13/11 /2024	20:00	14.62	9.06	2.34
13	11/11/2024	18.00	9.55	8.25	0.00	12/11 /2024	19:40	21.7	17.64	1.4	13/11 /2024	20:10	13.5	9.89	2.86
14	11/11/2024	18.10	7.50	6.50	0.20	12/11 /2024	19:50	22.3	16.8	0.9	13/11 /2024	20:20	15.64	11.23	3.16
15	11/11/2024	18.20	6.00	5.50	0.10	12/11 /2024	20:00	23.4	17.9	0.64	13/11 /2024	20:30	17.62	12.39	3.56
16	11/11/2024	18.30	5.00	4.50	0.00	12/11 /2024	20:10	22.8	18.57	1.2	13/11 /2024	20:40	19.02	12.45	3.96
17	11/11/2024	18.40	3.50	3.50	0.00	12/11 /2024	20:20	22.6	19.24	1.94	13/11 /2024	20:50	21.34	13.42	4.08
18	11/11/2024	18.50	2.50	2.00	0.00	12/11 /2024	20:30	21.8	19.86	2.14	13/11 /2024	21:00	24.15	14.76	4.67
19	11/11/2024	19.00	12.80	6.30	1.23	12/11 /2024	20:40	23.6	17.06	2.68	13/11 /2024	21:10	25.72	14.09	5.68
20	11/11/2024	19.10	15.77	9.44	3.75	12/11 /2024	20:50	25.31	16.84	2.91	13/11 /2024	21:20	26.77	14.75	6.24
21	11/11/2024	19.20	17.97	15.64	4.25	12/11	21:00	26.54	16.32	2.18	13/11	21:30	35.45	15.12	6.84

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
22	11/11/2024	19.30	22.78	18.36	5.60	12/11 /2024	21:10	27.24	14.92	3.49	13/11 /2024	21:40	24.53	15.94	7.64
23	11/11/2024	19.40	27.59	20.13	6.78	12/11 /2024	21:20	29.45	15.42	4.31	13/11 /2024	21:50	21.03	12.53	7.98
24	11/11/2024	19.50	27.42	20.13	6.89	12/11 /2024	21:30	28.21	13.86	4.68	13/11 /2024	22:00	20.5	11.55	7.26
25	11/11/2024	20.00	28.10	20.89	6.95	12/11 /2024	21:40	27.26	12.14	4.92	13/11 /2024	22:10	19.64	10.5	7.02
26	11/11/2024	20.10	28.46	22.40	7.10	12/11 /2024	21:50	27.13	11.28	5.21	13/11 /2024	22:20	18.24	9	7.94
27	11/11/2024	20.20	27.44	21.98	6.44	12/11 /2024	22:00	25.2	9.68	5.64	13/11 /2024	22:30	24.24	8.75	6.35
28	11/11/2024	20.30	27.56	22.70	6.78	12/11 /2024	22:10	23.14	8.04	5.7	13/11 /2024	22:40	14.34	12.36	5.94
29	11/11/2024	20.40	27.10	21.70	6.30	12/11 /2024	22:20	24.34	7.92	5.5	13/11 /2024	22:50	11.05	6.13	5.21
30	11/11/2024	20.50	30.22	24.50	7.12	12/11 /2024	22:30	21.36	5.26	5.9	13/11 /2024	23:00	9.21	5.05	4.93
31	11/11/2024	21.00	31.55	25.70	7.18.	12/11 /2024	22:40	19.24	8.64	6.4	13/11 /2024	23:10	8.62	3.61	3.21
32	11/11/2024	21.10	31.78	26.42	7.49	12/11 /2024	22:50	17.2	10.65	6.86	13/11 /2024	23:20	5.28	1.67	1.65
33	11/11/2024	21.20	29.45	25.79	7.23	12/11 /2024	23:00	15.04	11.86	5.2	13/11 /2024	23:30	7.1	0	2.58
34	11/11/2024	21.30	28.78	24.76	7.01	12/11	23:10	12.18	9.24	3.89	13/11	23:40	7.9	0	3.25

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
35	11/11/2024	21.40	28.33	22.10	6.40	12/11 /2024	23:20	13.85	9.56	3.85	13/11 /2024	23:50	8.2	1.34	4.18
36	11/11/2024	21.50	27.33	21.70	6.40	12/11 /2024	23:30	15.78	10.05	3.75	14/11 /2024	0:00	10.23	2.65	4.98
37	11/11/2024	22.00	27.12	21.50	6.10	12/11 /2024	23:40	15.3	9.86	2.94	14/11 /2024	0:10	11	3.74	5.23
38	11/11/2024	22.10	25.90	19.70	5.70	12/11 /2024	23:50	16.96	10.15	2.16	14/11 /2024	0:20	12.4	4.26	5.86
39	11/11/2024	22.20	25.80	19.70	5.50	13/11 /2024	0:00	14.2	9.42	1.94	14/11 /2024	0:30	14	5.14	6.25
40	11/11/2024	22.30	24.33	18.43	5.10	13/11 /2024	0:10	14.45	9.05	1.62	14/11 /2024	0:40	13.5	6.15	6.41
41	11/11/2024	22.40	23.78	18.10	4.75	13/11 /2024	0:20	16.57	8.86	1.26	14/11 /2024	0:50	16.28	8.1	6.35
42	11/11/2024	22.50	23.21	17.45	4.25	13/11 /2024	0:30	16.09	9.05	0.95	14/11 /2024	1:00	19.4	9.26	6.12
43	11/11/2024	23.00	22.85	17.45	4.12	13/11 /2024	0:40	15.46	10.24	0.42	14/11 /2024	1:10	21	14.2	5.64
44	11/11/2024	23.10	22.85	16.32	3.89	13/11 /2024	0:50	14.36	11.26	0	14/11 /2024	1:20	22	13.8	4.95
45	11/11/2024	23.20	22.85	16.23	3.85	13/11 /2024	1:00	13.24	10.86	0	14/11 /2024	1:30	21.5	15.9	4.23
46	11/11/2024	23.30	21.77	15.78	3.75	13/11 /2024	1:10	11.96	9.53	0	14/11 /2024	1:40	26.64	17.54	3.95
47	11/11/2024	23.40	21.10	15.30	3.27	13/11	1:20	9.32	8.06	0.45	14/11	1:50	24.12	18.65	3.2

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
48	11/11/2024	23.50	20.89	14.70	3.17	13/11 /2024	1:30	8.36	7.54	0.62	14/11 /2024	2:00	22.8	18	2.6
49	12/11/2024	0.00	19.90	14.45	3.10	13/11 /2024	1:40	7.45	5.94	0.91	14/11 /2024	2:10	27.9	17.5	2.1
50	12/11/2024	0.10	19.77	14.45	3.00	13/11 /2024	1:50	8.31	6.25	1.1	14/11 /2024	2:20	19.6	16.5	3.68
51	12/11/2024	0.20	19.50	17.50	2.78	13/11 /2024	2:00	9.1	7.49	1.29	14/11 /2024	2:30	18.21	14	3.42
52	12/11/2024	0.30	18.50	16.50	2.45	13/11 /2024	2:10	11.34	8.21	2.64	14/11 /2024	2:40	16.5	10.6	3.12
53	12/11/2024	0.40	16.00	14.00	2.10	13/11 /2024	2:20	14.62	9.06	2.34	14/11 /2024	2:50	15.38	11.5	3.11
54	12/11/2024	0.50	12.50	11.00	2.00	13/11 /2024	2:30	13.5	9.89	2.86	14/11 /2024	3:00	11.7	7.6	2.31
55	12/11/2024	1.00	11.00	10.50	2.12	13/11 /2024	2:40	15.64	11.23	3.16	14/11 /2024	3:10	8.65	5.55	1.88
56	12/11/2024	1.10	9.00	7.50	2.12	13/11 /2024	2:50	17.62	12.39	3.56	14/11 /2024	3:20	9	4.5	1.9
57	12/11/2024	1.20	8.77	6.31	1.45	13/11 /2024	3:00	19.02	12.45	3.96	14/11 /2024	3:30	7.5	6.5	2.33
58	12/11/2024	1.30	8.77	6.31	1.45	13/11 /2024	3:10	21.34	13.42	4.08	14/11 /2024	3:40	6	5.5	2.1
59	12/11/2024	1.40	8.79	6.45	1.49	13/11 /2024	3:20	23.15	13.76	4.67	14/11 /2024	3:50	5	4.5	2.1
60	12/11/2024	1.50	8.77	6.31	1.45	13/11	3:30	25.72	14.09	5.68	14/11	4:00	3.5	3.5	2.17

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
61	12/11/2024	2.00	10.45	7.49	2.20	13/11 /2024	3:40	26.77	14.75	6.24	14/11 /2024	4:10	2.5	2	2.32
62	12/11/2024	2.10	11.73	8.21	2.88	13/11 /2024	3:50	28.45	15.12	6.84	14/11 /2024	4:20	0	0	2.1
63	12/11/2024	2.20	12.45	9.66	3.12	13/11 /2024	4:00	24.53	15.94	7.64	14/11 /2024	4:30	18.5	15.8	2.15
64	12/11/2024	2.30	12.89	9.89	3.45	13/11 /2024	4:10	21.03	12.53	7.98	14/11 /2024	4:40	31.5	15.3	2.1
65	12/11/2024	2.40	13.78	10.45	3.46	13/11 /2024	4:20	20.5	11.55	8.26	14/11 /2024	4:50	0	19.7	3.14
66	12/11/2024	2.50	14.33	11.69	3.56	13/11 /2024	4:30	19.64	10.5	8.02	14/11 /2024	5:00	0	0	0
67	12/11/2024	3.00	15.78	12.45	3.89	13/11 /2024	4:40	18.24	9	7.94	14/11 /2024	5:10	1	1	1
68	12/11/2024	3.10	16.77	13.42	4.25	13/11 /2024	4:50	16.24	8.75	6.35	14/11 /2024	5:20	2.5	2.5	1.2
69	12/11/2024	3.20	15.50	14.00	4.65	13/11 /2024	5:00	14.34	7	5.94	14/11 /2024	5:30	4	3.5	1.45
70	12/11/2024	3.30	16.23	15.20	4.88	13/11 /2024	5:10	11.05	6.13	5.21	14/11 /2024	5:40	5	4.5	1.78
71	12/11/2024	3.40	16.77	15.20	4.88	13/11 /2024	5:20	9.21	5.05	4.93	14/11 /2024	5:50	6.5	6	2.12
72	12/11/2024	3.50	20.00	18.00	5.33	13/11 /2024	5:30	8.62	3.61	3.21	14/11 /2024	6:00	8.5	7	4.25
73	12/11/2024	4.00	21.00	18.50	5.33	13/11	5:40	5.28	1.67	2.65	14/11	6:10	9.5	8.5	4.65

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
74	12/11/2024	4.10	21.00	18.00	5.41	13/11 /2024	5:50	3.06	0	2.04	14/11 /2024	6:20	11.5	10.5	4.88
75	12/11/2024	4.20	20.50	18.00	5.35	13/11 /2024	6:00	0	0	1.65	14/11 /2024	6:30	13.5	12	4.88
76	12/11/2024	4.30	21.00	18.50	5.35	13/11 /2024	6:10	0	0	1.2	14/11 /2024	6:40	15	13	5.33
77	12/11/2024	4:40	20.50	18.00	5.32	13/11 /2024	6:20	0	0	0	14/11 /2024	6:50	16	14.5	5.33
78	12/11/2024	4:50	20.00	18.00	5.35	13/11 /2024	6:30	1.3	0	0	14/11 /2024	7:00	17.5	15.5	5.41
79	12/11/2024	5:00	27.59	20.13	6.78	13/11 /2024	6:40	1.5	2.3	0	14/11 /2024	7:10	18.5	16.5	5.35
80	12/11/2024	5:10	27.42	20.13	6.89	13/11 /2024	6:50	2.05	1.9	0	14/11 /2024	7:20	20	18	5.35
81	12/11/2024	5:20	28.10	20.89	6.95	13/11 /2024	7:00	2.97	0	0.61	14/11 /2024	7:30	21	18.5	5.32
82	12/11/2024	5:30	28.46	22.40	7.10	13/11 /2024	7:10	4.65	0	0.95	14/11 /2024	7:40	21	18	5.35
83	12/11/2024	5:40	27.44	21.98	6.44	13/11 /2024	7:20	7.16	0.6	1.45	14/11 /2024	7:50	20.5	18	3
84	12/11/2024	5:50	27.56	22.70	6.78	13/11 /2024	7:30	13.24	1.4	2.2	14/11 /2024	8:00	21	18.5	3.1
85	12/11/2024	6:00	27.10	21.70	6.30	13/11 /2024	7:40	15.37	1.8	2.4	14/11 /2024	8:10	20.5	18	3.2
86	12/11/2024	6:10	29.47	24.35	7.13	13/11	7:50	16.21	2.2	3.1	14/11	8:20	21	18.5	5.35

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
87	12/11/2024	6:20	31.55	25.70	7.18	13/11 /2024	8:00	17.51	2.9	3.65	14/11 /2024	8:30	20.5	18	5.32
88	12/11/2024	6:30	31.78	26.42	7.49	13/11 /2024	8:10	18.16	4.1	3.95	14/11 /2024	8:40	20	18	5.35
89	12/11/2024	6:40	30.45	25.89	7.10	13/11 /2024	8:20	17.66	5.61	4.1	14/11 /2024	8:50	27.59	20.13	6.78
90	12/11/2024	6:50	28.45	24.00	6.45	13/11 /2024	8:30	18.14	8.12	4.64	14/11 /2024	9:00	27.42	20.13	6.89
91	12/11/2024	7:00	25.66	23.15	6.12	13/11 /2024	8:40	16.24	10.24	3.86	14/11 /2024	9:10	28.1	20.89	6.95
92	12/11/2024	7:10	24.50	22.50	5.72	13/11 /2024	8:50	15.23	13.5	3.15	14/11 /2024	9:20	28.46	22.4	7.1
93	12/11/2024	7:20	24.00	22.00	5.54	13/11 /2024	9:00	13.2	9.26	2.6	14/11 /2024	9:30	27.44	21.98	6.44
94	12/11/2024	7:30	23.75	21.40	5.20	13/11 /2024	9:10	14.8	7	1.8	14/11 /2024	9:40	27.56	22.7	6.78
95	12/11/2024	7:40	18.78	16.40	3.40	13/11 /2024	9:20	14.03	6.21	1.24	14/11 /2024	9:50	27.1	21.7	6.3
96	12/11/2024	7:50	18.45	15.40	3.10	13/11 /2024	9:30	13.64	4.98	1.1	14/11 /2024	10:00	29.47	24.35	7.13
97	12/11/2024	8:00	15.78	13.78	2.24	13/11 /2024	9:40	11.28	3.7	0.3	14/11 /2024	10:10	31.55	25.7	7.18
98	12/11/2024	8:10	12.30	10.46	2.30	13/11 /2024	9:50	9.2	2.94	0	14/11 /2024	10:20	31.78	26.42	7.49
99	12/11/2024	8:20	10.90	8.64	2.10	13/11	10:00	7.64	2.08	1	14/11	10:30	15.47	10.78	5.46

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
100	12/11/2024	8:30	8.50	6.40	1.48	13/11 /2024	10:10	2.5	2.5	1.2	14/11 /2024	10:40	0.5	0.5	0
101	12/11/2024	8:40	4.00	3.50	1.50	13/11 /2024	10:20	4	1.86	1.98	14/11 /2024	10:50	3.5	3	0.27
102	12/11/2024	8:50	5.00	3.50	1.50	13/11 /2024	10:30	5.2	0.4	2.16	14/11 /2024	11:00	5.5	5	1.23
103	12/11/2024	9:00	6.50	6.00	1.50	13/11 /2024	10:40	7.1	0	2.58	14/11 /2024	11:10	7.5	7	1.25
104	12/11/2024	9:10	8.50	7.00	1.50	13/11 /2024	10:50	7.9	0	3.25	14/11 /2024	11:20	9.5	8.5	1.55
105	12/11/2024	9:20	9.50	7.50	1.50	13/11 /2024	11:00	8.2	1.34	4.18	14/11 /2024	11:30	10.5	9.5	1.69
106	12/11/2024	9:30	4.70	3.10	1.10	13/11 /2024	11:10	10.23	2.65	4.85	14/11 /2024	11:40	12	10.5	1.47
107	12/11/2024	9:40	2.10	1.70	0.45	13/11 /2024	11:20	11	3.74	5.23	14/11 /2024	11:50	13	11	2.47
108	12/11/2024	9:50	0.00	4.50	0.00	13/11 /2024	11:30	12.4	4.26	5.86	14/11 /2024	12:00	13	11	2.31
109	12/11/2024	10:00	1.00	1.00	1.00	13/11 /2024	11:40	14	5.14	6.25	14/11 /2024	12:10	13	12	2.44
110	12/11/2024	10:10	2.50	2.50	1.20	13/11 /2024	11:50	13.5	6.15	6.41	14/11 /2024	12:20	13.5	12	2.76
111	12/11/2024	10:20	4.00	3.50	1.45	13/11 /2024	12:00	16.28	8.1	6.35	14/11 /2024	12:30	14	12.5	2.54
112	12/11/2024	10:30	5.00	4.50	1.78	13/11	12:10	19.4	9.26	6.12	14/11	12:40	15	13	2.45

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
113	12/11/2024	10:40	6.50	6.00	2.12	13/11 /2024	12:20	21	11.2	5.64	14/11 /2024	12:50	16	14.5	2.64
114	12/11/2024	10:50	8.50	7.00	4.25	13/11 /2024	12:30	22	13.8	4.95	14/11 /2024	13:00	17	15	2.55
115	12/11/2024	11:00	9.50	8.50	4.65	13/11 /2024	12:40	21.5	15.9	4.23	14/11 /2024	13:10	18	16	2.78
116	12/11/2024	11:10	11.50	10.50	4.88	13/11 /2024	12:50	23.64	17.54	3.95	14/11 /2024	13:20	18	16	2.47
117	12/11/2024	11:20	13.50	12.00	4.88	13/11 /2024	13:00	24.12	18.65	3.2	14/11 /2024	13:30	18	16	2.98
118	12/11/2024	11:30	15.00	13.00	5.33	13/11 /2024	13:10	22.8	18	2.6	14/11 /2024	13:40	18	16	2.84
119	12/11/2024	11:40	16.00	14.50	5.33	13/11 /2024	13:20	21.9	17.5	2.1	14/11 /2024	13:50	17	15	2.55
120	12/11/2024	11:50	17.50	15.50	5.41	13/11 /2024	13:30	19.6	16.5	3.68	14/11 /2024	14:00	17	15	2.44
121	12/11/2024	12:00	18.50	16.50	5.35	13/11 /2024	13:40	17	14	3.42	14/11 /2024	14:10	16.5	15	2.35
122	12/11/2024	12:10	20.00	18.00	5.35	13/11 /2024	13:50	16.5	10.6	3.12	14/11 /2024	14:20	16	14	2.44
123	12/11/2024	12:20	21.00	18.50	5.32	13/11 /2024	14:00	12	9.5	2.98	14/11 /2024	14:30	15	13	2.78
124	12/11/2024	12:30	21.00	18.00	5.35	13/11 /2024	14:10	11.7	7.6	2.31	14/11 /2024	14:40	14	12.5	2.45
125	12/11/2024	12:40	20.50	18.00	3.00	13/11	14:20	11	6.4	2.33	14/11	14:50	13	12	2.31

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
126	12/11/2024	12:50	21.00	18.50	3.10	13/11 /2024	14:30	9	4.5	1.9	14/11 /2024	15:00	12	10.5	2.35
127	12/11/2024	13:00	20.50	18.00	3.20	13/11 /2024	14:40	6.5	3.8	1.25	14/11 /2024	15:10	11	10	2.22
128	12/11/2024	13:10	20.00	18.00	3.70	13/11 /2024	14:50	6.2	3.5	0.96	14/11 /2024	15:20	9	8.5	1.85
129	12/11/2024	13:20	19.50	17.50	4.20	13/11 /2024	15:00	6	2.8	0	14/11 /2024	15:30	8.5	7.5	1.65
130	12/11/2024	13:30	18.50	16.50	4.10	13/11 /2024	15:10	5.8	0	0	14/11 /2024	15:40	6.5	6	1.45
131	12/11/2024	13:40	16.00	14.00	4.00	13/11 /2024	15:20	5.4	0	0	14/11 /2024	15:50	4.5	4.5	1.2
132	12/11/2024	13:50	12.50	11.00	4.30	13/11 /2024	15:30	4.9	0	0	14/11 /2024	16:00	3.5	3	1.1
133	12/11/2024	14:00	11.00	9.50	2.50	13/11 /2024	15:40	3.6	0.68	0	14/11 /2024	16:10	1	1.5	1.1
134	12/11/2024	14:10	9.00	7.50	2.66	13/11 /2024	15:50	2.1	1.86	0	14/11 /2024	16:20	0	0	0
135	12/11/2024	14:20	7.50	6.50	2.33	13/11 /2024	16:00	2.94	2.24	0.45	14/11 /2024	16:30	0	0	0
136	12/11/2024	14:30	6.00	5.50	2.10	13/11 /2024	16:10	3.65	2.96	0.98	14/11 /2024	16:40	0	0	0
137	12/11/2024	14:40	5.00	4.50	2.10	13/11 /2024	16:20	4.26	3.56	1.25	14/11 /2024	16:50	0	0	0
138	12/11/2024	14:50	3.50	3.50	2.17	13/11	16:30	5.94	5.12	1.91	14/11	17:00	0	0	0

No.	OMS-1					OMS-2					OMS-3				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
139	12/11/2024	15:00	2.50	2.00	2.32	13/11 /2024	16:40	7.32	6.05	2.2	14/11 /2024	17:10	0	0	0
140	12/11/2024	15:10	0.00	0.00	2.10	13/11 /2024	16:50	9.5	6.54	2.5	14/11 /2024	17:20	0	0	0
141	12/11/2024	15:20	18.50	15.80	2.15	13/11 /2024	17:00	11.64	6.75	2.6	14/11 /2024	17:30	0	0	0
142	12/11/2024	15:30	31.50	15.30	2.10	13/11 /2024	17:10	10.24	5.91	1.8	14/11 /2024	17:40	0	0	0
143	12/11/2024	15:40	0.00	19.70	3.14	13/11 /2024	17:20	8.56	5.42	1.22	14/11 /2024	17:50	0	0	0
144	12/11/2024	15:50	0.00	0.00	0.00	13/11 /2024	17:30	6.24	4.94	0.8	14/11 /2024	18:00	0	0	0
Detection Limit (µg/m³)			0.01/0:26000	0.01/0:40000	0.01/0:20000			0.01/0:26000	0.01/0:40000	0.01/0:20000			0.01/0:26000	0.01/0:40000	0.01/0:20000

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
1	14/11/2024	19:10	3.1	1.4	2.34	20/11 /2024	12:15	0.52	0.38	0.87	25/11 /2024	12:40	0.81	0.6	1.31
2	14/11/2024	19:20	6.42	3.26	2.86	20/11 /2024	12:25	0.22	0.16	0.37	25/11 /2024	12:50	0.21	0.16	0.36
3	14/11/2024	19:30	7.23	4.25	3.2	20/11	12:35	0.21	0.15	0.34	25/11	13:00	0.2	0.15	0.34

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
4	14/11/2024	19:40	7.8	4.86	2.98	20/11 /2024	12:45	0.21	0.15	0.34	25/11 /2024	13:10	0.2	0.15	0.34
5	14/11/2024	19:50	9.02	4.92	2.65	20/11 /2024	12:55	0.21	0.15	0.35	25/11 /2024	13:20	0.2	0.15	0.34
6	14/11/2024	20:00	10.95	5.45	2.31	20/11 /2024	13:05	0.21	0.16	0.36	25/11 /2024	13:30	0.2	0.15	0.33
7	14/11/2024	20:10	11.45	6.75	2.58	20/11 /2024	13:15	0.21	0.16	0.36	25/11 /2024	13:40	0.2	0.15	0.33
8	14/11/2024	20:20	11.36	6.94	2.86	20/11 /2024	13:25	0.21	0.16	0.35	25/11 /2024	13:50	0.2	0.14	0.33
9	14/11/2024	20:30	11.74	7.24	3.16	20/11 /2024	13:35	0.21	0.15	0.35	25/11 /2024	14:00	0.2	0.14	0.33
10	14/11/2024	20:40	12.13	7.86	3.58	20/11 /2024	13:45	0.21	0.15	0.34	25/11 /2024	14:10	0.19	0.14	0.32
11	14/11/2024	20:50	12.84	8.21	3.75	20/11 /2024	13:55	0.2	0.15	0.33	25/11 /2024	14:20	0.19	0.14	0.32
12	14/11/2024	21:00	12.75	9.18	4.18	20/11 /2024	14:05	0.2	0.14	0.33	25/11 /2024	14:30	0.19	0.14	0.32
13	14/11/2024	21:10	13.2	9.56	4.65	20/11 /2024	14:15	0.19	0.14	0.32	25/11 /2024	14:40	0.19	0.14	0.32
14	14/11/2024	21:20	15.41	10.23	4.98	20/11 /2024	14:25	0.18	0.14	0.31	25/11 /2024	14:50	0.19	0.14	0.31
15	14/11/2024	21:30	17.2	10.86	5.06	20/11 /2024	14:35	0.18	0.13	0.3	25/11 /2024	15:00	0.19	0.14	0.31
16	14/11/2024	21:40	19.68	11.94	5.24	20/11	14:45	0.17	0.13	0.29	25/11	15:10	0.18	0.13	0.3

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
17	14/11/2024	21:50	21.03	12.65	5.68	20/11 /2024	14:55	0.17	0.12	0.28	25/11 /2024	15:20	0.18	0.13	0.3
18	14/11/2024	22:00	20.3	14.23	6.03	20/11 /2024	15:05	0.16	0.12	0.27	25/11 /2024	15:30	0.18	0.13	0.3
19	14/11/2024	22:10	21.9	14.95	5.94	20/11 /2024	15:15	0.16	0.12	0.26	25/11 /2024	15:40	0.17	0.13	0.29
20	14/11/2024	22:20	21.6	15.31	5.96	20/11 /2024	15:25	0.15	0.11	0.26	25/11 /2024	15:50	0.17	0.12	0.28
21	14/11/2024	22:30	22.03	16.32	5.82	20/11 /2024	15:35	0.15	0.11	0.25	25/11 /2024	16:00	0.16	0.12	0.27
22	14/11/2024	22:40	22.45	14.92	6.42	20/11 /2024	15:45	0.14	0.11	0.24	25/11 /2024	16:10	0.15	0.11	0.25
23	14/11/2024	22:50	22.95	15.42	6.51	20/11 /2024	15:55	0.14	0.1	0.23	25/11 /2024	16:20	0.14	0.1	0.23
24	14/11/2024	23:00	23.02	13.86	6.91	20/11 /2024	16:05	0.13	0.1	0.22	25/11 /2024	16:30	0.13	0.1	0.22
25	14/11/2024	23:10	25.16	12.14	7.03	20/11 /2024	16:15	0.13	0.09	0.21	25/11 /2024	16:40	0.13	0.09	0.21
26	14/11/2024	23:20	24.35	11.28	7.23	20/11 /2024	16:25	0.13	0.09	0.21	25/11 /2024	16:50	0.12	0.09	0.2
27	14/11/2024	23:30	25.12	9.68	6.95	20/11 /2024	16:35	0.12	0.09	0.2	25/11 /2024	17:00	0.12	0.09	0.2
28	14/11/2024	23:40	26.08	8.04	6.82	20/11 /2024	16:45	0.12	0.09	0.2	25/11 /2024	17:10	0.11	0.08	0.19
29	14/11/2024	23:50	24.32	7.92	5.02	20/11	16:55	0.11	0.08	0.19	25/11	17:20	0.11	0.08	0.19

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
30	15/11/2024	0:00	23.48	5.26	4.91	20/11 /2024	17:05	0.11	0.08	0.18	25/11 /2024	17:30	0.11	0.08	0.18
31	15/11/2024	0:10	23.01	8.64	2.31	20/11 /2024	17:15	0.1	0.07	0.17	25/11 /2024	17:40	0.11	0.08	0.18
32	15/11/2024	0:20	21.98	10.65	2.03	20/11 /2024	17:25	0.1	0.07	0.16	25/11 /2024	17:50	0.1	0.08	0.17
33	15/11/2024	0:30	21.56	11.86	1.66	20/11 /2024	17:35	0.09	0.07	0.15	25/11 /2024	18:00	0.1	0.07	0.17
34	15/11/2024	0:40	21.24	12.64	1.25	20/11 /2024	17:45	0.09	0.07	0.15	25/11 /2024	18:10	0.1	0.07	0.17
35	15/11/2024	0:50	20.14	13.85	0.96	20/11 /2024	17:55	0.09	0.07	0.15	25/11 /2024	18:20	0.1	0.07	0.16
36	15/11/2024	1:00	19.5	15.78	0.43	20/11 /2024	18:05	0.09	0.06	0.15	25/11 /2024	18:30	0.1	0.07	0.16
37	15/11/2024	1:10	19.46	15.3	0.02	20/11 /2024	18:15	0.09	0.07	0.15	25/11 /2024	18:40	0.09	0.07	0.15
38	15/11/2024	1:20	18.86	16.96	0	20/11 /2024	18:25	0.09	0.07	0.15	25/11 /2024	18:50	0.09	0.07	0.15
39	15/11/2024	1:30	18.4	14.2	0	20/11 /2024	18:35	0.09	0.07	0.15	25/11 /2024	19:00	0.09	0.07	0.15
40	15/11/2024	1:40	18.12	14.45	0	20/11 /2024	18:45	0.1	0.07	0.17	25/11 /2024	19:10	0.09	0.06	0.14
41	15/11/2024	1:50	16.57	12.32	0.15	20/11 /2024	18:55	0.11	0.08	0.18	25/11 /2024	19:20	0.09	0.06	0.14
42	15/11/2024	2:00	16.09	12.06	0.32	20/11	19:05	0.11	0.08	0.19	25/11	19:30	0.08	0.06	0.14

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
43	15/11/2024	2:10	15.46	11.94	0.98	20/11 /2024	19:15	0.12	0.08	0.19	25/11 /2024	19:40	0.08	0.06	0.14
44	15/11/2024	2:20	14.36	11.62	1.06	20/11 /2024	19:25	0.12	0.09	0.21	25/11 /2024	19:50	0.09	0.06	0.14
45	15/11/2024	2:30	13.24	10.98	1.53	20/11 /2024	19:35	0.14	0.1	0.23	25/11 /2024	20:00	0.09	0.06	0.14
46	15/11/2024	2:40	11.96	9.23	1.94	20/11 /2024	19:45	0.15	0.11	0.26	25/11 /2024	20:10	0.09	0.06	0.14
47	15/11/2024	2:50	9.32	8.96	2.3	20/11 /2024	19:55	0.18	0.13	0.3	25/11 /2024	20:20	0.09	0.06	0.14
48	15/11/2024	3:00	8.36	7.23	2.56	20/11 /2024	20:05	0.18	0.13	0.3	25/11 /2024	20:30	0.09	0.06	0.14
49	15/11/2024	3:10	7.45	6.33	2.94	20/11 /2024	20:15	0.17	0.13	0.29	25/11 /2024	20:40	0.09	0.06	0.14
50	15/11/2024	3:20	8.31	6.52	3.26	20/11 /2024	20:25	0.19	0.14	0.32	25/11 /2024	20:50	0.09	0.06	0.14
51	15/11/2024	3:30	7.49	6.31	4.26	20/11 /2024	20:35	0.2	0.15	0.34	25/11 /2024	21:00	0.09	0.06	0.14
52	15/11/2024	3:40	8.21	6.85	4.86	20/11 /2024	20:45	0.21	0.15	0.34	25/11 /2024	21:10	0.09	0.06	0.14
53	15/11/2024	3:50	9.06	7.06	5.2	20/11 /2024	20:55	0.21	0.15	0.35	25/11 /2024	21:20	0.09	0.06	0.14
54	15/11/2024	4:00	9.89	7.46	5.98	20/11 /2024	21:05	0.22	0.16	0.36	25/11 /2024	21:30	0.08	0.06	0.14
55	15/11/2024	4:10	11.23	8.52	6.05	20/11	21:15	0.21	0.16	0.36	25/11	21:40	0.08	0.06	0.14

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
56	15/11/2024	4:20	12.39	8.74	6.18	20/11 /2024	21:25	0.21	0.16	0.36	25/11 /2024	21:50	0.08	0.06	0.14
57	15/11/2024	4:30	12.45	9.16	5.94	20/11 /2024	21:35	0.22	0.16	0.37	25/11 /2024	22:00	0.08	0.06	0.14
58	15/11/2024	4:40	13.42	9.26	5.32	20/11 /2024	21:45	0.22	0.16	0.37	25/11 /2024	22:10	0.09	0.06	0.14
59	15/11/2024	4:50	13.76	9.84	4.96	20/11 /2024	21:55	0.23	0.17	0.38	25/11 /2024	22:20	0.09	0.06	0.14
60	15/11/2024	5:00	14.09	10.23	4.53	20/11 /2024	22:05	0.22	0.16	0.37	25/11 /2024	22:30	0.09	0.06	0.14
61	15/11/2024	5:10	14.75	10.56	5.26	20/11 /2024	22:15	0.22	0.16	0.37	25/11 /2024	22:40	0.09	0.06	0.14
62	15/11/2024	5:20	15.12	11.22	5.84	20/11 /2024	22:25	0.23	0.17	0.38	25/11 /2024	22:50	0.09	0.06	0.14
63	15/11/2024	5:30	15.94	11.86	5.92	20/11 /2024	22:35	0.23	0.17	0.38	25/11 /2024	23:00	0.09	0.06	0.14
64	15/11/2024	5:40	12.53	9.23	6.32	20/11 /2024	22:45	0.23	0.17	0.38	25/11 /2024	23:10	0.09	0.06	0.14
65	15/11/2024	5:50	11.55	10.26	6.86	20/11 /2024	22:55	0.23	0.17	0.38	25/11 /2024	23:20	0.09	0.06	0.14
66	15/11/2024	6:00	10.5	9.84	5.26	20/11 /2024	23:05	0.23	0.17	0.38	25/11 /2024	23:30	0.09	0.06	0.14
67	15/11/2024	6:10	9	8.23	4.23	20/11 /2024	23:15	0.23	0.17	0.38	25/11 /2024	23:40	0.09	0.06	0.14
68	15/11/2024	6:20	8.75	6.23	3.12	20/11	23:25	0.23	0.17	0.38	25/11	23:50	0.09	0.06	0.14

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
69	15/11/2024	6:30	7	4.35	2.62	20/11 /2024	23:35	0.36	0.27	0.6	26/11 /2024	0:00	0.09	0.07	0.15
70	15/11/2024	6:40	6.13	3.26	0.25	20/11 /2024	23:45	0.36	0.27	0.61	26/11 /2024	0:10	0.1	0.07	0.17
71	15/11/2024	6:50	5.05	1.23	0	20/11 /2024	23:55	0.37	0.27	0.62	26/11 /2024	0:20	0.09	0.07	0.16
72	15/11/2024	7:00	1.12	0.62	0	21/11 /2024	0:05	0.37	0.27	0.62	26/11 /2024	0:30	0.09	0.07	0.15
73	15/11/2024	7:10	0	0	0	21/11 /2024	0:15	0.38	0.28	0.64	26/11 /2024	0:40	0.09	0.06	0.15
74	15/11/2024	7:20	0	0	0	21/11 /2024	0:25	0.39	0.29	0.66	26/11 /2024	0:50	0.09	0.06	0.14
75	15/11/2024	7:30	0	0	0	21/11 /2024	0:35	0.4	0.29	0.66	26/11 /2024	1:00	0.09	0.06	0.14
76	15/11/2024	7:40	0.85	0	0	21/11 /2024	0:45	0.41	0.3	0.68	26/11 /2024	1:10	0.09	0.06	0.14
77	15/11/2024	7:50	1.04	0.21	0	21/11 /2024	0:55	0.41	0.3	0.68	26/11 /2024	1:20	0.09	0.06	0.14
78	15/11/2024	8:00	2.65	0.64	0	21/11 /2024	1:05	0.4	0.3	0.67	26/11 /2024	1:30	0.09	0.06	0.14
79	15/11/2024	8:10	3.26	1.18	0	21/11 /2024	1:15	0.42	0.31	0.7	26/11 /2024	1:40	0.09	0.06	0.14
80	15/11/2024	8:20	4.21	1.9	0	21/11 /2024	1:25	0.43	0.31	0.72	26/11 /2024	1:50	0.09	0.06	0.14
81	15/11/2024	8:30	4.65	2.24	0.02	21/11	1:35	0.43	0.32	0.73	26/11	2:00	0.09	0.06	0.14

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
82	15/11/2024	8:40	4.98	2.52	0.23	21/11 /2024	1:45	0.44	0.32	0.73	26/11 /2024	2:10	0.09	0.06	0.14
83	15/11/2024	8:50	5.12	3.26	0.46	21/11 /2024	1:55	0.39	0.28	0.65	26/11 /2024	2:20	0.09	0.06	0.14
84	15/11/2024	9:00	7.26	3.58	0.57	21/11 /2024	2:05	0.41	0.3	0.68	26/11 /2024	2:30	0.09	0.06	0.14
85	15/11/2024	9:10	9.24	4.26	1.65	21/11 /2024	2:15	0.32	0.23	0.53	26/11 /2024	2:40	0.09	0.06	0.14
86	15/11/2024	9:20	11.26	4.95	2.16	21/11 /2024	2:25	0.3	0.22	0.5	26/11 /2024	2:50	0.08	0.06	0.14
87	15/11/2024	9:30	14.68	5.02	2.85	21/11 /2024	2:35	0.43	0.32	0.72	26/11 /2024	3:00	0.08	0.06	0.14
88	15/11/2024	9:40	15.26	5.12	2.85	21/11 /2024	2:45	0.47	0.34	0.78	26/11 /2024	3:10	0.08	0.06	0.14
89	15/11/2024	9:50	18.65	5.61	3.21	21/11 /2024	2:55	0.46	0.34	0.77	26/11 /2024	3:20	0.08	0.06	0.14
90	15/11/2024	10:00	20.94	6.82	2.62	21/11 /2024	3:05	0.5	0.36	0.83	26/11 /2024	3:30	0.08	0.06	0.14
91	15/11/2024	10:10	22.35	7.23	2.12	21/11 /2024	3:15	0.49	0.36	0.82	26/11 /2024	3:40	0.08	0.06	0.14
92	15/11/2024	10:20	23.68	8.56	1.95	21/11 /2024	3:25	0.5	0.37	0.83	26/11 /2024	3:50	0.08	0.06	0.14
93	15/11/2024	10:30	25.15	9.26	1.85	21/11 /2024	3:35	0.49	0.36	0.81	26/11 /2024	4:00	0.08	0.06	0.14
94	15/11/2024	10:40	26.84	11.23	1.45	21/11	3:45	0.43	0.32	0.72	26/11	4:10	0.08	0.06	0.13

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
95	15/11/2024	10:50	27.05	12.35	2.56	21/11 /2024	3:55	0.42	0.3	0.69	26/11 /2024	4:20	0.08	0.06	0.13
96	15/11/2024	11:00	27.94	13.65	3.87	21/11 /2024	4:05	0.48	0.35	0.81	26/11 /2024	4:30	0.08	0.06	0.13
97	15/11/2024	11:10	28.34	15.26	4.86	21/11 /2024	4:15	0.54	0.39	0.89	26/11 /2024	4:40	0.08	0.06	0.13
98	15/11/2024	11:20	27.54	15.23	5.95	21/11 /2024	4:25	0.44	0.32	0.74	26/11 /2024	4:50	0.08	0.06	0.13
99	15/11/2024	11:30	26.32	16.94	5.62	21/11 /2024	4:35	0.41	0.3	0.69	26/11 /2024	5:00	0.08	0.06	0.13
100	15/11/2024	11:40	24.65	17.26	5.97	21/11 /2024	4:45	0.44	0.32	0.73	26/11 /2024	5:10	0.08	0.06	0.13
101	15/11/2024	11:50	23.15	17.56	6.8	21/11 /2024	4:55	0.55	0.4	0.92	26/11 /2024	5:20	0.08	0.06	0.13
102	15/11/2024	12:00	22.48	18.95	6.8	21/11 /2024	5:05	0.47	0.34	0.78	26/11 /2024	5:30	0.08	0.06	0.14
103	15/11/2024	12:10	21.68	18.56	6.24	21/11 /2024	5:15	0.42	0.3	0.69	26/11 /2024	5:40	0.08	0.06	0.13
104	15/11/2024	12:20	19.28	18.43	5.86	21/11 /2024	5:25	0.48	0.35	0.8	26/11 /2024	5:50	0.08	0.06	0.14
105	15/11/2024	12:30	21.45	19.26	5.36	21/11 /2024	5:35	0.51	0.37	0.84	26/11 /2024	6:00	0.08	0.06	0.14
106	15/11/2024	12:40	20.97	16.25	4.95	21/11 /2024	5:45	0.55	0.41	0.92	26/11 /2024	6:10	0.08	0.06	0.14
107	15/11/2024	12:50	21.65	15.23	5.97	21/11	5:55	0.5	0.37	0.84	26/11	6:20	0.08	0.06	0.14

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
108	15/11/2024	13:00	22.35	15.23	4.21	21/11 /2024	6:05	0.5	0.37	0.84	26/11 /2024	6:30	0.09	0.06	0.14
109	15/11/2024	13:10	23.45	14.26	3.9	21/11 /2024	6:15	0.55	0.41	0.92	26/11 /2024	6:40	0.09	0.06	0.14
110	15/11/2024	13:20	24.14	13.26	3.53	21/11 /2024	6:25	0.62	0.46	1.04	26/11 /2024	6:50	0.09	0.06	0.14
111	15/11/2024	13:30	23.94	12.3	2.96	21/11 /2024	6:35	0.59	0.43	0.98	26/11 /2024	7:00	0.09	0.07	0.15
112	15/11/2024	13:40	23.54	11.66	2.15	21/11 /2024	6:45	0.57	0.42	0.96	26/11 /2024	7:10	0.1	0.07	0.17
113	15/11/2024	13:50	23.12	11.2	1.85	21/11 /2024	6:55	0.65	0.48	1.09	26/11 /2024	7:20	0.1	0.07	0.16
114	15/11/2024	14:00	22.9	13.8	1.23	21/11 /2024	7:05	0.66	0.48	1.09	26/11 /2024	7:30	0.1	0.07	0.16
115	15/11/2024	14:10	22.54	15.9	0.65	21/11 /2024	7:15	0.68	0.5	1.14	26/11 /2024	7:40	0.1	0.07	0.17
116	15/11/2024	14:20	22.12	17.54	0	21/11 /2024	7:25	0.51	0.37	0.85	26/11 /2024	7:50	0.1	0.08	0.18
117	15/11/2024	14:30	22.06	18.65	0	21/11 /2024	7:35	0.58	0.42	0.96	26/11 /2024	8:00	0.11	0.08	0.18
118	15/11/2024	14:40	21.8	18	0	21/11 /2024	7:45	0.62	0.46	1.03	26/11 /2024	8:10	0.11	0.08	0.18
119	15/11/2024	14:50	21.55	17.5	0	21/11 /2024	7:55	0.62	0.46	1.03	26/11 /2024	8:20	0.11	0.08	0.18
120	15/11/2024	15:00	21.09	16.5	0	21/11	8:05	0.57	0.42	0.95	26/11	8:30	0.1	0.08	0.18

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
121	15/11/2024	15:10	19.24	14	0	21/11 /2024	8:15	0.52	0.38	0.86	26/11 /2024	8:40	0.11	0.08	0.18
122	15/11/2024	15:20	18.26	10.6	0	21/11 /2024	8:25	0.46	0.34	0.76	26/11 /2024	8:50	0.11	0.08	0.18
123	15/11/2024	15:30	18.12	9.5	0	21/11 /2024	8:35	0.42	0.3	0.69	26/11 /2024	9:00	0.1	0.08	0.17
124	15/11/2024	15:40	17.84	8.56	0	21/11 /2024	8:45	0.31	0.22	0.51	26/11 /2024	9:10	0.1	0.07	0.17
125	15/11/2024	15:50	16.45	7.25	0	21/11 /2024	8:55	0.23	0.17	0.38	26/11 /2024	9:20	0.1	0.07	0.17
126	15/11/2024	16:00	15.23	6.26	0	21/11 /2024	9:05	0.22	0.16	0.36	26/11 /2024	9:30	0.1	0.07	0.17
127	15/11/2024	16:10	15.26	7.95	0	21/11 /2024	9:15	0.21	0.15	0.35	26/11 /2024	9:40	0.1	0.07	0.17
128	15/11/2024	16:20	14.97	7.25	0	21/11 /2024	9:25	0.2	0.14	0.33	26/11 /2024	9:50	0.1	0.07	0.17
129	15/11/2024	16:30	14.25	6.89	0	21/11 /2024	9:35	0.18	0.13	0.31	26/11 /2024	10:00	0.1	0.08	0.17
130	15/11/2024	16:40	13.26	6.77	0	21/11 /2024	9:45	0.17	0.12	0.28	26/11 /2024	10:10	0.11	0.08	0.18
131	15/11/2024	16:50	13.06	7.02	0.42	21/11 /2024	9:55	0.16	0.12	0.27	26/11 /2024	10:20	0.12	0.08	0.19
132	15/11/2024	17:00	11.94	6.84	0.13	21/11 /2024	10:05	0.16	0.12	0.27	26/11 /2024	10:30	0.12	0.09	0.21
133	15/11/2024	17:10	12.64	6.23	0	21/11	10:15	0.16	0.12	0.27	26/11	10:40	0.14	0.1	0.23

No.	OMS-4					OMS-5					OMS-6				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
						/2024					/2024				
134	15/11/2024	17:20	14.65	5.85	0.02	21/11 /2024	10:25	0.16	0.12	0.27	26/11 /2024	10:50	0.15	0.11	0.24
135	15/11/2024	17:30	16.42	5.21	0.45	21/11 /2024	10:35	0.17	0.12	0.28	26/11 /2024	11:00	0.16	0.11	0.26
136	15/11/2024	17:40	17.45	4.23	0.52	21/11 /2024	10:45	0.17	0.13	0.29	26/11 /2024	11:10	0.17	0.12	0.28
137	15/11/2024	17:50	17.26	5.26	0.2	21/11 /2024	10:55	0.18	0.13	0.3	26/11 /2024	11:20	0.17	0.13	0.29
138	15/11/2024	18:00	18.21	5.12	0.34	21/11 /2024	11:05	0.18	0.13	0.3	26/11 /2024	11:30	0.18	0.13	0.3
139	15/11/2024	18:10	18.65	6.05	0.65	21/11 /2024	11:15	0.19	0.14	0.31	26/11 /2024	11:40	0.19	0.14	0.31
140	15/11/2024	18:20	19.03	6.54	1.23	21/11 /2024	11:25	0.19	0.14	0.32	26/11 /2024	11:50	0.19	0.14	0.32
141	15/11/2024	18:30	19.65	6.75	1.2	21/11 /2024	11:35	0.19	0.14	0.32	26/11 /2024	12:00	0.19	0.14	0.32
142	15/11/2024	18:40	19.55	5.91	1.18	21/11 /2024	11:45	0.2	0.14	0.33	26/11 /2024	12:10	0.2	0.14	0.33
143	15/11/2024	18:50	19.94	5.42	1.05	21/11 /2024	11:55	0.2	0.14	0.33	26/11 /2024	12:20	0.2	0.15	0.33
144	15/11/2024	19:00	20.31	4.94	0.95	21/11 /2024	12:05	0.2	0.14	0.33	26/11 /2024	12:30	0.2	0.15	0.32
Detection Limit (µg/m³)			0.01/0:26000	0.01/0:40000	0.01/0:20 000			0.01/0:26 000	0.01/0:400 00	0.01/0:2 0000			0.01/0:2 6000	0.01/0:4 0000	0.01/0:2 0000

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
1	26/11/2024	13:20	0.18	0.13	0.3	27/11/2024	14:40	0.15	0.11	0.25	28/11/2024	16:10	0.1	0.07	0.17	29/11/2024	17:10	0.08	0.06	0.13
2	26/11/2024	13:30	0.17	0.12	0.28	27/11/2024	14:50	0.15	0.11	0.25	28/11/2024	16:20	0.1	0.07	0.17	29/11/2024	17:20	0.08	0.06	0.13
3	26/11/2024	13:40	0.17	0.12	0.28	27/11/2024	15:00	0.15	0.11	0.25	28/11/2024	16:30	0.1	0.08	0.17	29/11/2024	17:30	0.08	0.06	0.13
4	26/11/2024	13:50	0.17	0.13	0.28	27/11/2024	15:10	0.15	0.11	0.25	28/11/2024	16:40	0.1	0.08	0.17	29/11/2024	17:40	0.08	0.06	0.13
5	26/11/2024	14:00	0.17	0.13	0.29	27/11/2024	15:20	0.15	0.11	0.26	28/11/2024	16:50	0.1	0.08	0.17	29/11/2024	17:50	0.08	0.06	0.13
6	26/11/2024	14:10	0.17	0.13	0.29	27/11/2024	15:30	0.15	0.11	0.26	28/11/2024	17:00	0.1	0.07	0.17	29/11/2024	18:00	0.08	0.06	0.13
7	26/11/2024	14:20	0.17	0.13	0.29	27/11/2024	15:40	0.15	0.11	0.26	28/11/2024	17:10	0.1	0.07	0.17	29/11/2024	18:10	0.08	0.06	0.13
8	26/11/2024	14:30	0.17	0.13	0.29	27/11/2024	15:50	0.15	0.11	0.26	28/11/2024	17:20	0.1	0.07	0.17	29/11/2024	18:20	0.08	0.06	0.13
9	26/11/2024	14:40	0.17	0.12	0.28	27/11/2024	16:00	0.15	0.11	0.25	28/11/2024	17:30	0.1	0.07	0.16	29/11/2024	18:30	0.08	0.06	0.13
10	26/11/2024	14:50	0.16	0.12	0.27	27/11/2024	16:10	0.15	0.11	0.25	28/11/2024	17:40	0.09	0.07	0.15	29/11/2024	18:40	0.08	0.06	0.13
11	26/11/2024	15:00	0.16	0.12	0.26	27/11/2024	16:20	0.15	0.11	0.25	28/11/2024	17:50	0.09	0.07	0.15	29/11/2024	18:50	0.08	0.06	0.13
12	26/11/2024	15:10	0.15	0.11	0.26	27/11/2024	16:30	0.15	0.11	0.24	28/11/2024	18:00	0.09	0.06	0.15	29/11/2024	19:00	0.08	0.06	0.13
13	26/11/2024	15:20	0.15	0.11	0.25	27/11/2024	16:40	0.14	0.1	0.24	28/11/2024	18:10	0.08	0.06	0.14	29/11/2024	19:10	0.08	0.06	0.13

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
14	26/11/2024	15:30	0.15	0.11	0.25	27/11/2024	16:50	0.14	0.1	0.23	28/11/2024	18:20	0.08	0.06	0.14	29/11/2024	19:20	0.08	0.06	0.13
15	26/11/2024	15:40	0.14	0.11	0.24	27/11/2024	17:00	0.13	0.1	0.22	28/11/2024	18:30	0.08	0.06	0.13	29/11/2024	19:30	0.08	0.06	0.13
16	26/11/2024	15:50	0.14	0.1	0.24	27/11/2024	17:10	0.13	0.09	0.21	28/11/2024	18:40	0.08	0.06	0.13	29/11/2024	19:40	0.08	0.06	0.13
17	26/11/2024	16:00	0.14	0.1	0.23	27/11/2024	17:20	0.12	0.09	0.21	28/11/2024	18:50	0.08	0.06	0.13	29/11/2024	19:50	0.08	0.06	0.13
18	26/11/2024	16:10	0.14	0.1	0.23	27/11/2024	17:30	0.12	0.09	0.2	28/11/2024	19:00	0.08	0.06	0.13	29/11/2024	20:00	0.08	0.06	0.13
19	26/11/2024	16:20	0.13	0.1	0.22	27/11/2024	17:40	0.11	0.08	0.19	28/11/2024	19:10	0.07	0.05	0.12	29/11/2024	20:10	0.08	0.06	0.13
20	26/11/2024	16:30	0.13	0.1	0.22	27/11/2024	17:50	0.11	0.08	0.18	28/11/2024	19:20	0.07	0.05	0.12	29/11/2024	20:20	0.08	0.06	0.13
21	26/11/2024	16:40	0.13	0.09	0.21	27/11/2024	18:00	0.11	0.08	0.18	28/11/2024	19:30	0.07	0.05	0.12	29/11/2024	20:30	0.08	0.06	0.13
22	26/11/2024	16:50	0.12	0.09	0.21	27/11/2024	18:10	0.1	0.08	0.17	28/11/2024	19:40	0.07	0.05	0.12	29/11/2024	20:40	0.08	0.06	0.13
23	26/11/2024	17:00	0.12	0.09	0.2	27/11/2024	18:20	0.1	0.07	0.17	28/11/2024	19:50	0.07	0.05	0.12	29/11/2024	20:50	0.08	0.06	0.13
24	26/11/2024	17:10	0.12	0.08	0.19	27/11/2024	18:30	0.1	0.07	0.17	28/11/2024	20:00	0.07	0.05	0.12	29/11/2024	21:00	0.08	0.06	0.13
25	26/11/2024	17:20	0.11	0.08	0.19	27/11/2024	18:40	0.1	0.07	0.16	28/11/2024	20:10	0.07	0.05	0.12	29/11/2024	21:10	0.08	0.06	0.13
26	26/11/2024	17:30	0.11	0.08	0.18	27/11/2024	18:50	0.1	0.07	0.16	28/11/2024	20:20	0.07	0.05	0.12	29/11/2024	21:20	0.08	0.06	0.13
27	26/11/2024	17:40	0.11	0.08	0.18	27/11/2024	19:00	0.1	0.07	0.16	28/11/2024	20:30	0.07	0.05	0.12	29/11/2024	21:30	0.08	0.06	0.13

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
28	26/11/2024	17:50	0.1	0.08	0.17	27/11/2024	19:10	0.1	0.07	0.16	28/11/2024	20:40	0.07	0.05	0.12	29/11/2024	21:40	0.07	0.05	0.12
29	26/11/2024	18:00	0.1	0.07	0.17	27/11/2024	19:20	0.1	0.07	0.16	28/11/2024	20:50	0.07	0.05	0.11	29/11/2024	21:50	0.07	0.05	0.12
30	26/11/2024	18:10	0.1	0.07	0.16	27/11/2024	19:30	0.1	0.07	0.16	28/11/2024	21:00	0.07	0.05	0.11	29/11/2024	22:00	0.07	0.05	0.12
31	26/11/2024	18:20	0.1	0.07	0.16	27/11/2024	19:40	0.09	0.07	0.16	28/11/2024	21:10	0.07	0.05	0.11	29/11/2024	22:10	0.08	0.06	0.13
32	26/11/2024	18:30	0.09	0.07	0.16	27/11/2024	19:50	0.09	0.07	0.15	28/11/2024	21:20	0.07	0.05	0.11	29/11/2024	22:20	0.07	0.05	0.12
33	26/11/2024	18:40	0.09	0.07	0.15	27/11/2024	20:00	0.09	0.07	0.15	28/11/2024	21:30	0.07	0.05	0.11	29/11/2024	22:30	0.07	0.05	0.12
34	26/11/2024	18:50	0.09	0.07	0.15	27/11/2024	20:10	0.09	0.07	0.15	28/11/2024	21:40	0.07	0.05	0.11	29/11/2024	22:40	0.07	0.05	0.12
35	26/11/2024	19:00	0.09	0.07	0.15	27/11/2024	20:20	0.09	0.07	0.15	28/11/2024	21:50	0.07	0.05	0.11	29/11/2024	22:50	0.07	0.05	0.12
36	26/11/2024	19:10	0.09	0.06	0.15	27/11/2024	20:30	0.09	0.06	0.15	28/11/2024	22:00	0.07	0.05	0.11	29/11/2024	23:00	0.07	0.05	0.12
37	26/11/2024	19:20	0.09	0.06	0.14	27/11/2024	20:40	0.09	0.06	0.15	28/11/2024	22:10	0.07	0.05	0.11	29/11/2024	23:10	0.07	0.05	0.12
38	26/11/2024	19:30	0.09	0.06	0.14	27/11/2024	20:50	0.09	0.06	0.14	28/11/2024	22:20	0.07	0.05	0.11	29/11/2024	23:20	0.08	0.06	0.13
39	26/11/2024	19:40	0.08	0.06	0.14	27/11/2024	21:00	0.08	0.06	0.14	28/11/2024	22:30	0.07	0.05	0.11	29/11/2024	23:30	0.08	0.06	0.13
40	26/11/2024	19:50	0.08	0.06	0.14	27/11/2024	21:10	0.08	0.06	0.14	28/11/2024	22:40	0.07	0.05	0.11	29/11/2024	23:40	0.08	0.06	0.13
41	26/11/2024	20:00	0.08	0.06	0.14	27/11/2024	21:20	0.08	0.06	0.14	28/11/2024	22:50	0.07	0.05	0.11	29/11/2024	23:50	0.08	0.06	0.13

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
42	26/11/2024	20:10	0.08	0.06	0.13	27/11/2024	21:30	0.08	0.06	0.14	28/11/2024	23:00	0.07	0.05	0.11	30/11/2024	0:00	0.07	0.05	0.13
43	26/11/2024	20:20	0.08	0.06	0.13	27/11/2024	21:40	0.08	0.06	0.14	28/11/2024	23:10	0.07	0.05	0.11	30/11/2024	0:10	0.07	0.05	0.12
44	26/11/2024	20:30	0.08	0.06	0.13	27/11/2024	21:50	0.08	0.06	0.14	28/11/2024	23:20	0.07	0.05	0.11	30/11/2024	0:20	0.07	0.05	0.12
45	26/11/2024	20:40	0.08	0.06	0.13	27/11/2024	22:00	0.08	0.06	0.14	28/11/2024	23:30	0.07	0.05	0.11	30/11/2024	0:30	0.07	0.05	0.12
46	26/11/2024	20:50	0.08	0.06	0.13	27/11/2024	22:10	0.08	0.06	0.14	28/11/2024	23:40	0.07	0.05	0.11	30/11/2024	0:40	0.07	0.05	0.12
47	26/11/2024	21:00	0.08	0.06	0.13	27/11/2024	22:20	0.08	0.06	0.14	28/11/2024	23:50	0.07	0.05	0.11	30/11/2024	0:50	0.07	0.05	0.12
48	26/11/2024	21:10	0.08	0.06	0.13	27/11/2024	22:30	0.08	0.06	0.14	29/11/2024	0:00	0.07	0.05	0.11	30/11/2024	1:00	0.07	0.05	0.12
49	26/11/2024	21:20	0.08	0.06	0.13	27/11/2024	22:40	0.08	0.06	0.14	29/11/2024	0:10	0.07	0.05	0.11	30/11/2024	1:10	0.07	0.05	0.12
50	26/11/2024	21:30	0.08	0.06	0.13	27/11/2024	22:50	0.08	0.06	0.14	29/11/2024	0:20	0.07	0.05	0.11	30/11/2024	1:20	0.07	0.05	0.12
51	26/11/2024	21:40	0.08	0.06	0.13	27/11/2024	23:00	0.08	0.06	0.14	29/11/2024	0:30	0.07	0.05	0.12	30/11/2024	1:30	0.07	0.05	0.12
52	26/11/2024	21:50	0.08	0.06	0.13	27/11/2024	23:10	0.08	0.06	0.14	29/11/2024	0:40	0.07	0.05	0.12	30/11/2024	1:40	0.07	0.05	0.12
53	26/11/2024	22:00	0.08	0.06	0.14	27/11/2024	23:20	0.09	0.06	0.14	29/11/2024	0:50	0.07	0.05	0.12	30/11/2024	1:50	0.07	0.05	0.12
54	26/11/2024	22:10	0.09	0.06	0.14	27/11/2024	23:30	0.09	0.06	0.14	29/11/2024	1:00	0.07	0.05	0.12	30/11/2024	2:00	0.07	0.05	0.12
55	26/11/2024	22:20	0.09	0.07	0.15	27/11/2024	23:40	0.09	0.06	0.14	29/11/2024	1:10	0.07	0.05	0.12	30/11/2024	2:10	0.07	0.05	0.12

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
56	26/11/2024	22:30	0.09	0.07	0.16	27/11/2024	23:50	0.09	0.06	0.15	29/11/2024	1:20	0.07	0.05	0.11	30/11/2024	2:20	0.07	0.05	0.12
57	26/11/2024	22:40	0.1	0.07	0.16	28/11/2024	0:00	0.09	0.06	0.15	29/11/2024	1:30	0.07	0.05	0.11	30/11/2024	2:30	0.07	0.05	0.12
58	26/11/2024	22:50	0.1	0.07	0.16	28/11/2024	0:10	0.09	0.06	0.15	29/11/2024	1:40	0.07	0.05	0.11	30/11/2024	2:40	0.07	0.05	0.12
59	26/11/2024	23:00	0.1	0.07	0.16	28/11/2024	0:20	0.09	0.06	0.15	29/11/2024	1:50	0.07	0.05	0.11	30/11/2024	2:50	0.07	0.05	0.12
60	26/11/2024	23:10	0.09	0.07	0.15	28/11/2024	0:30	0.09	0.06	0.15	29/11/2024	2:00	0.07	0.05	0.11	30/11/2024	3:00	0.07	0.05	0.12
61	26/11/2024	23:20	0.09	0.07	0.15	28/11/2024	0:40	0.09	0.07	0.15	29/11/2024	2:10	0.07	0.05	0.11	30/11/2024	3:10	0.07	0.05	0.12
62	26/11/2024	23:30	0.09	0.07	0.15	28/11/2024	0:50	0.09	0.07	0.15	29/11/2024	2:20	0.07	0.05	0.11	30/11/2024	3:20	0.08	0.06	0.12
63	26/11/2024	23:40	0.09	0.07	0.15	28/11/2024	1:00	0.09	0.07	0.15	29/11/2024	2:30	0.07	0.05	0.11	30/11/2024	3:30	0.07	0.05	0.12
64	26/11/2024	23:50	0.09	0.07	0.15	28/11/2024	1:10	0.09	0.07	0.15	29/11/2024	2:40	0.07	0.05	0.11	30/11/2024	3:40	0.07	0.05	0.12
65	27/11/2024	0:00	0.09	0.07	0.15	28/11/2024	1:20	0.09	0.06	0.15	29/11/2024	2:50	0.07	0.05	0.11	30/11/2024	3:50	0.07	0.05	0.12
66	27/11/2024	0:10	0.09	0.06	0.15	28/11/2024	1:30	0.09	0.06	0.14	29/11/2024	3:00	0.07	0.05	0.11	30/11/2024	4:00	0.07	0.05	0.12
67	27/11/2024	0:20	0.09	0.06	0.15	28/11/2024	1:40	0.08	0.06	0.14	29/11/2024	3:10	0.07	0.05	0.11	30/11/2024	4:10	0.07	0.05	0.12
68	27/11/2024	0:30	0.09	0.06	0.15	28/11/2024	1:50	0.08	0.06	0.14	29/11/2024	3:20	0.07	0.05	0.11	30/11/2024	4:20	0.07	0.05	0.12
69	27/11/2024	0:40	0.09	0.06	0.15	28/11/2024	2:00	0.08	0.06	0.14	29/11/2024	3:30	0.07	0.05	0.11	30/11/2024	4:30	0.07	0.05	0.12

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
70	27/11/2024	0:50	0.09	0.06	0.15	28/11/2024	2:10	0.08	0.06	0.14	29/11/2024	3:40	0.07	0.05	0.11	30/11/2024	4:40	0.07	0.05	0.12
71	27/11/2024	1:00	0.09	0.07	0.15	28/11/2024	2:20	0.08	0.06	0.14	29/11/2024	3:50	0.07	0.05	0.11	30/11/2024	4:50	0.07	0.05	0.12
72	27/11/2024	1:10	0.09	0.07	0.15	28/11/2024	2:30	0.08	0.06	0.14	29/11/2024	4:00	0.06	0.05	0.11	30/11/2024	5:00	0.07	0.05	0.12
73	27/11/2024	1:20	0.09	0.07	0.15	28/11/2024	2:40	0.08	0.06	0.14	29/11/2024	4:10	0.06	0.05	0.11	30/11/2024	5:10	0.07	0.05	0.12
74	27/11/2024	1:30	0.09	0.07	0.15	28/11/2024	2:50	0.08	0.06	0.13	29/11/2024	4:20	0.06	0.05	0.11	30/11/2024	5:20	0.07	0.05	0.12
75	27/11/2024	1:40	0.09	0.07	0.15	28/11/2024	3:00	0.08	0.06	0.13	29/11/2024	4:30	0.06	0.05	0.11	30/11/2024	5:30	0.07	0.05	0.12
76	27/11/2024	1:50	0.09	0.07	0.15	28/11/2024	3:10	0.08	0.06	0.13	29/11/2024	4:40	0.06	0.05	0.11	30/11/2024	5:40	0.07	0.05	0.12
77	27/11/2024	2:00	0.09	0.07	0.15	28/11/2024	3:20	0.08	0.06	0.13	29/11/2024	4:50	0.06	0.05	0.11	30/11/2024	5:50	0.07	0.05	0.12
78	27/11/2024	2:10	0.09	0.07	0.15	28/11/2024	3:30	0.08	0.06	0.13	29/11/2024	5:00	0.06	0.05	0.11	30/11/2024	6:00	0.07	0.05	0.12
79	27/11/2024	2:20	0.09	0.07	0.15	28/11/2024	3:40	0.08	0.06	0.13	29/11/2024	5:10	0.06	0.05	0.11	30/11/2024	6:10	0.07	0.05	0.12
80	27/11/2024	2:30	0.09	0.07	0.16	28/11/2024	3:50	0.08	0.06	0.13	29/11/2024	5:20	0.06	0.05	0.11	30/11/2024	6:20	0.07	0.05	0.12
81	27/11/2024	2:40	0.09	0.07	0.16	28/11/2024	4:00	0.08	0.06	0.13	29/11/2024	5:30	0.06	0.05	0.11	30/11/2024	6:30	0.07	0.05	0.12
82	27/11/2024	2:50	0.09	0.07	0.16	28/11/2024	4:10	0.07	0.05	0.13	29/11/2024	5:40	0.06	0.05	0.11	30/11/2024	6:40	0.08	0.06	0.13
83	27/11/2024	3:00	0.09	0.07	0.16	28/11/2024	4:20	0.07	0.05	0.12	29/11/2024	5:50	0.06	0.05	0.11	30/11/2024	6:50	0.08	0.06	0.13

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
84	27/11/2024	3:10	0.09	0.07	0.16	28/11/2024	4:30	0.08	0.06	0.13	29/11/2024	6:00	0.06	0.05	0.11	30/11/2024	7:00	0.08	0.06	0.13
85	27/11/2024	3:20	0.1	0.07	0.16	28/11/2024	4:40	0.08	0.06	0.13	29/11/2024	6:10	0.06	0.05	0.11	30/11/2024	7:10	0.08	0.06	0.13
86	27/11/2024	3:30	0.1	0.07	0.16	28/11/2024	4:50	0.08	0.06	0.13	29/11/2024	6:20	0.06	0.05	0.11	30/11/2024	7:20	0.08	0.06	0.13
87	27/11/2024	3:40	0.1	0.07	0.16	28/11/2024	5:00	0.08	0.06	0.13	29/11/2024	6:30	0.06	0.05	0.11	30/11/2024	7:30	0.07	0.05	0.12
88	27/11/2024	3:50	0.1	0.07	0.16	28/11/2024	5:10	0.1	0.07	0.16	29/11/2024	6:40	0.07	0.05	0.11	30/11/2024	7:40	0.07	0.05	0.12
89	27/11/2024	4:00	0.1	0.07	0.16	28/11/2024	5:20	0.11	0.08	0.18	29/11/2024	6:50	0.06	0.05	0.11	30/11/2024	7:50	0.07	0.05	0.12
90	27/11/2024	4:10	0.1	0.07	0.17	28/11/2024	5:30	0.13	0.1	0.22	29/11/2024	7:00	0.06	0.05	0.11	30/11/2024	8:00	0.07	0.05	0.12
91	27/11/2024	4:20	0.1	0.07	0.17	28/11/2024	5:40	0.12	0.09	0.2	29/11/2024	7:10	0.07	0.05	0.11	30/11/2024	8:10	0.07	0.05	0.12
92	27/11/2024	4:30	0.1	0.07	0.17	28/11/2024	5:50	0.12	0.08	0.19	29/11/2024	7:20	0.07	0.05	0.11	30/11/2024	8:20	0.07	0.05	0.12
93	27/11/2024	4:40	0.1	0.07	0.17	28/11/2024	6:00	0.13	0.09	0.21	29/11/2024	7:30	0.07	0.05	0.11	30/11/2024	8:30	0.07	0.05	0.12
94	27/11/2024	4:50	0.1	0.07	0.16	28/11/2024	6:10	0.12	0.09	0.2	29/11/2024	7:40	0.07	0.05	0.11	30/11/2024	8:40	0.08	0.06	0.13
95	27/11/2024	5:00	0.09	0.07	0.16	28/11/2024	6:20	0.11	0.08	0.19	29/11/2024	7:50	0.07	0.05	0.11	30/11/2024	8:50	0.08	0.06	0.13
96	27/11/2024	5:10	0.1	0.07	0.16	28/11/2024	6:30	0.11	0.08	0.18	29/11/2024	8:00	0.07	0.05	0.11	30/11/2024	9:00	0.08	0.06	0.13
97	27/11/2024	5:20	0.1	0.07	0.16	28/11/2024	6:40	0.1	0.07	0.17	29/11/2024	8:10	0.07	0.05	0.12	30/11/2024	9:10	0.08	0.06	0.14

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
98	27/11/2024	5:30	0.1	0.07	0.16	28/11/2024	6:50	0.09	0.07	0.16	29/11/2024	8:20	0.07	0.05	0.12	30/11/2024	9:20	0.08	0.06	0.14
99	27/11/2024	5:40	0.1	0.07	0.16	28/11/2024	7:00	0.09	0.07	0.15	29/11/2024	8:30	0.07	0.05	0.12	30/11/2024	9:30	0.09	0.06	0.14
100	27/11/2024	5:50	0.1	0.07	0.16	28/11/2024	7:10	0.09	0.07	0.15	29/11/2024	8:40	0.08	0.06	0.13	30/11/2024	9:40	0.09	0.07	0.15
101	27/11/2024	6:00	0.1	0.07	0.17	28/11/2024	7:20	0.09	0.06	0.15	29/11/2024	8:50	0.08	0.06	0.14	30/11/2024	9:50	0.09	0.07	0.15
102	27/11/2024	6:10	0.1	0.07	0.17	28/11/2024	7:30	0.09	0.06	0.14	29/11/2024	9:00	0.08	0.06	0.14	30/11/2024	10:00	0.09	0.07	0.16
103	27/11/2024	6:20	0.1	0.07	0.17	28/11/2024	7:40	0.09	0.06	0.15	29/11/2024	9:10	0.09	0.07	0.15	30/11/2024	10:10	0.10	0.07	0.17
104	27/11/2024	6:30	0.1	0.07	0.17	28/11/2024	7:50	0.09	0.06	0.15	29/11/2024	9:20	0.09	0.07	0.16	30/11/2024	10:20	0.10	0.08	0.17
105	27/11/2024	6:40	0.1	0.07	0.17	28/11/2024	8:00	0.08	0.06	0.14	29/11/2024	9:30	0.1	0.07	0.16	30/11/2024	10:30	0.11	0.08	0.18
106	27/11/2024	6:50	0.1	0.08	0.17	28/11/2024	8:10	0.09	0.07	0.15	29/11/2024	9:40	0.1	0.07	0.17	30/11/2024	10:40	0.11	0.08	0.18
107	27/11/2024	7:00	0.1	0.08	0.17	28/11/2024	8:20	0.09	0.07	0.15	29/11/2024	9:50	0.1	0.08	0.17	30/11/2024	10:50	0.11	0.08	0.19
108	27/11/2024	7:10	0.11	0.08	0.18	28/11/2024	8:30	0.09	0.07	0.15	29/11/2024	10:00	0.11	0.08	0.18	30/11/2024	11:00	0.11	0.08	0.19
109	27/11/2024	7:20	0.11	0.08	0.18	28/11/2024	8:40	0.09	0.07	0.15	29/11/2024	10:10	0.11	0.08	0.18	30/11/2024	11:10	0.11	0.08	0.19
110	27/11/2024	7:30	0.11	0.08	0.19	28/11/2024	8:50	0.09	0.07	0.16	29/11/2024	10:20	0.11	0.08	0.18	30/11/2024	11:20	0.12	0.08	0.19
111	27/11/2024	7:40	0.12	0.09	0.2	28/11/2024	9:00	0.1	0.07	0.16	29/11/2024	10:30	0.11	0.08	0.18	30/11/2024	11:30	0.12	0.09	0.2

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
112	27/11/2024	7:50	0.12	0.09	0.2	28/11/2024	9:10	0.1	0.07	0.17	29/11/2024	10:40	0.11	0.08	0.19	30/11/2024	11:40	0.12	0.09	0.2
113	27/11/2024	8:00	0.12	0.09	0.2	28/11/2024	9:20	0.11	0.08	0.18	29/11/2024	10:50	0.11	0.08	0.19	30/11/2024	11:50	0.12	0.09	0.2
114	27/11/2024	8:10	0.12	0.09	0.2	28/11/2024	9:30	0.11	0.08	0.18	29/11/2024	11:00	0.12	0.09	0.2	30/11/2024	12:00	0.12	0.09	0.2
115	27/11/2024	8:20	0.12	0.09	0.2	28/11/2024	9:40	0.12	0.09	0.2	29/11/2024	11:10	0.12	0.09	0.2	30/11/2024	12:10	0.12	0.09	0.2
116	27/11/2024	8:30	0.12	0.09	0.2	28/11/2024	9:50	0.13	0.09	0.21	29/11/2024	11:20	0.12	0.09	0.2	30/11/2024	12:20	0.12	0.09	0.21
117	27/11/2024	8:40	0.12	0.09	0.21	28/11/2024	10:00	0.14	0.1	0.23	29/11/2024	11:30	0.12	0.09	0.2	30/11/2024	12:30	0.13	0.09	0.21
118	27/11/2024	8:50	0.13	0.1	0.22	28/11/2024	10:10	0.14	0.11	0.24	29/11/2024	11:40	0.12	0.09	0.21	30/11/2024	12:40	0.13	0.09	0.21
119	27/11/2024	9:00	0.14	0.1	0.23	28/11/2024	10:20	0.15	0.11	0.26	29/11/2024	11:50	0.12	0.09	0.21	30/11/2024	12:50	0.13	0.09	0.21
120	27/11/2024	9:10	0.14	0.1	0.23	28/11/2024	10:30	0.16	0.12	0.27	29/11/2024	12:00	0.12	0.09	0.21	30/11/2024	13:00	0.13	0.09	0.21
121	27/11/2024	9:20	0.15	0.11	0.25	28/11/2024	10:40	0.17	0.12	0.28	29/11/2024	12:10	0.12	0.09	0.21	30/11/2024	13:10	0.13	0.09	0.21
122	27/11/2024	9:30	0.15	0.11	0.26	28/11/2024	10:50	0.17	0.12	0.28	29/11/2024	12:20	0.12	0.09	0.21	30/11/2024	13:20	0.13	0.09	0.21
123	27/11/2024	9:40	0.16	0.12	0.27	28/11/2024	11:00	0.17	0.12	0.28	29/11/2024	12:30	0.12	0.09	0.21	30/11/2024	13:30	0.13	0.09	0.21
124	27/11/2024	9:50	0.16	0.12	0.27	28/11/2024	11:10	0.16	0.12	0.27	29/11/2024	12:40	0.12	0.09	0.21	30/11/2024	13:40	0.13	0.09	0.21
125	27/11/2024	10:00	0.16	0.12	0.27	28/11/2024	11:20	0.16	0.12	0.27	29/11/2024	12:50	0.12	0.09	0.2	30/11/2024	13:50	0.13	0.09	0.21

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
126	27/11/2024	10:10	0.16	0.12	0.27	28/11/2024	11:30	0.16	0.12	0.27	29/11/2024	13:00	0.12	0.09	0.2	30/11/2024	14:00	0.13	0.09	0.21
127	27/11/2024	10:20	0.16	0.12	0.26	28/11/2024	11:40	0.16	0.12	0.27	29/11/2024	13:10	0.12	0.09	0.2	30/11/2024	14:10	0.13	0.09	0.21
128	27/11/2024	10:30	0.16	0.12	0.26	28/11/2024	11:50	0.16	0.12	0.27	29/11/2024	13:20	0.12	0.09	0.2	30/11/2024	14:20	0.12	0.09	0.21
129	27/11/2024	10:40	0.16	0.12	0.27	28/11/2024	12:00	0.16	0.12	0.27	29/11/2024	13:30	0.12	0.09	0.2	30/11/2024	14:30	0.12	0.09	0.2
130	27/11/2024	10:50	0.17	0.12	0.28	28/11/2024	12:10	0.16	0.12	0.27	29/11/2024	13:40	0.12	0.09	0.2	30/11/2024	14:40	0.12	0.09	0.2
131	27/11/2024	11:00	0.17	0.12	0.28	28/11/2024	12:20	0.16	0.12	0.27	29/11/2024	13:50	0.12	0.09	0.19	30/11/2024	14:50	0.12	0.09	0.2
132	27/11/2024	11:10	0.17	0.12	0.28	28/11/2024	12:30	0.16	0.12	0.26	29/11/2024	14:00	0.12	0.08	0.19	30/11/2024	15:00	0.12	0.09	0.2
133	27/11/2024	11:20	0.17	0.13	0.29	28/11/2024	12:40	0.16	0.11	0.26	29/11/2024	14:10	0.11	0.08	0.19	30/11/2024	15:10	0.12	0.09	0.2
134	27/11/2024	11:30	0.17	0.13	0.29	28/11/2024	12:50	0.16	0.11	0.26	29/11/2024	14:20	0.11	0.08	0.19	30/11/2024	15:20	0.12	0.08	0.19
135	27/11/2024	11:40	0.18	0.13	0.29	28/11/2024	13:00	0.16	0.11	0.26	29/11/2024	14:30	0.11	0.08	0.19	30/11/2024	15:30	0.11	0.08	0.19
136	27/11/2024	11:50	0.18	0.13	0.29	28/11/2024	13:10	0.15	0.11	0.26	29/11/2024	14:40	0.11	0.08	0.18	30/11/2024	15:40	0.11	0.08	0.19
137	27/11/2024	12:00	0.18	0.13	0.3	28/11/2024	13:20	0.15	0.11	0.26	29/11/2024	14:50	0.11	0.08	0.18	30/11/2024	15:50	0.11	0.08	0.18
138	27/11/2024	12:10	0.18	0.13	0.3	28/11/2024	13:30	0.15	0.11	0.25	29/11/2024	15:00	0.11	0.08	0.18	30/11/2024	16:00	0.11	0.08	0.18
139	27/11/2024	12:20	0.18	0.13	0.3	28/11/2024	13:40	0.15	0.11	0.24	29/11/2024	15:10	0.11	0.08	0.18	30/11/2024	16:10	0.11	0.08	0.18

No.	OMS-7					OMS-8					OMS-9					OMS-10				
	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)	Day	Time	C_2H_6S (µg/m³) (Limit =56)	$C_2H_6S_2$ (µg/m³) (Limit =30)	CH_4S (µg/m³) (Limit =13)
140	27/11/2024	12:30	0.19	0.14	0.31	28/11/2024	13:50	0.14	0.1	0.24	29/11/2024	15:20	0.11	0.08	0.18	30/11/2024	16:20	0.10	0.08	0.17
141	27/11/2024	12:40	0.19	0.14	0.32	28/11/2024	14:00	0.14	0.1	0.23	29/11/2024	15:30	0.1	0.08	0.18	30/11/2024	16:30	0.10	0.07	0.17
142	27/11/2024	12:50	0.19	0.14	0.32	28/11/2024	14:10	0.13	0.1	0.22	29/11/2024	15:40	0.1	0.08	0.17	30/11/2024	16:40	0.10	0.07	0.16
143	27/11/2024	13:00	0.19	0.14	0.32	28/11/2024	14:20	0.13	0.1	0.22	29/11/2024	15:50	0.1	0.07	0.17	30/11/2024	16:50	0.09	0.07	0.16
144	27/11/24	13:10	0.19	0.14	0.32	28/11/2024	14:30	0.13	0.1	0.22	29/11/2024	16:00	0.1	0.07	0.17	30/11/2024	17:00	0.09	0.07	0.15
Detection Limit (µg/m³)			0.01/0:26000	0.01/0:40000	0.01/0:20000			0.01/0:26000	0.01/0:40000	0.01/0:20000			0.01/0:26000	0.01/0:40000	0.01/0:20000			0.01/0:26000	0.01/0:40000	0.01/0:20000

5.1.2.2 Odor Monitoring

The results of the monitoring showed that 24-hours continuous measurement with 30-min averaging time concentrations of the measured pollutant showing well within DECCA standards except exceedances were observed at four locations (OMS-1, OMS-2, OMS-3, OMS-4) during monitoring campaign (see Table 5.3). NH_3 concentrations exceeded at OMS-01, OMS-02, OMS-03, and OMS-04, with OMS-01 recording the highest levels. H_2S levels also showed high concentrations at OMS-01, particularly during the evening hours, while OMS-02, OMS-03, and OMS-04 showed occasional exceedances. Concentrations of C2H6S, C2H6S2, and CH4S remained below the regulatory limits at all monitoring locations throughout the measurement period.

The exceedances are primarily attributed to nearby sources: OMS-1 (Jebel Ali STP), OMS-3 (Imdaad Reem STP), OMS-2 (a small standing water pond and from Jebel Ali STP), and OMS-4 (greenery maintenance near a roundabout).

It should be noted that for NH_3 the NIH-recommended threshold of 30 µg/m³ and for H_2S WHO-recommended odor threshold of 7 µg/m³ (30-min averaging time) is adopted by DECCA. For Dimethyl disulfide, Dimethyl sulfide, and Methyl mercaptan, DECCA uses Ontario's Ambient Air Quality Criteria thresholds of 56, 30, and 13 µg/m³, respectively (30-min averaging time).

It should be noted that the recorded concentrations reflect the conditions at the time of monitoring and actual conditions may vary during the year depending on the seasonal, meteorological changes and the active emission sources. Odor monitoring report is attached as Annex 6 of this report.

5.2 Waste Management

The DM Waste Department is the lead government agency responsible for the management and control of waste throughout the Emirate of Dubai. Collection and disposal of waste is carried out through licensed waste transport companies. Table 5.7 presents the non-hazardous solid waste generation in the Emirate of Dubai for the year 2021 (www.dsc.gov.ae). The data shows that construction waste represents about 93% of the total waste generation in the Emirate. In terms of hazardous waste, data shows total generation of 234,522 tons or just about 3.7% of the total waste generation.

Table 5.5 – Waste Generation in Dubai, 2021

Type of Waste	Transport Source				Total (metric tons)
	DM Waste Management Department	DM Other Department	Other Government Department	Private Sector	
Domestic Waste	576,971	9,648	3,233	2,663,492	3,253,344
Horticultural Waste	10,898	36,997	-	65,045	112,940
Construction Waste	6494	34,513	3,297	58,129,710	58,174,014
Sludge	-	550	-	336,656	337,206
Difficult Waste	-	-	430	11,163	11,593
Animal Waste	133,380	-	-	48,139	181,519
Industrial Waste	-	-	933	224,753	225,686
Medical Waste	722	4	3,169	4,941	8,836
Total	728,465	81,712	11,062	61,483,899	62,305,138

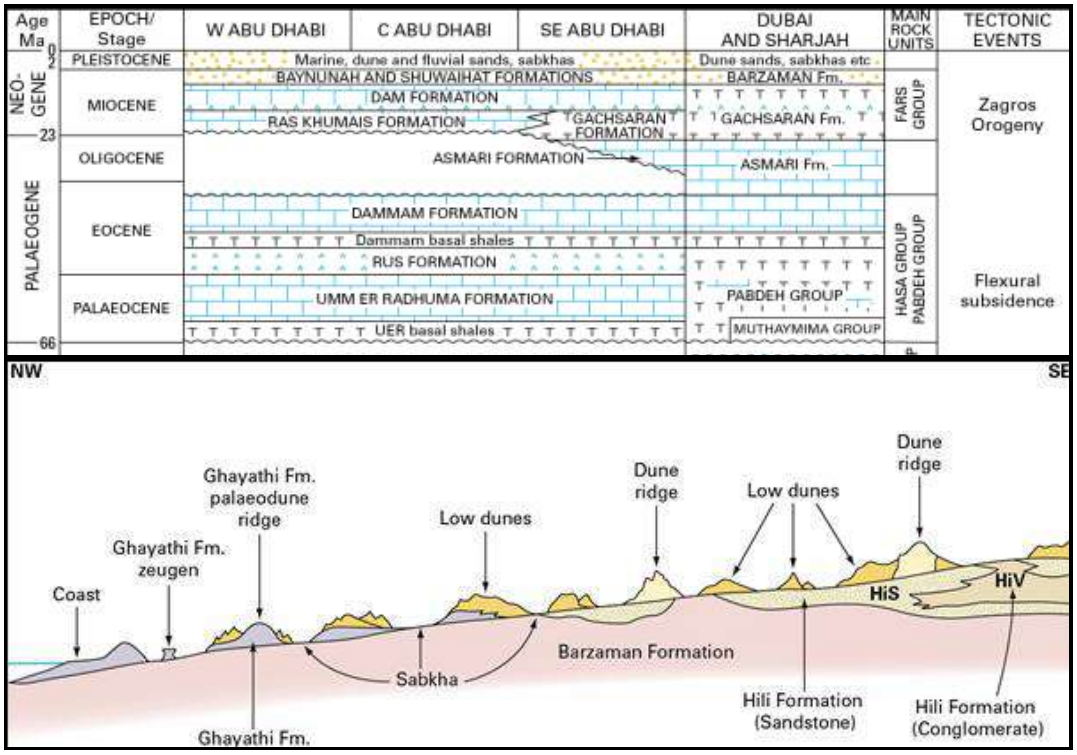
Source: www.dsc.gov.ae

5.3 Baseline Geology, Seismicity, Soil and Groundwater Conditions

5.3.1 Geology and Hydrogeology

UAE occupies an area of the Arabian Platform, a body of continental rock that covers present day Arabia, the Arabian Gulf and Zagros mountains of Iran. The Arabian Platform has remained relatively stable since the Cambrian Period. The geology of the UAE is largely a result of sea level changes and the deposition of marine sediments over recent geological time, with the exception of the mountainous region that borders Oman in the north-east, the UAE is relatively flat and low-lying, with the near-surface geology dominated by sand and sabkha.

The surface geology of the western and central part of the country is characterized by desert sands and coastal sediments, while to the north-east a mountain range extends from Ras Al Khaimah to Fujairah and extends southwards to the Al Ain Region. The Arabian Gulf coast is characterized by a carbonate-evaporite sequence while the Gulf of Oman coastline is characterized by siliclastics, minor carbonate sands, and local sabkhas. The coastline is dominated by surface deposits of sabkha plains (which may extend up to 15 km inland), which are deposited as extensive inter-tidal and inland saline flats.



Modified after FARRANT ET AL., (2012)

Figure 5.2 – UAE Surface Geology

The Emirate of Dubai is geologically located at the north-eastern edge of the Arabian Plate. The Arabian Plate is bounded by a collision (destructive) margin to the north and northeast (Taurus/Zagros crush zones) and by rifted (constructive) margins to the southeast (Arabian Sea, Gulf of Aden) and southwest (Red Sea). In general, the Emirate of Dubai is characterized by recent deposits of bioclastic and oolitic beach and dune sands, silty sabkha sands and carbonate muds and silts all variable cementation. These are underlain by bioclastic limestones (comprising shell fragments and other organic materials of marine origin) and Miliolitic (fossil foraminifer) sandstones. The sandstone and limestone overlie gypsiferous carbonate siltstone or carbonate mudstone and Gypsum to depth.

The underlying geology of the Emirate of Dubai generally comprises the following sequence of deposits:

- Sand, generally comprising medium dense to dense light brown to brown, silty fine to medium sand.
- Sand/cemented sand, generally comprising dense to very dense brown silty fine to medium sand with bands of moderately to well cemented sand/very weak sandstone.
- Gypsiferous sandstone/cemented sand/sand, generally comprising slightly to moderately weathered, reddish brown, fine to medium grained weak to moderately strong gypsiferous sandstone with close to widely spaced fractures/cemented gypsiferous sand.

The topography of the Emirate of Dubai is significantly different from that of the southern portion of the UAE in that much of Dubai's landscape is highlighted by sandy desert patterns, while gravel deserts dominate much of the southern region of the country. The sand consists mostly of crushed shells and coral and is fine, clean and white.

5.3.1.1 Project Specific Geology Conditions

The site's geological stratigraphy is generally uniform but exhibits vertical and lateral heterogeneity across the project area. Tunneling near the deepest sections of Bur Dubai tunnels, particularly near Jebel Ali treatment plant, will encounter the uppermost layers of the Fars Formation. Below Table 5.6 is a summary of the geological units observed along the Bur Dubai Tunnel route.

Table 5.6 – Summary of Geological Units

Depth	Lithology
0.00 to 8.00 m	Loose to medium dense, brown, silty, fine to medium grained, calcareous SAND
8.00 to 12.00 m	Dense, brown, silty, fine to medium grained, SAND
12.00 to 12.83 m	Very dense, brown, slightly gravelly, silty, fine to medium grained, calcareous SAND, with fine cemented sand pieces.
12.83 to 21.56 m	Extremely weak to very weak/very weak to weak, thinly to medium bedded, brown/grayish brown/reddish brown, calcareous/gypsiferous/conglomeritic SANDSTONE/sandy silty CONGLOMERATE. Partially to distinctly weathered, distinctly to medium spaced, sub-horizontal rough fractures
21.56 to 75.00 m	Very weak to weak, very thinly to medium bedded, brown/light gray/light grayish brown, conglomeritic/calcareous/silty conglomeritic SILTSTONE. Partially to distinctly weathered, very closely to medium spaced, sub-horizontal rough fractures.

5.3.1.2 Hydrogeological Setting

The main geological division of the Arabian Peninsula into Arabian Shield and Arabian Platform is also manifested in the distribution of groundwater resources. Lateral continuous and extensive aquifers are only found within the sediments of the Arabian Platform. In contrast, the magmatic and metamorphic rocks of the Hajar Mountains in the east generally have a low water bearing potential only.

The aquifer system in the Dubai area forms part of the Arabian Platform and is characterized by two units. The lower unit comprises consolidated and fractured rocks, the upper (surficial) unit consists of unconsolidated alluvial and/ or aeolian deposits. Although varying in the degree of consolidation and cementation, the alluvial and aeolian deposits occur in most areas of the U.A.E. and, historically, have been the main source of water for municipal, agricultural, and industrial use (MOEW, 2013).

Several publications (HALCRAW, 1969, IWACO, 1986, ENTEC, 1996, and JICA, 1996) refer to the shallow, unconsolidated water bearing deposits in the Northern United Arab Emirates as “Quaternary Aquifer” or Shallow Aquifer. The Shallow Aquifer is a principal aquifer

within the Emirate of Dubai. The hydrogeological map of UAE shown below in Figure 6.21 clearly indicates the groundwater flow direction towards sea.

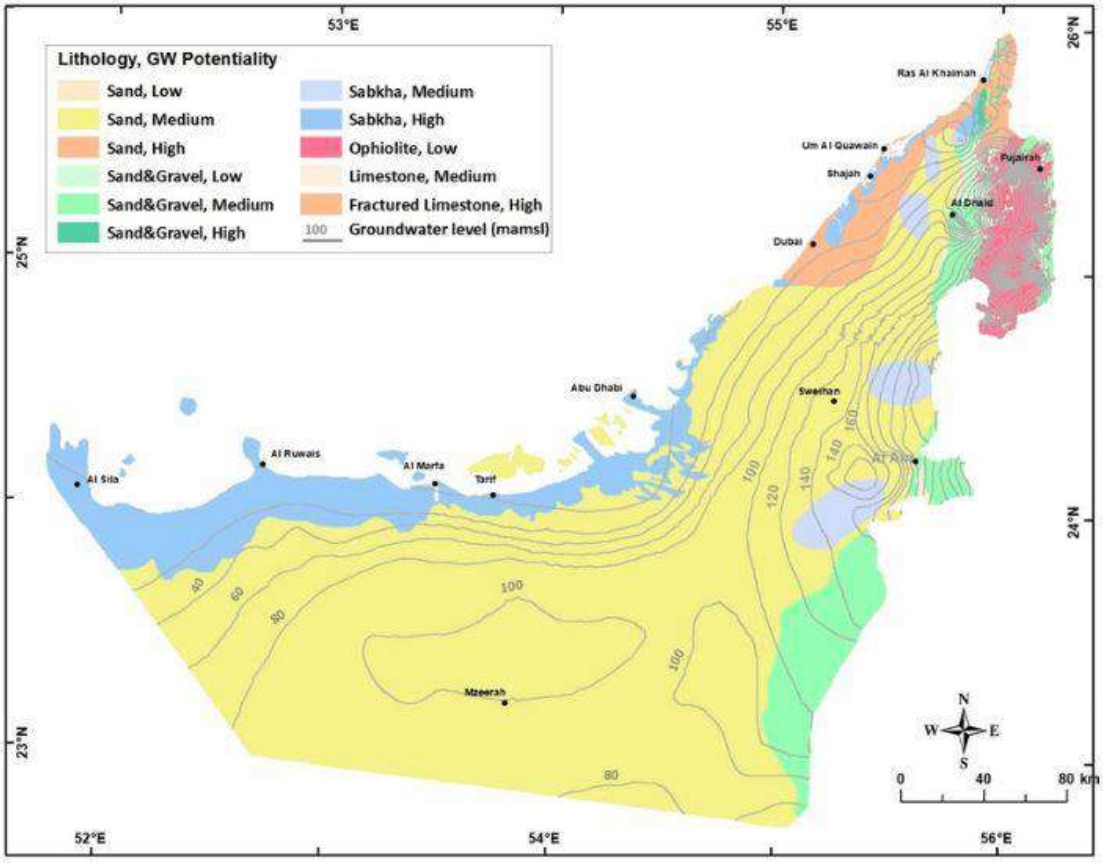


Figure 5.3 – Hydrogeological Map of UAE

5.3.1.3 Characterization of Aquifer System

As mentioned above, in Dubai area, the Shallow Aquifer can be divided into two subunits. The upper unit mainly comprises the water saturated sands/ sandstones of the Hili, Ghayathi, and Abu Dhabi Formation. The lower unit is characterized by the water bearing conglomerates of the Barzaman Formation and is widespread within the central and eastern parts of the Dubai area. Towards the north and northwest, a transition takes place and also rocks of the upper unit are water saturated. In these areas, both units are in direct contact and form one aquifer.

The groundwater flow regime in the UAE, with exception to some areas at the south-western region of Abu Dhabi, is generally from east to west driven by the flow from the Hajar mountain range along the UAE-Oman border (see Figure 5.4). The groundwater condition is controlled by the regional topography, climate, rainfall, and drainage pattern. It falls within the interface of two main hydrological regimes, the continental water discharge, and the marine water incursion. The coastal area of the Arabian Peninsula along the Gulf forms the discharge area for the continental waters flowing from the interiors.

These continental waters meet the seawater of the Gulf at a very low velocity due to the low gradient of the topography across the coastal plain. At places within few kilometers inland from the shoreline, groundwater has been observed bonding on the surface.

Seawater intrusion in the low-lying areas is very common; however horizontal mixing is not well defined. Recharging rainwater dissolves halite and other soluble minerals on the surface, causing the solution to become denser and sink to the bottom of the aquifer where it vertically mixes with less dense ascending brines. Solutes are returned to the surface by capillary forces and recycled or lost from the system by aeolian or fluvial processes.

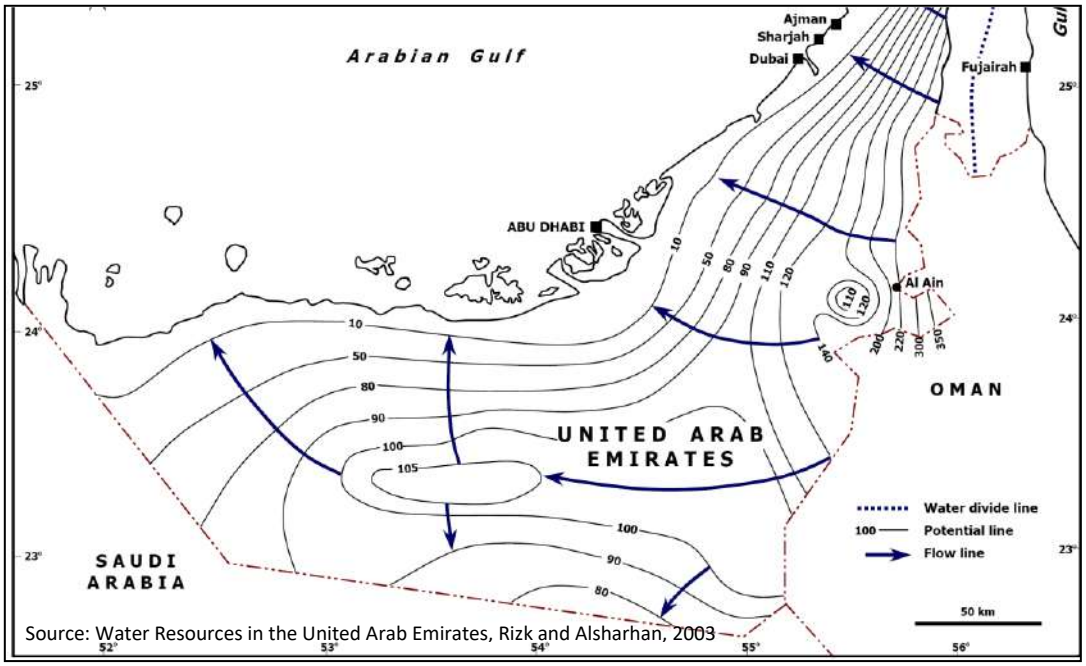


Figure 5.4 – Hydraulic Head Map of the Sand and Gravel Aquifer in the UAE

5.3.2 Seismicity

The UAE is tectonically located in the southeastern region of the Arabian Plate. It is comprised of crystalline basement of Precambrian continental crust about 40-50 km thick, an overlaying basement of sequence of younger Phanerozoic sedimentary rocks that range in thickness from zero to 10 km, in addition to basalt and oceanic basin (J. Abdalla, et.al, 2004). The Arabian Plate is diverging from the African Plate and converging with the Eurasian Plate. This condition has resulted to the formation of the Zagros Fold Belt along the Arabian Plate's eastern border. The Zagros Fold Belt is over 1,500 km in length and extends in a northwest to southeast direction along the northeastern part of Iraq and the western part of Iran, extending to Turkey in the north and Oman in the south (see Figure 5.5). This fold belt is one of the most active in the world. Several studies undertaken suggest that UAE has moderate to low seismic hazards levels, especially the area away from Zagros belt.

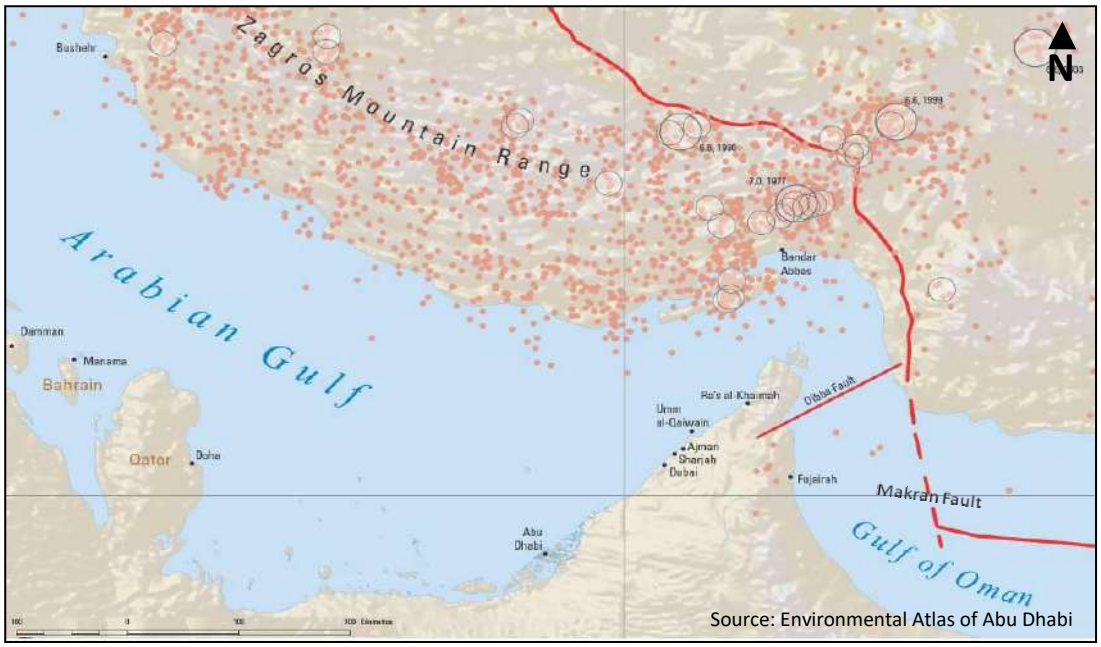


Figure 5.5 – Seismicity in the Arabian Plate

5.3.3 Physical Conditions and Groundwater Quality

5.3.3.1 Geotechnical Investigation

A site-specific subsurface investigation was carried out by Parsons appointed sub-consultant to support the design of the project along the tunnel and link sewer alignments. The investigation involved drilling 113 boreholes along the tunnel alignment to depths ranging from 28.0m to 126.0m and 68 boreholes along the link sewers to depths of 14.0m to 47.5m. Standpipe piezometers were installed, and groundwater monitoring was carried out in 67 tunnel boreholes and 34 link sewer boreholes. Groundwater levels along the tunnel alignment ranged from 0.8m to 18.7m below ground level, while levels along the sewer link ranged from 0.5m to 11.5m below ground, corresponding to elevations of +22.8m to -4.1m DMD.

Boreholes along the tunnel alignment show superficial deposits primarily consisting of light brown, slightly silty to slightly gravelly fine to medium sand with sub-angular to sub-rounded gravels, cemented sand pieces, and occasional rock fragments. The layer thickness ranges from 1.5m to 7.4m, with relative density from medium to very dense. Boreholes along the sewer link reveal deposits of light brown to brownish grey, slightly silty to very silty, slightly gravelly to gravelly fine to medium sand with sub-angular to sub-rounded gravels of sandstone, igneous rock, or cemented sand, underlain by a thin layer of slightly silty sand or sandy gravel (Class D Sandstone) averaging 0.5m in thickness.

5.3.3.2 Groundwater Quality Assessment

Groundwater samples from existing boreholes at various depths were collected along the sewer (tunnel) line corridors to check the existing groundwater quality of the project area and to characterize both the natural hydrochemistry and potential anthropogenic impacts to the groundwater system along the tunnel route. The natural hydrochemistry of the groundwater system is a result of the hydrochemistry of water recharging the aquifer (both laterally and vertically), and reactions between the groundwater and the aquifer matrix. In general, groundwater quality tends to become more saline as it migrates downstream and interacts with aquifer matrix materials. This is particularly the case when the aquifer system consists of shallow marine deposits including evaporites.

In coastal areas of Dubai, shallow groundwater can reach high salinity concentrations due to potential near-coastline seawater interactions or even much higher than seawater due to sabkha-based evaporation processes

The results of the laboratory analysis of the groundwater samples taken at the Project site (see Table 5.7), showed that the concentrations of all the parameters within the relevant Dutch standards (Soil Remediation Circular, 2013) except benzene. The analytical results are attached as Annex 9 (Laboratory Analytical Results).

To assess the data quality and consistency of groundwater data, the following parameters were checked:

- The electrical conductivity (EC) of a solution is a measure of its ability to carry an electric current and the more dissolved ionic solutes are in a water the greater is its EC. Conductivity can be regarded as a crude indicator of water quality since it is related to the sum of all ionized solutes or total dissolved solids (TDS). The following relationship between EC and TDS is commonly used as a rough approximation:

  TDS [mg/l] = 0.66458 x EC [µS/cm]

- The correlation between EC and TDS depicted in Figure 5.6 provides high confidence in EC and TDS data, with a TDS/EC ratio of 0.50. The hosts rocks are of marine origin and are further add to the native saline character in groundwater.

- The Na-Cl bonding plot (Figure 5.7) suggests uniformity of the source rocks contributing to the equivalence of Na-Cl. Na is also associated with F but with mild correlation.

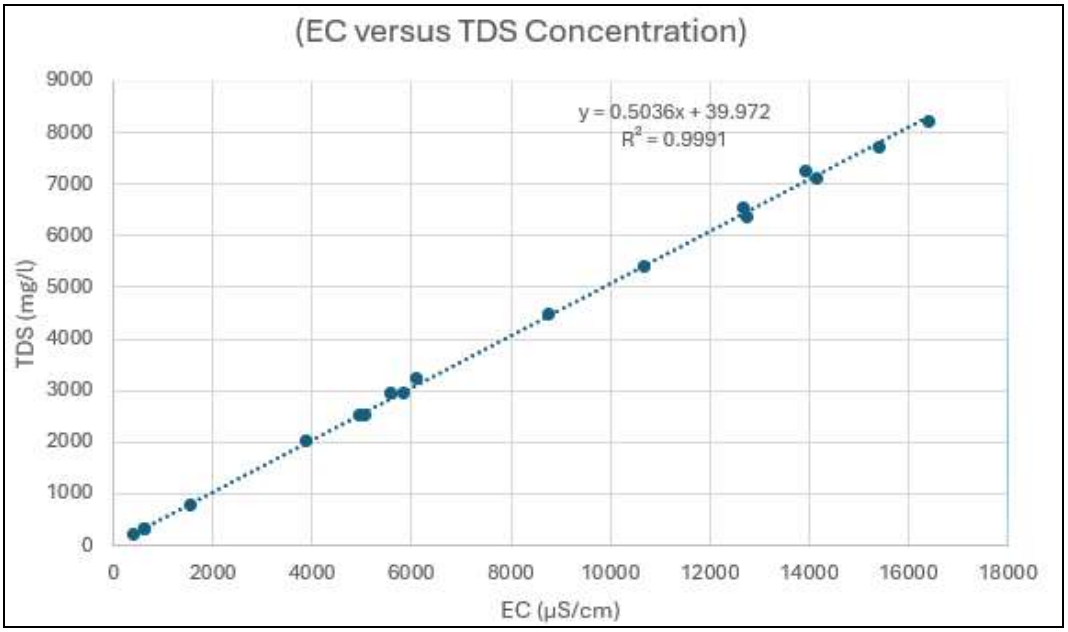


Figure 5.6 – Correlation between EC and TDS

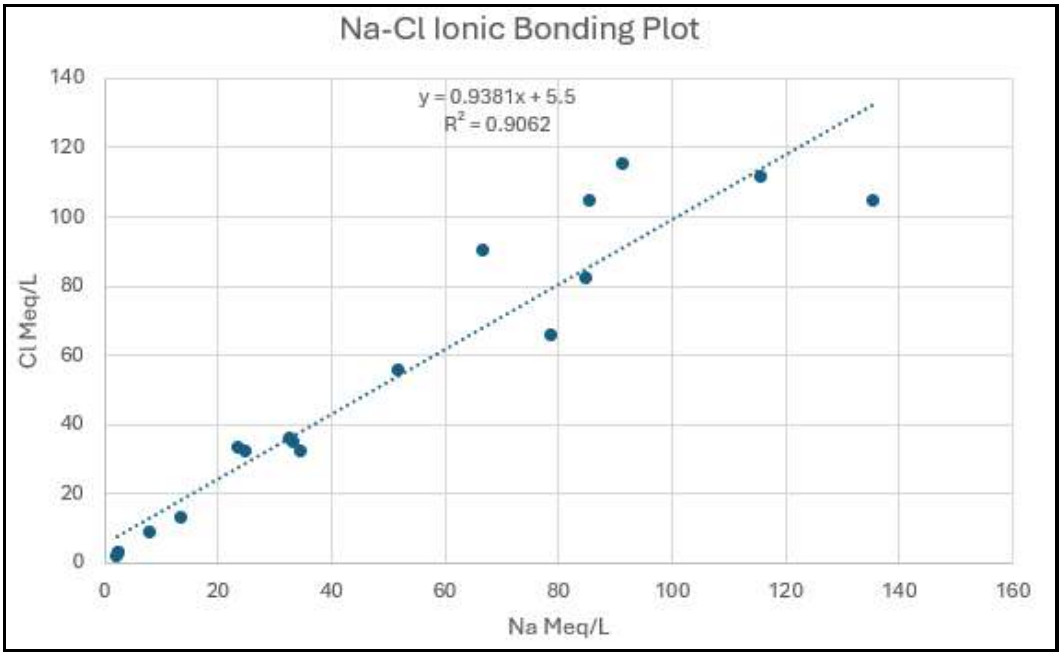


Figure 5.7 – Na-Cl Ionic Bonding Plot

Based on the results, the water quality was highly mineralized as depicted in the hardness results. Total hardness is a sum total of carbonate hardness and non-carbonate hardness. High concentration of Mg and SO4 show that hardness of groundwater is of non-carbonate type, which may be due to dissolution of Mg-sulfate minerals such as Epsomite (MgSO4.7H2O) and Hexahydrite (MgSO4.6H2O) (Stamatkis et al. 2009). With the exception of Benzene, most of the BETEX monoaromatics compounds involved had not been reported in samples. Furthermore, the concentrations Benzene involved were generally low and appeared to be randomly distributed rather than in a pattern suggesting any relationship to possible sources. The exceedances for minerals elements and aromatic hydrocarbon are likely due to the natural geological conditions and anthropogenic activities.

Table 5.7 – Groundwater Quality Analysis Results

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	
Temperature @ Site	APHA AWWA 2550 B	°C	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	-
Dissolved Oxygen	APHA AWWA 4500-O H/G	mg/L	-	4.3	5.0	8.5	7.7	9.3	6.4	6.7	4.6	6.7	-
Electrical Conductivity @ 25 °C	APHA AWWA 2510 B	µS/cm	-	12760.0	14160.0	4960.0	10670.0	12690.0	5580.0	5050.0	3890.0	15420.0	-
pH @ 25 °C	APHA AWWA 4500 H+ B	-	-	7.3	7.2	7.0	7.3	7.9	7.3	7.3	7.3	7.9	-
Total Dissolved Solids @ 180 °C	APHA AWWA 2540 C	mg/L	-	6380	7100	2530	5420	6540	2960	2540	2020	7710	-
Biochemical Oxygen Demand @ 5 Days	ASTM D 888	mg/L	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	-
Oil & Grease (Emulsified)	APHA AWWA 5520 B	mg/L	-	2	2	Nil	Nil	Nil	3	2	2	2	-
Oil & Grease (Free)	Gravimetric / IP-13	%	-	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-
Chloride as Cl-	APHA AWWA 4500 Cl B	mg/L	-	3712	4100	1140	2340	2918	1188	1138	470	3712	-
Total Hardness as $CaCO_3$	APHA AWWA 2340 C	mg/L	-	2477	3171	1585	3567	4162	1982	2180	1883	2378	-
Total Nitrogen (TN)	ASTM D 5176	mg/L	-	0.66	0.78	12.10	12.20	12.40	1.10	0.76	0.40	1.47	-
Colour	Platinum-Cobalt Method	Pt-Co Unit	-	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	-
Cyanide as CN	Pyridine Pyrazalone Method	mg/L	--	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-
Free Chlorine as Cl_2	USEPA DPD Method	mg/L	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-
Nitrate-Nitrogen as NO_3-N	Cadmium Reduction Method	mg/L	-	0.50	0.38	5.80	6.00	6.20	0.50	0.40	0.20	0.90	-
Phosphate - Phosphorus as PO_4	USEPA PhosVer 3	mg/L	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-
Sulfide as S_2-	USEPA Methylene Blue Method	mg/L	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-
Total Sulfate as SO_4	Sulfa Ver Method	mg/L	-	1075	1300	590	1600	1700	850	875	925	1675	-

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	
Turbidity	USEPA 180.1	NTU	-	0.3	0.3	2.6	2.8	2.4	15.3	43.3	84.1	0.2	-
Aluminium as Al	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-
Arsenic as As	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.060 (mg/l)
Barium as Ba	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.625 (mg/l)
Beryllium as Be	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-
Boron as B	APHA AWWA 3030 E / 3120 B	mg/L	-	1.09	0.97	2.74	3.00	3.12	1.99	1.02	0.63	2.87	-
Cadmium as Cd	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.006 (mg/l)
Calcium as Ca	APHA AWWA 3030 E / 3120 B	mg/L	-	533.00	484.00	420.00	1012.10	1120.80	518.00	704.00	571.00	492.00	-
Chromium as Cr	APHA AWWA 3030 E / 3120 B	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.030 (mg/l)
Cobalt as Co	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.100 (mg/l)
Copper as Cu	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	0.075 (mg/l)
Iron as Fe	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.011	< 0.011	0.021	0.019	0.017	0.042	0.026	0.019	< 0.011	-
Lead as Pb	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.075 (mg/l)
Magnesium as Mg	APHA AWWA 3030 E / 3120 B	mg/L	-	284.00	524.00	133.92	256.08	317.25	151.00	120.00	75.30	291.00	-
Manganese as Mn	APHA AWWA 3030 E / 3120 B	mg/L	-	0.064	0.052	< 0.002	< 0.002	< 0.002	0.130	0.120	< 0.002	< 0.002	-
Mercury as Hg	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0003 (mg/l)
Molybdenum as Mo	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.300 (mg/l)
Potassium as K	APHA AWWA 3030 E / 3120 B	mg/L	-	42.40	38.20	27.28	52.28	65.99	32.80	28.20	17.00	51.90	-
Sodium as Na	APHA AWWA 3030 E / 3120 B	mg/L	-	1960.00	2100.00	790.00	1810.00	1950.00	539.00	568.00	310.00	3110.00	-
Zinc as Zn	APHA AWWA 3030 E / 3120 B	mg/L	-	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	0.800 (mg/l)
Pesticide (Organochlorine)	USEPA 8081	mg/L	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	
Phenols	USEPA 604	mg/L	-	0.005	0.006	0.003	0.003	0.004	0.006	0.015	0.007	0.005	-
Benzene	USEPA 8260	µg/L	-	37	30	15	12	14	28	45	23	34	0.030 (mg/l)
7 1,2-Dichloroethane	USEPA 8260	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.006	0.006	0.007	< 0.001	-
9 Dichloromethane	USEPA 8260	mg/L	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.009	0.008	0.010	< 0.001	-
Total Bacterial Count	APHA AWWA 9215 B	CFU/ ml	-	35000	38000	17000	10000	5000	100	50	1300	30000	-
Escherichia coli	APHA AWWA 9222 B & H	CFU/100ml	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Total Coliform	APHA AWWA 9222 B	CFU/100ml	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW11	GW12	GW13	GW14	GW15	GW16	GW17	GW18	GW19	GW20	
Temperature @ Site	APHA AWWA 2550 B	°C	NA	NA	NA	NA	NA	NA	NA	--	NA	NA	-
Dissolved Oxygen	APHA AWWA 4500-O H/G	mg/L	4.2	7.6	4.1	7.7	4.3	8.4	8.2	-	5.4	6.7	-
Electrical Conductivity @ 25 °C	APHA AWWA 2510 B	µS/cm	632.0	5830.0	626.0	1538.0	8770.0	13950.0	6110.0	-	16400.0	409.0	-
pH @ 25 °C	APHA AWWA 4500 H+ B	-	7.7	8.1	7.7	7.6	7.3	7.4	7.3	-	7.1	8.1	-
Total Dissolved Solids @ 180 °C	APHA AWWA 2540 C	mg/L	320	2950	320	770	4480	7250	3240	-	8200	210	-
Biochemical Oxygen Demand @ 5 Days	ASTM D 888	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	< 5	-	< 5	< 5	-
Oil & Grease (Emulsified)	APHA AWWA 5520 B	mg/L	2	1	3	2	Nil	1	1	-	2	2	-
Oil & Grease	Gravimetric / IP-13	%	Nil	Nil	Nil	Nil	Nil	Nil	Nil	-	Nil	Nil	-

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW11	GW12	GW13	GW14	GW15	GW16	GW17	GW18	GW19	GW20	
Chloride as Cl-	APHA AWWA 4500 Cl B	mg/L	99	1282	104	322	1980	3208	1237	-	3959	74	-
Total Hardness as CaCO3	APHA AWWA 2340 C	mg/L	151	1982	155	416	2378	3369	2180	-	2973	111	-
Total Nitrogen (TN)	ASTM D 5176	mg/L	1.01	1.18	0.44	8.90	1.20	1.10	10.70	-	1.10	1.40	-
Colour	Platinum-Cobalt Method	Pt-Co Unit	< 15	< 15	< 15	< 15	< 15	< 15	< 15	-	< 15	< 15	-
Cyanide as CN	Pyridine Pyrazalone Method	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	< 0.002	< 0.002	-
Free Chlorine as Cl2	USEPA DPD Method	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-	< 0.02	< 0.02	-
Nitrate-Nitrogen as NO3-N	Cadmium Reduction Method	mg/L	0.70	0.62	0.20	4.40	0.70	0.50	9.25	-	0.84	0.90	-
Phosphate - Phosphorus as PO4	USEPA PhosVer 3	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-	< 0.02	< 0.02	-
Sulfide as S2-	USEPA Methylene Blue Method	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	-	< 0.5	< 0.5	-
Total Sulfate as SO4	Sulfa Ver Method	mg/L	6	675	17	170	1750	2100	1600	-	1500	45	-
Turbidity	USEPA 180.1	NTU	8.0	8.5	6.2	2.5	3.9	6.7	10.6	-	3.8	7.1	-
Aluminum as Al	APHA AWWA 3030 E / 3120 B	mg/L	0.03	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.07	-	< 0.01	< 0.01	-
Arsenic as As	APHA AWWA 3030 E / 3120 B	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	0.060 (mg/l)
Barium as Ba	APHA AWWA 3030 E / 3120 B	mg/L	0.15	0.20	0.25	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	0.625 (mg/l)
Beryllium as Be	APHA AWWA 3030 E / 3120 B	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	-
Boron as B	APHA AWWA 3030 E / 3120 B	mg/L	0.28	0.22	0.14	2.50	2.01	0.74	1.99	-	1.47	1.01	-
Cadmium as Cd	APHA AWWA 3030 E / 3120 B	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	< 0.002	< 0.002	0.006 (mg/l)
Calcium as Ca	APHA AWWA 3030 E / 3120 B	mg/L	49.50	585.00	47.60	130.00	625.00	944.00	576.00	-	787.00	31.50	-
Chromium as Cr	APHA AWWA 3030 E / 3120 B	µg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	-	< 1	< 1	0.030 (mg/l)
Cobalt as Co	APHA AWWA 3030 E / 3120 B	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	-	< 0.002	< 0.002	0.100 (mg/l)
Copper as Cu	APHA AWWA 3030 E / 3120 B	mg/L	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	-	< 0.006	< 0.006	0.075 (mg/l)
Iron as Fe	APHA AWWA 3030 E / 3120 B	mg/L	0.025	0.020	0.014	0.017	0.031	0.022	0.068	-	0.089	0.055	-
Lead as Pb	APHA AWWA 3030 E / 3120 B	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	0.075 (mg/l)
Magnesium as Mg	APHA AWWA 3030 E / 3120 B	mg/L	6.48	120.10	8.06	23.10	197.00	238.00	171.00	-	242.00	7.80	-

Parameters	Test Method Reference	Units	Groundwater Sampling Locations										Dutch Standards (Intervention Values)
			GW11	GW12	GW13	GW14	GW15	GW16	GW17	GW18	GW19	GW20	
Manganese as Mn	APHA AWWA 3030 E / 3120 B	mg/L	0.014	0.008	< 0.002	0.004	0.028	0.002	< 0.002	-	0.393	0.010	-
Mercury as Hg	APHA AWWA 3030 E / 3120 B	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	0.0003 (mg/l)
Molybdenum as Mo	APHA AWWA 3030 E / 3120 B	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	0.300 (mg/l)
Potassium as K	APHA AWWA 3030 E / 3120 B	mg/L	2.71	26.82	2.99	8.46	90.60	83.50	42.00	-	80.30	2.12	-
Sodium as Na	APHA AWWA 3030 E / 3120 B	mg/L	57.30	750.00	54.30	180.00	1190.00	1530.00	763.00	-	2660.00	50.00	-
Zinc as Zn	APHA AWWA 3030 E / 3120 B	mg/L	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	-	< 0.006	< 0.006	0.800 (mg/l)
Pesticide (Organochlorine)	USEPA 8081	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	-
Phenols	USEPA 604	mg/L	0.008	0.005	0.008	0.010	0.005	0.004	0.009	--	0.020	0.007	-
Benzene	USEPA 8260	µg/L	34	20	36	31	26	15	32	-	54	30	0.030 (mg/l)
7 1,2-Dichloroethane	USEPA 8260	mg/L	0.003	0.001	0.004	0.003	< 0.001	0.001	0.003	-	0.008	0.005	-
9 Dichloromethane	USEPA 8260	mg/L	0.006	0.003	0.007	0.005	< 0.001	0.003	0.006		0.012	0.008	-
Total Bacterial Count	APHA AWWA 9215 B	CFU/ml	23000	28000	29000	1500	150	5000	7200		2250	150	-
Escherichia coli	APHA AWWA 9222 B & H	CFU/100ml	ND	ND	ND	ND	ND	ND	ND		ND	ND	-
Total Coliform	APHA AWWA 9222 B	CFU/100ml	ND	ND	120	ND	35	ND	620		1240	ND	-

5.4 Ambient Noise

5.4.1 Ambient Noise Monitoring Methodology

The available noise quality data related to Project site is from the baseline study carried out as a part of the existing EIA prepared for the whole (DS215 A&B DSST, Bur Dubai & Deira) Project in 2018. The measured ambient noise levels during the daytime and night-time surveys showed exceedances compared to the DECCA/UAE noise limit at all locations. The ambient noise sources at that time of survey were from vehicular movement, aircrafts and construction activities in the vicinity of some monitoring locations. Considering that these existing data is relatively old, an updated noise quality survey was undertaken as part of the EIA study (see details in Section 5.4.3).

The results of the ambient noise survey (see Table 5.8 & Table 5.9) (day and nighttime) campaigns showed exceedances to the DECCA/UAE limits at most of the locations. The survey results showed 11 out of 25 recorded ambient daytime noise and 20 out of 25 recorded ambient nighttime noise levels exceed the DECCA standard. These exceedances are primarily due to vehicular traffic, as almost all of the locations are along highways, with significant movement of vehicles, including car, motorbike, trucks and lorries. In addition, noise from construction activities in the vicinity of monitoring location (NLM 24) was captured during the survey. Noise monitoring datasheet is attached as Annex 8 in this report.

Table 5.8 – Summary of Noise Survey Results: Daytime

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Measured Noise Level dB(A)								DECCA/UAE Standards
				Wind Speed (mph)	Ambient Temp.	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ	
NLM-01	21-Nov	13:25	Sewage Treatment Plant, Jebel Al	1.7	89.4	43.3	50.2	44.5	55.0	51.2	46.7	44.2	47.6	70
NLM-02	21-Nov	12:30	Sewage Treatment Plant, Jebel Ali	0.6	88.7	48.1	51.4	49.3	55.1	51.8	50.5	48.9	50.6	70
NLM-03	21-Nov	14:04	Sewage Treatment Plant, Jebel Ali	2.1	89.2	43.6	47.1	45.1	61.4	47.6	46.0	44.8	46.5	60
NLM-04	22-Nov	12:52	Sewage Treatment Plant, Jebel Ali	1.5	88.9	39.3	48.5	40.9	65.3	50.9	42.4	40.5	46.5	60
NLM-05	22-Nov	11:59	Dubai South (Car, Bus)	1.8	88.1	55.3	64.2	57.5	67.3	65.1	60.8	57.0	61.5	60
NLM-06	22-Nov	11:30	Dubai South (Car, Bus)	2.1	87.3	51.0	58.1	53.4	65.3	58.7	55.7	52.9	56.1	60
NLM-07	25-Nov	14:41	Emirates Road (Car, Bus, Motorbike)	2.3	90.1	71.0	84.7	74.2	90.8	86.3	78.3	73.3	81.0	60
NLM-08	25-Nov	15:18	Al Qudra Road (Car, Bus, Motorbike)	2.8	88.5	62.7	76.2	68.6	80.2	76.9	73.4	66.8	73.8	60
NLM-09	25-Nov	16:00	Al Qudra Road (Car, Bus, Motorbike).	3.1	87.5	56.7	64.9	59.2	68.9	66.8	61.1	58.2	62.3	60
NLM-10	26-Nov	12:47	Umm Suqeim Street (Car, Bus, Motorbike)	1.4	89.8	60.2	66.2	62.1	69.4	67.2	63.5	61.7	64.1	60
NLM-11	26-Nov	16:22	Sheik Mohammed. Bin Zayed Rd. Cars, Motorbike	1.8	85.6	62.3	66.0	64.0	64.3	75.5	66.3	65.2	64.1	60
NLM-12	26-Nov	13:25	Near Farms.	2.1	90.3	48.8	51.5	49.8	59.8	52.1	50.6	49.7	50.8	60
NLM-13	26-Nov	13:52	Across Dubai Hills	1.8	90.1	53.0	59.1	54.5	68.3	61.1	55.8	54.1	57.2	60
NLM-14	27-Nov	15:30	Across Main Road. Car, Bus, Motorbike	1.4	89.1	61.4	70.2	63.0	84.3	73.1	65.7	62.6	68.7	60
NLM-15	27-Nov	12:45	Across Al Meydan Street, Near Ghadeer Pond	1.6	88.8	51.0	55.3	52.6	68.3	55.9	53.8	52.4	54.2	60
NLM-16	27-Nov	16:35	Ras Al Khor Road (Car, Bus, Motorbike)	1.9	84.2	51.0	57.0	52.9	75.3	59.3	53.8	52.7	55.8	60

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Measured Noise Level dB(A)								DECCA/UAE Standards
				Wind Speed (mph)	Ambient Temp.	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ	
NML-17	28-Nov	15:33	Ras Al Khor Road (Car, Bus, Motorbike)	1.8	85.1	63.1	67.5	64.6	75.0	68.0	65.8	64.2	66.1	60
NLM-18	28-Nov	12:07	Sheikh Mohammed Bin Zayed Rd (Cars, Motorbike)	2.2	86.3	56.9	62.7	60.5	71.6	63.0	61.6	60.1	61.6	60
NLM-19	28-Nov	11:14	Near Al Fay Roda Car, Bus, Motorbike	1.8	86.7	52.9	57.2	54.2	68.2	58.1	55.3	53.9	55.8	60
NLM-20	04-Dec	11:00	Near Expo Road. Cars, Bus.	0.9	83.6	55.6	60.1	57.1	62.9	60.6	58.4	56.7	58.6	60
NLM-21	04-Dec	10:33	Near Expo Road. Cars, Bus.	0.8	83.8	55.7	63.9	58.4	68.2	65.2	60.6	57.9	61.5	60
NML-22	04-Dec	09:05	Near Tristar. Cars.	0.6	83.6	53.6	57.2	54.7	64.5	58.3	55.6	54.4	56.3	70
NLM-23	04-Dec	08:30	Near IKEA Supply ME. Cars.	1.1	82.6	53.5	56.0	54.4	58.5	56.3	55.1	54.2	55.2	70
NLM-24	04-Dec	11:37	Construction Area, Tilal Al Ghaf Harmony - 3	2.4	85.6	42.3	52.7	45.0	65.7	54.3	48.0	44.3	49.5	60
NLM-25	04-Dec	14:53	Al Khail Road (Car, Bus, Motorbike)	1.8	86.1	61.9	66.0	63.6	77.3	66.6	64.6	63.3	65.0	60

Table 5.9 – Summary of Noise Survey Results: Nighttime

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Measured Noise Level dB(A)								DECCA/UAE Standards
				Wind Speed (mph)	Ambient Temp.	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ	
NLM-01	21-Nov	21:21	Sewage Treatment Plant, Jebel Al	1.3	77.7	49.7	53.5	50.6	57.0	54.3	52.4	50.3	52.4	60
NLM-02	21-Nov	22:16	Sewage Treatment Plant, Jebel Ali	1.4	78.1	46.0	48.0	46.9	49.5	48.2	47.5	46.7	47.5	60
NLM-03	21-Nov	22:41	Sewage Treatment Plant, Jebel Ali	3.2	77.8	53.5	55.9	54.3	56.6	56.0	55.0	54.1	55.1	50
NLM-04	22-Nov	21:40	Sewage Treatment Plant, Jebel Ali	1.2	77.7	53.3	57.9	54.8	60.6	58.4	56.2	54.6	56.4	50
NLM-05	22-Nov	23:01	Dubai South (Car, Bus)	1.6	79.1	59.1	70.2	62.8	73.1	71.1	66.4	61.4	67.1	50

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Measured Noise Level dB(A)								DECCA/UAE Standards
				Wind Speed (mph)	Ambient Temp.	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ	
NLM-06	22-Nov	23:32	Dubai South (Car, Bus)	1.9	78.6	56.6	62.8	58.8	65.6	63.4	60.4	58.3	60.8	50
NLM-07	25-Nov	21:56	Emirates Road (Car, Bus, Motorbike)	5.5	78.1	64.7	70.1	67.0	72.8	70.6	68.4	66.7	68.7	50
NLM-08	25-Nov	19:55	Al Qudra Road (Car, Bus, Motorbike)	1.1	78.6	62.3	73.2	73.2	68.1	79.7	73.9	70.8	67.3	50
NLM-09	25-Nov	19:28	Al Qudra Road (Car, Bus, Motorbike).	2.3	78.9	52.7	67.5	56.1	80.1	68.5	62.0	55.2	64.4	50
NLM-10	26-Nov	20:42	Umm Suqeim Street (Car, Bus, Motorbike)	0.9	79.1	61.0	66.9	63.4	76.1	67.5	65.2	62.9	65.5	50
NLM-11	26-Nov	19:01	Sheik Mohammed. Bin Zayed Rd. Cars, Motorbike	2.5	78.7	60.2	63.9	62.0	80.3	64.2	63.0	61.7	63.1	50
NLM-12	26-Nov	21:15	Near Farms.	1.5	79.0	48.7	52.8	50.2	73.3	53.8	51.2	50.0	51.9	50
NLM-13	26-Nov	22:13	Across Dubai Hills	2.5	74.8	49.1	50.9	49.8	57.1	51.1	50.4	49.7	50.4	50
NLM-14	27-Nov	21:45	Across Main Road. Car, Bus, Motorbike	1.8	75.1	61.4	69.3	62.6	81.8	70.3	64.9	62.2	67.1	50
NLM-15	27-Nov	20:32	Across Al Meydan Street, Near Ghadeer Pond	0.9	74.9	59.2	61.3	59.9	66.1	61.5	60.5	59.7	60.6	50
NLM-16	27-Nov	22:22	Ras Al Khor Road (Car, Bus, Motorbike)	4.1	79.1	52.1	57.4	53.7	62.8	57.9	55.3	53.3	55.7	50
NML-17	28-Nov	20:45	Ras Al Khor Road (Car, Bus, Motorbike)	0.9	74.1	64.0	67.8	65.9	70.1	68.2	66.7	65.6	66.9	50
NLM-18	28-Nov	22:07	Sheikh Mohammed Bin Zayed Rd (Cars, Motorbike)	1.9	74.9	56.4	59.0	57.5	66.5	59.5	58.1	57.3	58.3	50
NLM-19	28-Nov	19:11	Near Al Fay Roda Car, Bus, Motorbike	2.5	75.6	56.9	55.2	57.6	56.2	65.1	57.8	56.9	56.9	50
NLM-20	04-Dec	20:28	Near Expo Road. Cars, Bus.	1.5	79.8	56.4	63.3	59.2	67.7	64.0	61.5	58.6	61.8	50
NLM-21	04-Dec	23:58	Near Expo Road. Cars, Bus.	2.0	79.6	57.0	67.5	58.2	79.2	72.5	60.5	57.8	65.1	50
NML-22	04-Dec	21:22	Near Tristar. Cars.	2.7	80.9	51.9	55.3	52.7	65.0	58.6	54.0	52.5	55.1	60

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Measured Noise Level dB(A)								DECCA/UAE Standards
				Wind Speed (mph)	Ambient Temp.	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ	
NLM-23	04-Dec	20:03	Near IKEA Supply ME. Cars.	2.3	80.7	51.3	58.8	53.3	64.3	59.6	55.8	52.6	56.4	60
NLM-24	04-Dec	21:52	Construction Area, Tilal Al Ghaf Harmony - 3	1.2	75.1	45.8	49.6	47.0	64.2	50.1	48.1	46.7	48.5	50
NLM-25	04-Dec	23:10	Al Khail Road (Car, Bus, Motorbike)	1.8	74.7	60.6	64.2	62.0	69.1	66.2	62.6	61.6	63.1	50

5.5 Terrestrial Ecology

5.5.1 Survey Methodology

A rapid terrestrial ecology baseline survey was conducted along the tunnel route from 22nd of November to 15th of December 2024. The survey was undertaken for single season and primarily focused in defining the terrestrial habitats that will be affected during the implementation of the proposed project. The survey was carried out by a certified ecologist using a combination of drive and walkthrough assessment as per the procedure given in Annex 4 of the DECCA "Guidance on the Environmental Clearance (EC) and Requirements for Development, Infrastructure and Industrial Projects in the Emirate of Dubai (2024)". Therefore, to gather information on the terrestrial biodiversity, a total of eighteen (N=18) line transects and thirty-six (N=36) quadrats (18 x 2 = 36) were laid in the project area (Figure 5.8).

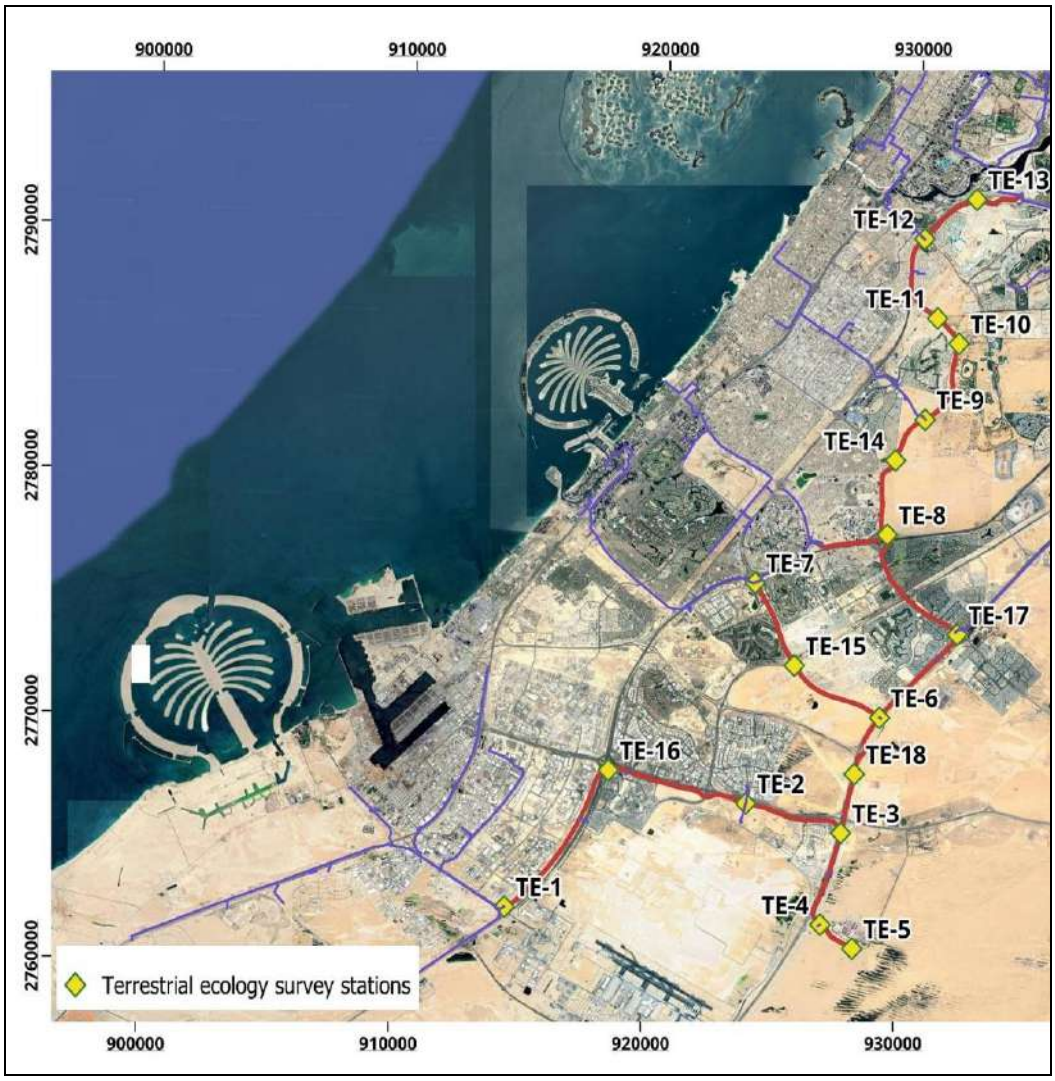


Figure 5.8 – Terrestrial Ecology Sampling Points

Habitat types were identified based on the geological content of the substrate and floristic composition. Habitat classification is based on habitat descriptions provided by Al Dhaheri et al. (2017), Brown and Boer (2004), and the recently published IUCN Red List of Ecosystems (Javed et al. 2023). To collect information on plant listings in the selected habitat types a random point sampling technique was used. The points were established using randomization to ensure that plant species in diverse habitats have an equal chance of being sampled.

Every plant that was recorded had comprehensive data on its ecological characteristics, including growth form, and lifespan. During the investigation of plant composition, plant samples were collected to identify reported plants at the species level.

Plants were identified using relevant regional taxonomic literature (Deil and Müller-Hohenstein, 1996; Brown and Sakkir, 2004; Norton et al. 2009; Burt, 2023; Brown and Feulner, 2023); and online flora (https://www.worldplants.de/world-plants-complete-list; https://www.uaeflora.ae/). The nomenclature was updated follow the Plants of the World Online (POWO) (https://powo.science.kew.org). Further, the recorded species were categorized into native/ threatened/ endemic/ alien plant species following regional flora (Soorae et al. 2009; Allen et al. 2021) and the native ranges are determined following the updated online flora POWO (https://powo.science.kew.org).

The vegetation community data for each of the specified habitat types was collected using a line transect and point quadrat plot methods (Mueller-Dombois, 1974; Bonham, 1989; Dix, 1961; Sakkir et al., 2012). The representative sampling points were determined based on habitat type, with a focus on the vegetated habitat. Transects of 150 meters length were laid for each sample station. In addition, two square shaped 10 x 10-meter quadrats were placed on each line transect to gather data about the location and physical environment of the sampling site, including topography, GPS coordinates, vegetation condition, and degree of disturbance (Figure 5.9).



Figure 5.9 – Terrestrial Ecology Sampling Method (Quadrat) - On-Site



Figure 5.10 – Terrestrial Ecology Survey – Specialist On Field

All trees, shrubs, and herbs along the transect and within each quadrat were recorded and identified. The DAFOR scale (Dominant = >75%, Abundant = 75 – 51%, Frequent = 50 – 26%, Occasional = 25 – 11%, Rare 10 – 1% species) was utilized to determine the percent (%) floral composition within selected vegetated habitats (Braun-Blanquet, 1964).

Furthermore, the frequency for all species was computed by dividing the number of transects that contained the species by the total number of transects laid in the project area (Curtis and McIntosh, 1950).

The data was summarized in Microsoft Excel, and the analysis was performed using Origin Pro software. A rank-frequency curve was created in Microsoft Excel by ranking species in decreasing order based on the occurrence of species in the project area. The contribution of different plant species in various ecological attributes i.e., growth form, and life span were displayed in chord diagrams using Origin Pro version 2024 software. The chord diagram visualizes weighted relationship between species and ecological traits.

Mammal activity was recorded during line transects surveys within the project area. Transect surveys was conducted during daytime when visibility is optimal, and teams quietly move along the transects. The presence of mammal activity was recorded through both direct visual sightings and indirect observations such as tracks, burrows, scats, pellets, scratches, and carcasses.

During the survey, infrared camera traps were also deployed to aid in the identification of nocturnal species in the project area (Figure 5.11). Each camera trap was installed as close as possible to the ground (i.e. about 0.5 m from ground height). The camera traps were placed in each selected location for a minimum of 1 week and consider new moon or full moon to increase the probability of detecting nocturnal animals present in the project area. A total of ten (N=10) camera traps were installed during the survey period in the project area (Figure 5.12).



Figure 5.11 – Installation of Camera Traps Location On-Site

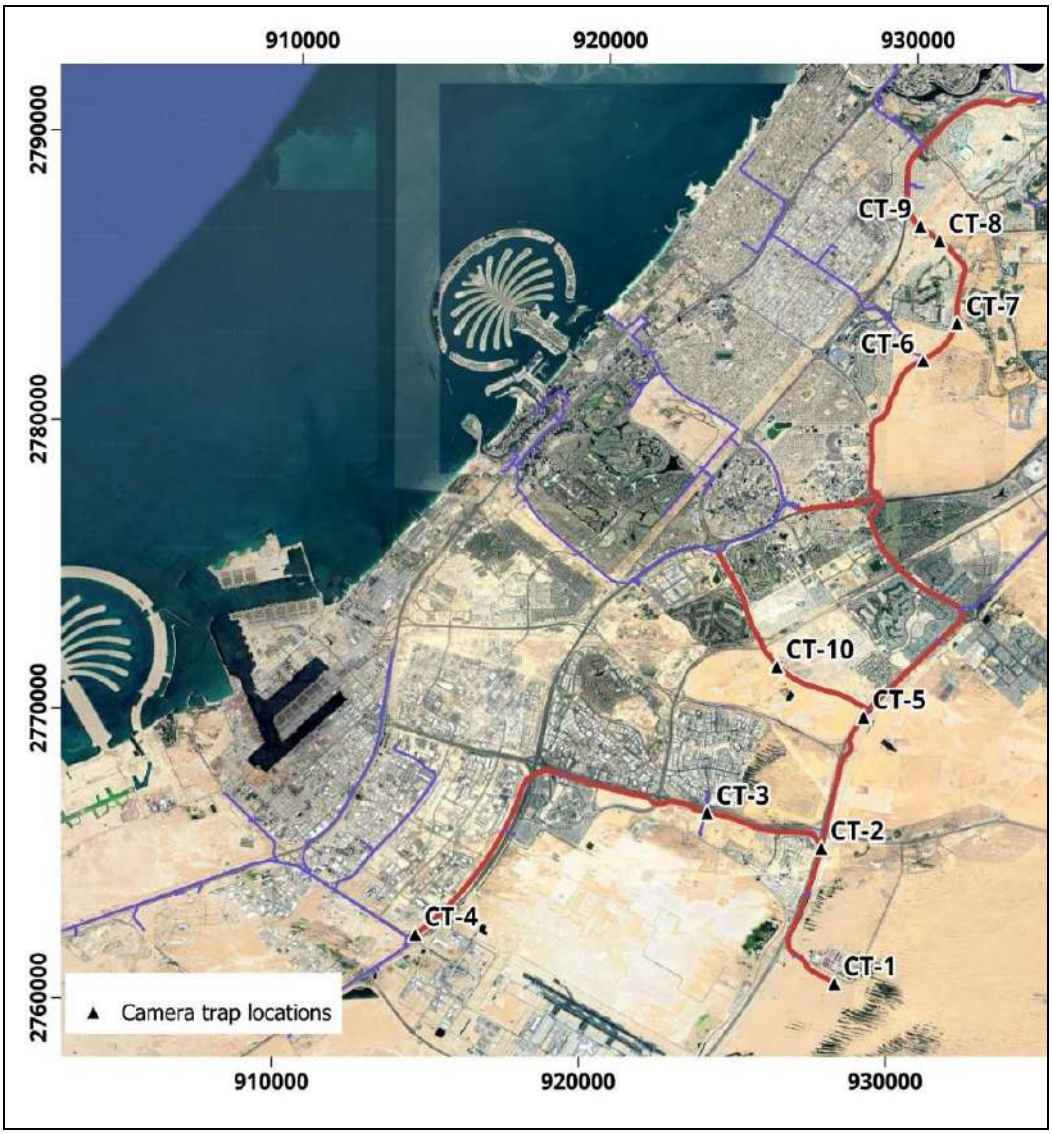


Figure 5.12 – Location Map of Camera Traps Installed On-Site

A survey for reptiles was undertaken concurrently with the mammal surveys during line transect and quadrat assessments. An effort was made to search under discarded plywood sheets and other anthropogenic debris as well as under natural shelters such as rocks, shrubs, and dead wood. The documented reptiles were identified using relevant regional taxonomic literature (Hornby, 1996; Soorae et al. 2010; Els et al. 2023).

Further to the above, to gather data on nocturnal species, as requested by DECCA, a night survey was carried out from 4th May to 8th May 2025 (five days). Line transect surveys were conducted throughout the project area to monitor nocturnal reptiles. Nocturnal surveys were undertaken for the first five hours after dusk following guidelines for detecting reptiles by Sadlier et al. (2011). Survey techniques for suitable substrates for reptiles typically include searches using head torches with a brightly focused beam or spotlights at night. Many reptiles were detected primarily by their reflective eye shine. Suitable substrates were searched for includes vegetation cover, the ground, tree branches, rocks and tree trunks, especially along roads and tracks.



Figure 5.13 – Line Transect Night Surveys in the Project Area

Bird activity throughout the project area was surveyed during the point count and line transect surveys (Bibby et al. 1998). The survey area was scanned by using binoculars (8- or 10-times magnification) to identify birds and their activity. The duration of the point count was 10 min in each point to record all the avian species. Moreover, randomly encounter birds were also recorded inside project area while moving from one habitat to another. The recorded avifauna were identified using relevant regional taxonomic literature (Pedersen and Aspinall, 2010; Pedersen et al. 2022; Campbell, 2023), and online bird list (https://ebird.org/region/AE-DU).

5.5.2 Monitoring Results

5.5.2.1 Terrestrial Habitat

The project area is mainly composed of six (N=6) habitat types based on substrate, and flora composition (Figure 5.14 to Figure 5.19). The habitats within the project area were identified through rapid ground-truthing and details provided below.

Sand sheets and dunes with tree cover

The substrates of this type of habitat are typically composed of sand sheets. In this habitat, the tree species *Prosopis cineraria* are sparsely distributed and associated plants were *Calotropis procera, Leptadenia pyrotechnica,* and *Cyperus conglomeratus.* This habitat type has been recognized as Vulnerable according to IUCN Red List of Ecosystems assessment.



Figure 5.14 – Sand sheets and dunes with tree cover Habitat type in the Project area

Sand sheets and dunes with shrub cover

The substrates of this type of habitat are predominantly formed of sand sheets with varied levels of vegetation cover. This habitat is covered in woody flora dominated by the native shrub species *Leptadenia pyrotechnica,* and the associated plants were *Calotropis procera, Cyperus conglomeratus, Heliotropium bacciferum, Arnebia hispidissima,* and *Panicum turgidum.* This habitat type has been recognized as Least Concern according to IUCN Red List of Ecosystems assessment.



Figure 5.15 – Sand sheets and dunes with Shrub Cover Habitat type in the Project area

Sand Sheets and Dunes with Perennial Herbs and Graminoids

These areas are characterized mostly by undulating sandy deserts with dunes that are less than 20m in height. periodsora species commonly found in this habitat during the survey period are *Cyperus conglomeratus,* with associated species like *Stipagrostis plumosa,* and *Limeum arabicum.* This habitat type has been recognized as Least Concern according to IUCN Red List of Ecosystems assessment.



Figure 5.16 – Sand Sheets and Dunes with Perennial Herbs and Graminoids Habitat type in the Project area

Sand sheets and dunes with dwarf shrub cover

This habitat is covered by mixed dwarf woody species including *Zygophyllum qatarense*, and the associated plants were *Salsola imbricata, Zygophyllum indicum, Heliotropium bacciferum, Stipagrostis plumosa, Panicum turgidum,* and *Arnebia hispidissima.* The IUCN Red List of Ecosystems classifies this habitat type as Least Concern.



Figure 5.17 – Sand Sheets and Dunes with Dwarf Shrub Cover Habitat type in the Project area

Gravel Plains with Sparse Vegetation

The substrates of this type of habitat are mainly composed of gravel, pebbles, or gravel materials and home for different shrub species. Interdunal plains have either sandy-gravelly or thin sheets of sand over gravel as its substrate. Minimal vegetation was observed in this type of habitat during the survey period, mainly composed of *Zygophyllum qatarense, Zygophyllum indicum* and several individuals of *Cornulaca monacantha.*



Figure 5.18 – Gravel Plains with Sparse Vegetation Habitat type in the Project

Disturbed ground

The disturbed ground in the project area is created by anthropogenic activities, which generated due to construction sites, soil mobilization, and other areas under earthworks development. In this habitat, the predominant species are *Zygophyllum qatarense, Salsola imbricata,* and the associated species woody shrub species like *Calotropis procera, Zygophyllum indicum*. This habitat type has been recognized as Least Concern according to IUCN Red List of Ecosystems assessment.



Figure 5.19 – Human Impacted (Disturbed ground) Habitat type in the Project area

5.5.2.2 Terrestrial Floristic Composition

Floristic analysis yielded a total of twenty-eight (N=28) plant species in 25 genera and 17 different families (Table 5.10). Amaranthaceae was the top-represented family in terms of species number (N=4) followed by Apocynaceae, Poaceae, and Zygophyllaceae (N=3 species each). Other significant families included Fabaceae, and Boraginaceae (N=2 species each). While the remaining thirteen (N=13) families were monotypic (one species each) (Figure 5.20, Table 5.10).

In the documented flora, the species and family relationship ($y=0.0223x^2 – 0.2375x + 1.4412$; $R^2 = 0.9358$) was observed (Figure 5.20). The circle-shaped dots in green colour in the graph show the species distribution pattern in the families. The black dotted line in the graph represents the degree of a polynomial function observed in the recorded flora. The coefficient of determination (R^2) value shows the strength of the association between the study variables (species vs families) (Figure 5.20).

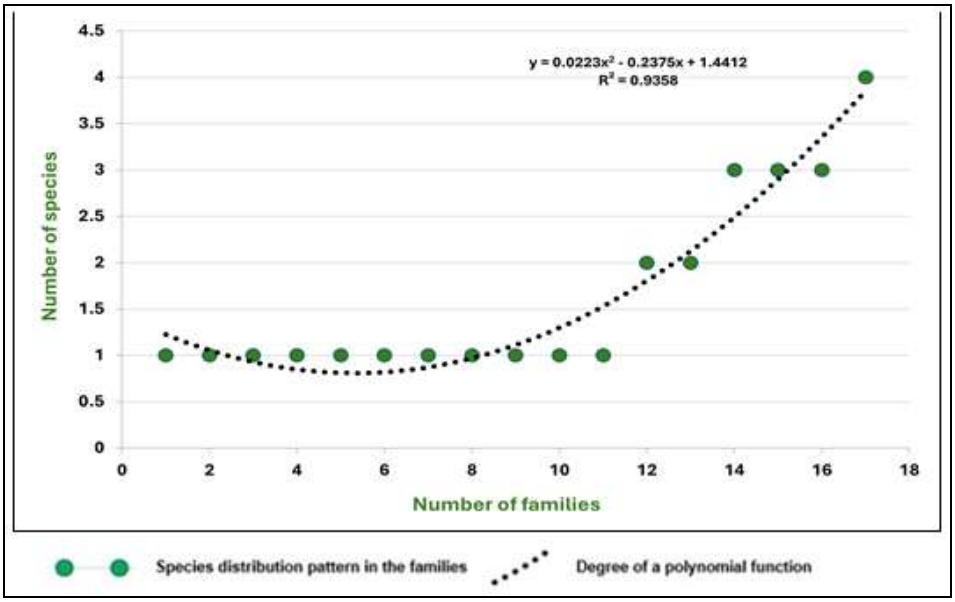


Figure 5.20 – The relationship observed between Species and Families in the reported Flora

Maximum of the documented species were herbs (N=9; 32%), followed by shrub (N=8; 29%), trees (N=6; 21%), while lowest (N=5; 18%) were subshrubs (Figure 5.21a). Among the species documented, perennial plants constituted the dominant life span, accounting for (N= 24; 86%) of the total, followed by annual (N=4; 14%) (Figure 5.21b).

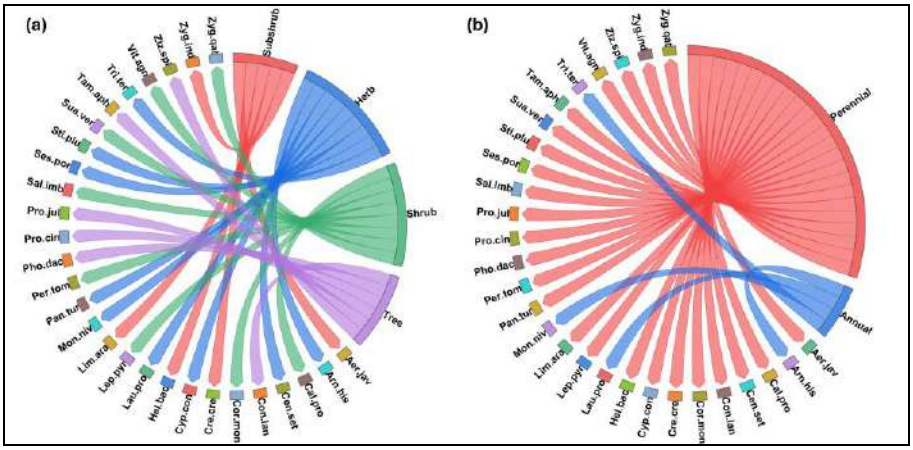


Figure 5.21 – Chord diagram depicting the distribution of documented species in various ecological attributes (a) growth form categories, (b) life span categories

There were no Threatened species (i.e. Vulnerable, Endangered, Critically Endangered) species recorded in the study area based on the UAE National and IUCN Red Lists (Table 5.10). Most of the recorded species were Least Concern (N=21; 75%) based on the UAE National and IUCN Red Lists. However, two species (*Tamarix aphylla* & *Heliotropium bacciferum*) were listed as Data Deficient and (N=5; 18%) of the species were not included in the UAE National Red List of Vascular Plants (Figure 5.22a).

Of the total recorded species, (N=23; 82%) of species were identified as native, while three (N=5; 18%) species were classified as introduced/ non-native species to the country (Figure 6.10b). Maximum of the documented non-native species four species (*Conocarpus lancifolius Sesuvium portulacastrum, Cenchrus setaceus*, and *Vitex agnus-castus*) were identified ornamental species and were intentionally planted for landscaping purposes in the project area; however, one species, *Prosopis juliflora*, is considered harmful invasive to the country (Table 5.10). However, a few individuals of the Ghaf tree (*Prosopis cineraria*) were observed at the terrestrial ecology survey points TE-6; TE-8; & TE-10 (within the buffer zone (500 m) (see Figure 5.23).

The chord diagram depicts the contributions of reported species to the examined ecological traits. The direction of the lines in the diagram indicates which species are related with which type of ecological trait, and the thickness of each bar indicates how many species are found in each category under investigation. The complete name of the species is shown in Table 5.10.

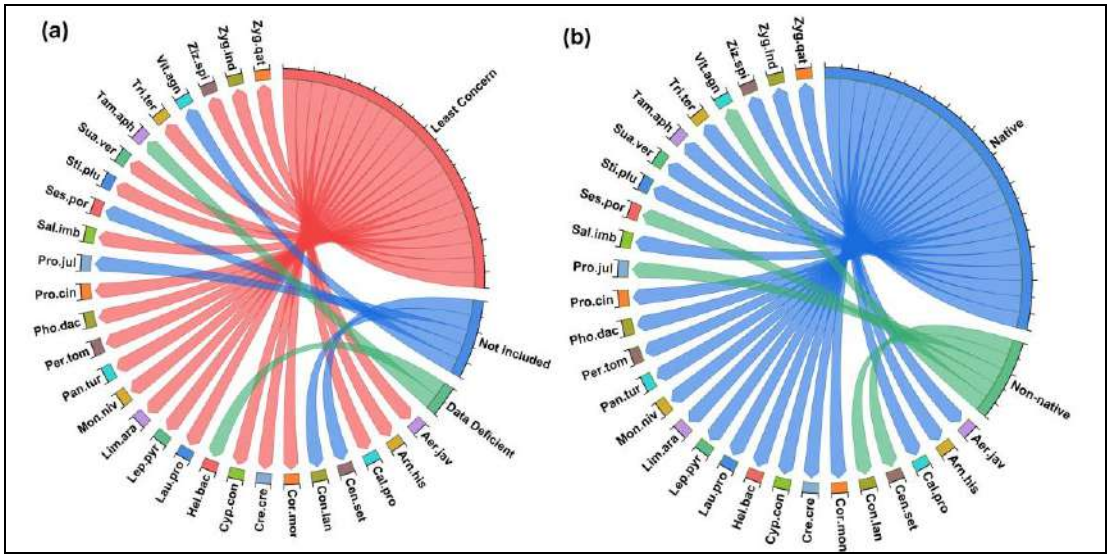


Figure 5.22 – Chord diagram depicting the distribution of documented species in various ecological attributes (a) UAE National Red List, (b) nativity categories

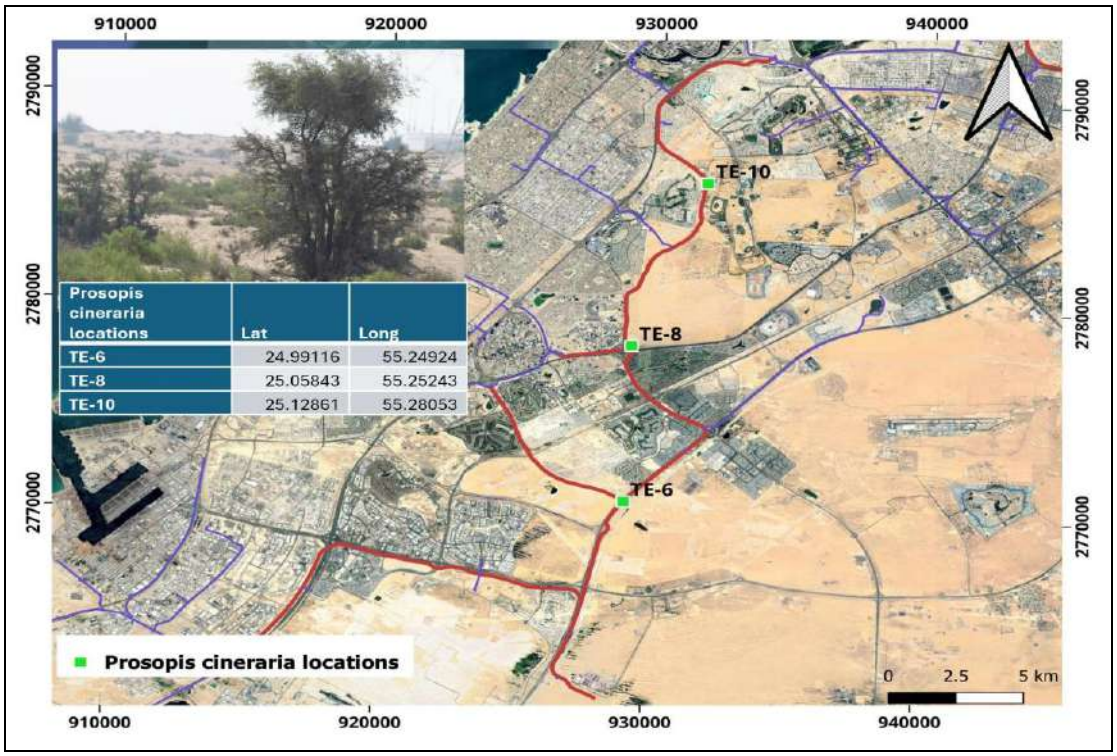


Figure 5.23 – Location Map of Ghaf Tree (Prosopis cineraria) in the Project area

5.5.2.3 Frequency-rank Distribution

The survey findings indicated that floral communities in the project area were generally less diverse, with low natural vegetation cover. In the project area, *Zygophyllum qatarense,* was the dominant species, with a higher frequency index compared to other species. *Salsola imbricata,* was the second most common/abundant species, followed by frequent species like *Cyperus conglomeratus, Heliotropium bacciferum,* and *Leptadenia pyrotechnica,* and *Cornulaca monacantha.*

The occasional species i.e., *Panicum turgidum, Zygophyllum indicum, Calotropis procera, Stipagrostis plumosa, Prosopis cineraria, Aerva javanica,* and *Launaea procumbens* were found to have an intermediate frequency index value ranging from 2 to 7.

The rare species had a frequency index value of less than 2 including *Arnebia hispidissima, Cenchrus setaceus, Conocarpus lancifolius, Cressa cretica, Limeum arabicum, Monsonia nivea, Pergularia tomentosa, Phoenix dactylifera, Prosopis juliflora, Sesuvium portulacastrum, Suaeda vermiculata, Tamarix aphylla, Tribulus terrestris, Vitex agnus-castus,* and *Ziziphus spina-christi* (Figure 5.24).

The rank-frequency curve of the reported species in the project area is shown in Figure 5.24. In the graph, the Y-axis represents relative frequency, while the X-axis represents frequency rank. The green circle- shaped dots in the graph depicts species, which are ranked in decreasing order. The most frequent species is ranked first, followed by the second most frequent, and so on. Comparative frequency of each species to other species reported in the project area is displayed on the Y-axis.

Furthermore, high frequency index values for unpalatable plants like *Zygophyllum qatarense, Salsola imbricata, Heliotropium bacciferum, Cornulaca monacantha* and *Prosopis juliflora,* indicate significant disturbance in the project area. Since these plants are considered a refuge for biodiversity in the urban wasteland, their high occurrence is considered as the indicators of disturbance (Brown and Feulner, 2023).

In addition, the presence of the invasive non-native tree species i.e., *Prosopis juliflora* another indicative of anthropogenic pressure in the project area. The pictorial

representation of the species documented during the survey is shown in Figure 5.25. The checklist of reported flora species with studied ecological traits and UAE National and IUCN Red Lists status is shown in Table 5.10.

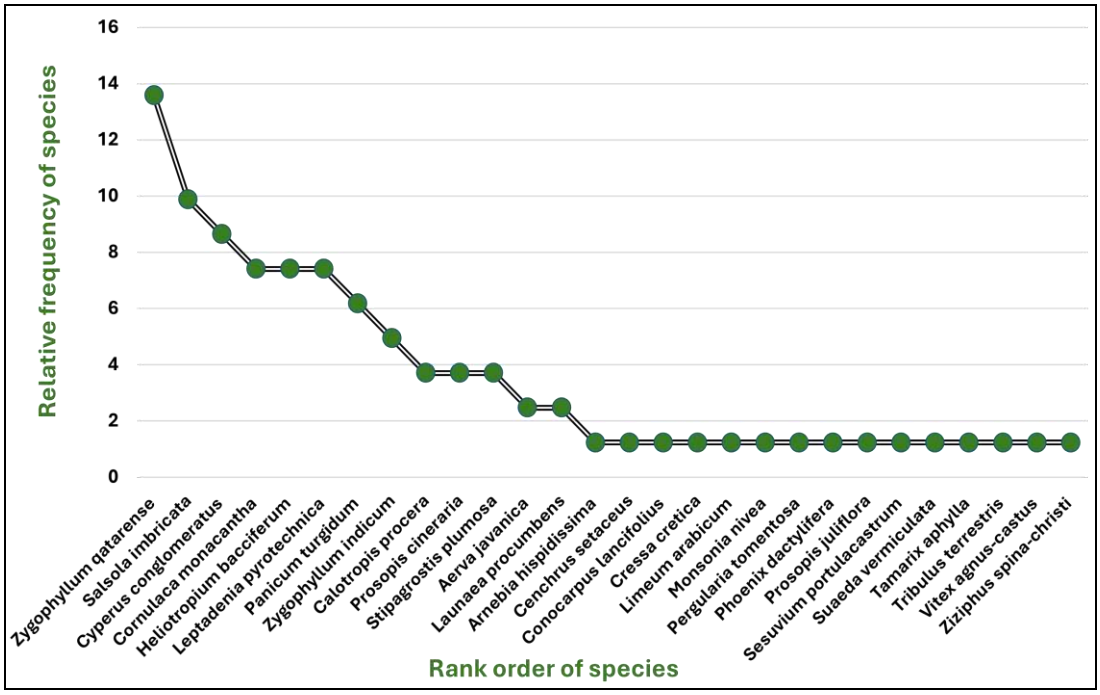


Figure 5.24 – Frequency-rank distribution of the documented species in the Project area

Table 5.10 – Checklist of Floral species with Ecological attributes recorded within the Project area

Name of species	Code	Family	Growth form	Life span	Nativity	Red list UAE	IUCN Red List
Arnebia hispidissima (Sieber ex Lehm.) A.DC.	Arn.his	Boraginaceae	Herb	Annual	Native	Least Concern	Least Concern
Calotropis procera (Aiton) W.T.Aiton	Cal.pro	Apocynaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Cenchrus setaceus (Forssk.) Morrone	Cen.set	Poaceae	Herb	Perennial	Non-native	Not included	Least Concern
Conocarpus lancifolius Engl.	Con.lan	Combretaceae	Tree	Perennial	Non-native	Not included	Least Concern
Cornulaca monacantha Delile	Cor.mon	Amaranthaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Cressa cretica L.	Cre.cre	Convolvulaceae	Subshrub	Perennial	Native	Least Concern	Least Concern
Cyperus conglomeratus Rottb.	Cyp.con	Cyperaceae	Herb	Perennial	Native	Least Concern	Least Concern
Heliotropium bacciferum Forssk.	Hel.bac	Boraginaceae	Subshrub	Perennial	Native	Data Deficient	Least Concern
Launaea procumbens (Roxb.) Ramayya & Rajagopal	Lau.pro	Asteraceae	Herb	Annual	Native	Least Concern	Least Concern
Leptadenia pyrotechnica (Forssk.) Decne.	Lep.pyr	Apocynaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Limeum arabicum Friedrich	Lim.ara	Limeaceae	Subshrub	Perennial	Native	Least Concern	Least Concern
Monsonia nivea (Decne.) Webb	Mon.niv	Geraniaceae	Herb	Annual	Native	Least Concern	Least Concern
Panicum turgidum Forssk.	Pan.tur	Poaceae	Herb	Perennial	Native	Least Concern	Least Concern
Pergularia tomentosa L.	Per.tom	Apocynaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Phoenix dactylifera L.	Pho.dac	Arecaceae	Tree	Perennial	Native	Least Concern	Least Concern
Prosopis juliflora (Sw.) DC.	Pro.jul	Fabaceae	Tree	Perennial	Non-native	Not included	Least Concern
Salsola imbricata Forssk.	Sal.imb	Amaranthaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Sesuvium portulacastrum (L.) L.	Ses.por	Aizoaceae	Herb	Perennial	Non-native	Not included	Least Concern
Stipagrostis plumosa (L.) Munro ex T.Anderson	Sti.plu	Poaceae	Herb	Perennial	Native	Least Concern	Least Concern
Suaeda vermiculata Forssk. ex J.F.Gmel.	Sua.ver	Amaranthaceae	Shrub	Perennial	Native	Least Concern	Least Concern
Tribulus terrestris L.	Tri.ter	Zygophyllaceae	Herb	Annual	Native	Least Concern	Least Concern
Vitex agnus-castus L.	Vit.agn	Lamiaceae	Shrub	Perennial	Non-native	Not included	Least Concern
Ziziphus spina-christi (L.) Desf.	Ziz.spi	Rhamnaceae	Tree	Perennial	Native	Least Concern	Least Concern
Zygophyllum qatarense Hadidi	Zyg.qat	Zygophyllaceae	Shrub	Perennial	Native	Least Concern	Least Concern


Cornulaca monacantha Delile
Leptadenia pyrotechnica (Forssk.) Decne.
Heliotropium bacciferum Forssk.
Salsola imbricata Forssk.
Launaea procumbens (Roxb.) Ramayya & Rajagopal
Prosopis juliflora (Sw.) DC.



Figure 5.25 – Species Documented during the field Survey

5.5.2.4 Terrestrial Mammals

A total of three (N=3) mammal species were recorded during the survey period. The species observed are domesticated (i.e. Dromedary Camel) and highly adapted to anthropogenic activities species (i.e. Arabian Red Fox). In addition, the two individuals of the Arabian gazelle (*Gazella arabica*) were directly sighted at line transect (TE-8). Male gazelle (are generally larger and heavier with larger horns while females are lighter, smaller in size with smaller horns. The said species is classified as vulnerable based on UAE and IUCN Red Lists. However, indirect evidence of fauna activity, such as animal tracks, and inactive burrows have been observed from the project area (Figure 5.26). Grazing was evident on herbaceous graminoids, such as on (*Cyperus conglomeratus)* within the project area.

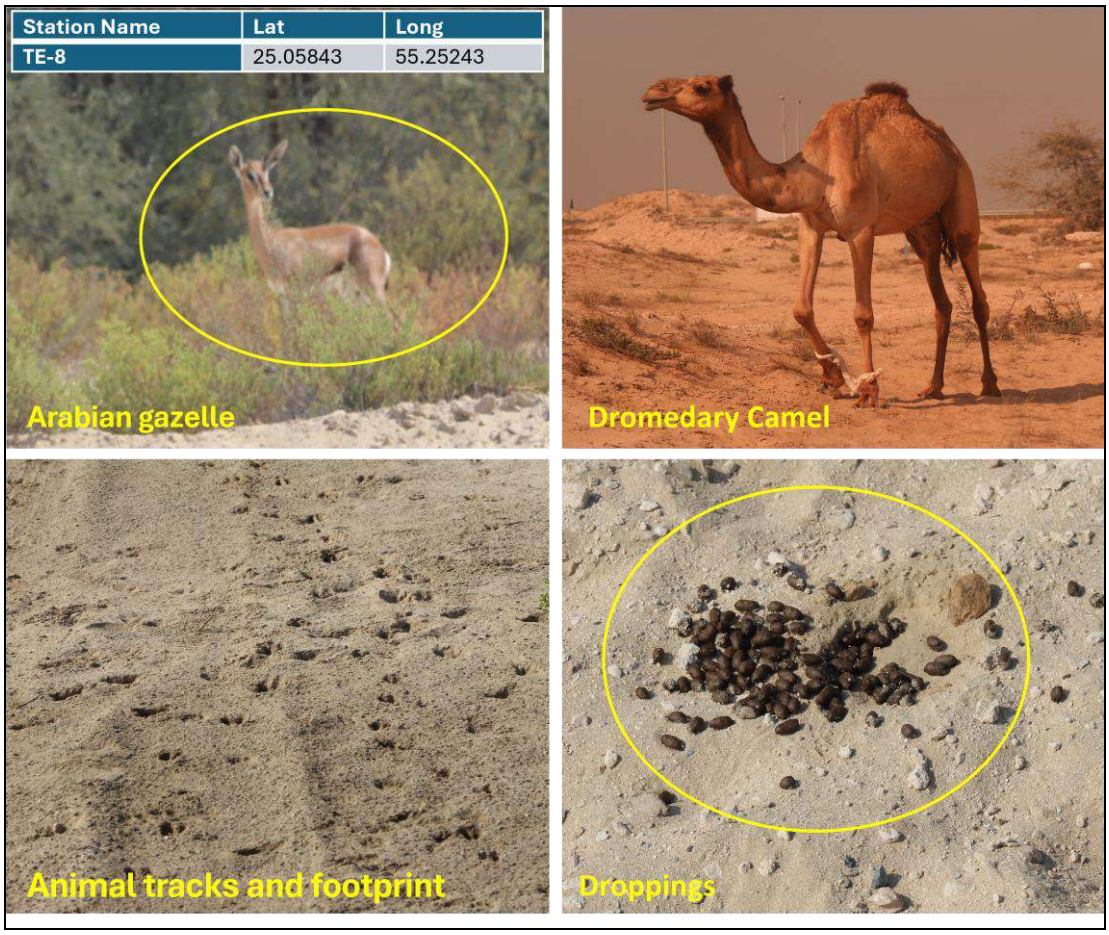


Figure 5.26 – Indirect Evidence of Fauna recorded in the Project area

The Arabian Red Fox (*Vulpes vulpes arabica*) was recorded in the installed camera traps within the project area one locations (CT-2) during nighttime (see Figure 5.27). Arabian Red Fox is predominantly nocturnal and, venturing out to forage during the cooler hours of the evening and night. Arabian Red Fox is well-adapted to living in human-populated areas and has benefited greatly from development activities. The diet of Arabian Red Fox is generally variable, and they exhibit highly opportunistic behavior. These are also known to forage within rubbish dumps, litter, urban environments and predate on most native or introduced species. The sightings of this mammal are common throughout UAE. The UAE National and IUCN Red lists classify this species under “Least Concern” category.

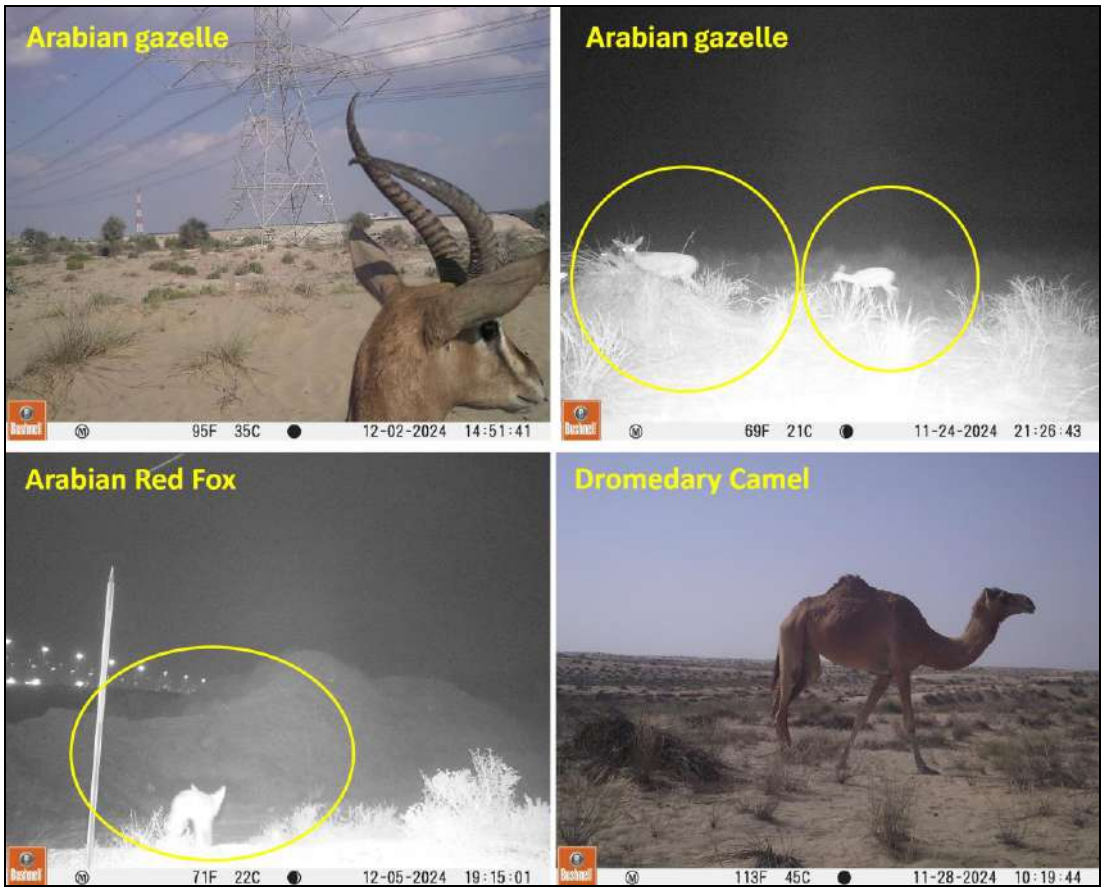


Figure 5.27 – Fauna species recorded in the Project area

5.5.2.5 Avifauna

A total of eight (N=08) avifauna species were recorded during the survey (see Table 5.11). Columbidae was the taxonomic family with the highest number of species (N=3), while the remaining five (N=5) families were monotypic (one species each) (Table 5.11).

Of the total recorded species, (N=5; 63%) of species were identified as native, while (N=3; 37%) of species were classified as feral/non-native to the region (Table 5.11). The common resident bird species such as Laughing dove (*Spilopelia senegalensis*) and Collared dove (*Streptopelia decaocto*) were frequently sighted during the survey period in the project area. However, regional near–endemic species i.e., *Merops cyanophrys* was occasionally spotted throughout the field survey.

Out of the reported native species, one species House sparrow (*Passer domesticus*) is native but considered to be problematic pest bird to the UAE (El-Shafie and Abdel-Banat, 2018). This species has an extremely large extent/range (<20,000 km^2) and are very common/frequently sighted.

During the field survey, non-native bird species such as *Acridotheres tristis*, *Corvus splendens*, and *Columba livia* were common/frequently sighted during the survey period in the project area. The documented non-native species are known to colonize human settlements and can dwell in both urban and rural habitats that have been impacted by human activities. These species typically consume seeds of weeds and grains, but they are also adaptive and opportunistic feeders that make use of any available food (Hart et al. 2020). Hence, the worldwide populations of all these species are expanding.

The reported birds were either solitarily or in pairs, feeding, roaming and resting within the project area. All the reported avifauna species are Least Concern according to the UAE National and IUCN Red Lists.

The checklist of recorded avifauna reported in the project area during field survey period is shown in Table 5.11. The pictorial representation of the avifauna species documented during the survey period is shown in Figure 5.28.

Table 5.11 – Avifauna species

Scientific name	Common name	Family	Nativity	Red list UAE	IUCN Red List
Acridotheres tristis	Common myna	Sturnidae	Non-native	Not included	Least Concern
Columba livia	Rock pigeon	Columbidae	Non-native	Not included	Least Concern
Corvus splendens	House Crow	Corvidae	Non-native	Not included	Least Concern
Cinnyris asiaticus	Purple sunbird	Nectariniidae	Native	Least Concern	Least Concern
Merops cyanophrys	Arabian Green Bee-eater	Meropidae	Native	Least Concern	Least Concern
Passer domesticus	House sparrow	Passeridae	Native/ Problematic pest	Least Concern	Least Concern
Spilopelia senegalensis	Laughing dove	Columbidae	Native	Least Concern	Least Concern
Streptopelia decaocto	Collared dove	Columbidae	Native	Least Concern	Least Concern



Figure 5.28 – Avifauna Species Documented during the Survey Period

5.5.2.6 Terrestrial Reptiles

During the survey period, one direct visual sighting of Hadramaut sand lizard (*Mesalina adramitana*) was recorded in the Sand sheets and dune with tree cover habitat type at line transect TE-6 (Figure 5.29). This lizard is small and slender, with a depressed body and head, a pointed snout, and is a common diurnal ground lizard that prefers sandy habitats (Carranza and Burriel-Carranza, 2021). This species is classified as 'Least Concern' on both the IUCN and UAE National Red Lists.

There were several small burrows observed during the survey period that were possibly burrows of small lizards (Figure 5.29). It is less likely to be burrows of Spiny-tailed Lizard (*Uromastyx aegyptia*), since this species can be usually found in gravel plains with stable substrate (de la Torre–Conservation et al. 2023). However, the existence of Hadramaut sand lizard suggests the possibility of occurrence of other small lizard species in the project area.

The common desert species, which are likely to be observed within the study area may include Common Sandfish (*Scincus mitranus*), Schmidt's Fringe Toed Lizard (*Acanthodactylus schmidti*), White-spotted Sand Lizard (*Acanthodactylus schmidti*), Arabian Toad Headed Agama (*Phrynocephalus arabicus*) Arabian Desert Gecko (*Bunopus tuberculatus*), and Dune Sand Gecko (*Stenodactylus doriae*). All the probable terrestrial reptiles that can be found in the project area are categorized as either Least Concern and Not Evaluated in IUCN and UAE's National Red List.



Figure 5.29 – Terrestrial Reptiles Documented during the Survey Period

5.5.2.7 Night Survey Results

A total of two (N=2) reptile species were recorded during the survey period. The species include Dune Sand Gecko (Stenodactylus doriae) and Baluch Rock Gecko (Bunopus tuberculatus), both of which are classified as 'Least Concern' on the UAE's National and IUCN Red Lists. These species were observed during the nighttime walkthrough survey and were predominately recorded in the Sand sheets and dunes with dwarf/shrub cover habitat types (see Figure 5.30).

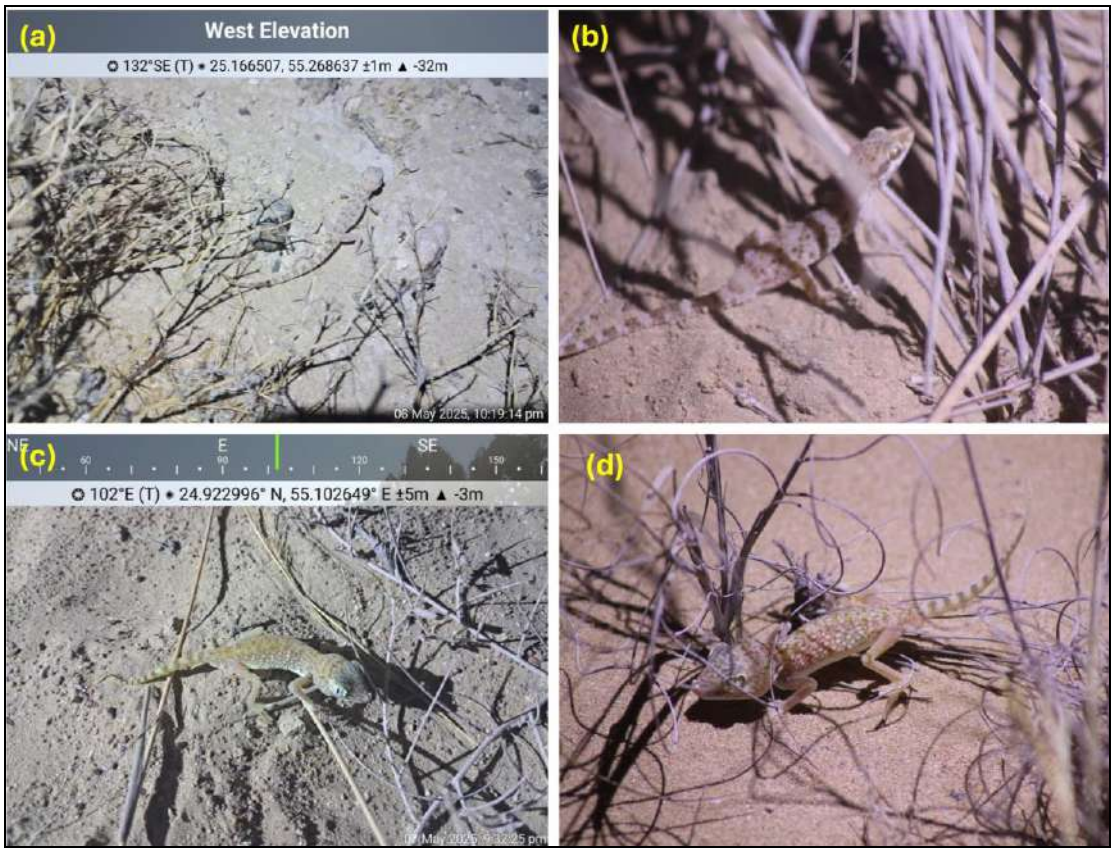


Figure 5.30 – Terrestrial reptiles documented during night survey (a, b) Bunopus tuberculatus (c, d) Stenodactylus doriae in the project area

5.6 Social Baseline Conditions

5.6.1 Are of Influence (AoI)

Area of influence (AoI) is defined in IFC PS1, as follows:

- the primary project site(s) and related facilities that the proponent (including its contractors) develops or controls, such as power transmission corridors, pipelines, canals, tunnels, relocation and access roads, borrow and disposal areas, construction camps.
- associated facilities that are not funded as part of the project (funding may be provided separately by the client or by third parties including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project;
- areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the ESIA is undertaken; and
- areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project.

In general, AoI is the "geographic area within which the physical elements, aspects, and facilities and construction and operational activities of a business activity are likely to generate social risks and impacts.' It is essentially the area outside the operational boundary of the facility that is occupied by the civilian population that could potentially be affected (directly or indirectly) by the implementation or operation of a proposed project.

5.6.1.1 AoI of the Project

In the context of the proposed Project, its AoI is mainly defined by the following (see details in the following discussions):

- Areas to be directly affected or within the footprint of the proposed Project. These areas are limited to the sites wherein the above ground facilities will be located (i.e., the location for shafts, such as launching, maintenance, pump, etc.) and there will be a total and permanent change in land use and loss of habitat, and any areas where temporary facilities would be constructed (particularly during the construction phase).
- Areas that could be affected due to environmental releases associated with the Project implementation, including potential releases during construction (i.e., dust) and operation (i.e., noise).
- The users of the roads that would be utilized during the construction and operation phases of the Project.
- Areas within the zone of theoretical visibility of the above ground facilities or where the plant facilities would be visible. This includes the potential glare issues that could affect air traffic that would be passing over the area.

Construction Phase AoI

Considering the nature of the proposed Project (i.e., underground sewerage tunnel), the actual above-ground disturbance during construction will mainly occur at the location of the proposed shafts (i.e., construction shafts, maintenance shaft, etc., see Table 3.6 and Figure 3.2). The activities that will take place in these areas will involve shaft excavations (with diameter ranging from 12 to 78 m) and installation of the above ground structure. It should be noted that these proposed shafts are mainly located adjacent to existing roads and highways and are within the defined utilities and services lines corridor (i.e., there are no residential areas or any civilian land-uses to be affected). A maximum land-uptake of about 100x100 m is expected at the location of each shaft.

In regard to the actual tunnel construction, considering its depth (i.e., 36 to 81 m below the ground), there are no social impacts or disturbance expected. The primary impact associated with the tunnelling activity is potential damage to any underground utilities/services lines and on the foundations of any above-ground structure along the route.

In terms of construction related environmental releases (such as noise, dust emissions, etc.), it is also expected to occur only at the locations of the proposed shaft. For this aspect, a maximum distance of 500 m from construction sites can be considered as potential area of influence.

In addition to the actual construction works within the Project sites, construction traffic could also result in impact existing road users. Traffic is a particular concern during the delivery of construction materials. In terms of the highways to be used for material delivery it is expected that the movement will be in accordance with permit requirements of Dubai Police and thus, no significant issue is expected.

Operation Phase AoI

During the operation phase, the sewerage tunnel system will not involve any activities that would extend outside the Project boundary. The primary factors that would influence the AoI during this phase is the odor generation that would be released at the shaft locations along the tunnel route. It should be noted, however, that appropriate odor control units will be installed at these locations in order to ensure that impacts related to public health and annoyance will be within minimum and acceptable levels.

In regard to visual impacts, the visible parts of the infrastructure is limited to the actual above ground structure of the shafts (i.e., shaft building structure. It should be noted, however, that these above-ground structures are minimal and will be fenced, thus, not expected to pose significant visual issues.

5.6.2 Social Conditions and Socio-economic Activities

5.6.2.1 Existing Land-uses

Figure 5.25 presents land-use map for the proposed sewerage tunnel route. The route starts from a proposed Vortex Drop Shaft (VDS-1A) that is located in Dubai Design District area in Dubai. The tunnel will subsequently traverse under the E44 and will turn southeast at the E44/D67 intersection. The tunnel will traverse undeveloped areas (mainly alongside internal roads in Mohamed Bin Rashid City, before eventually reaching D63 that it will traverse down to its intersection with E611. The tunnel will then traverse E611 down to Jebel Ali STP.

In general, the proposed tunnel will generally follow typical utility corridors that are adjacent to existing highways in Dubai (i.e., E44, D67, D63 and E611). The proposed route will not directly pass through any major residential area nor any particularly sensitive infrastructure. In terms of the proposed shafts, the general area of each site is assessed to be fully developed and disturbed and surrounded primarily by residential areas with commercial establishment and community facilities. Table 5.12 provides a summary of the existing land-uses within the vicinity of the proposed shaft locations along the route based on the results of the site visits undertaken in 26th to 28th March, 9th to 11th April and 1st and 2nd May 2025 (see details of land-uses in Annex 3).

Table 5.12 – Existing Land-uses in the Vicinity of the Proposed Tunnel VDS and MS

Shaft	Location	Description	Existing Land Uses	Distance
CS-10	Jebel Ali Free Zone South	Located along Sheikh Mohammed Bin Zayed Road (E311) and several commercial and industrial establishments	Jebel Ali Free Zone South (industrial and commercial)	~300 m to the north, northwest, west, and northeast
			Logistics City (industrial)	~600 m to the south, southeast, and east
			Vacant land	~400 m southwest
CS-9	Jebel Ali Free Zone South	Located along Sheikh Mohammed Bin Zayed Road (E311) and several commercial and industrial establishments	Jebel Ali Free Zone South (industrial and commercial)	~200 m to the north, northwest, west, and southwest
			E311 Sheikh Mohammed Bin Zayed Road (infrastructure)	~700 m to the south
			Expo Village (residential)	~600 m to the southeast and east, and northeast
CS-5	Al Selai: Dubai Wholesale City Extension	Located in a vacant area adjacent to a sewage treatment plant	Jebel Ali STP (industrial)	400 m – 500 m to the north, northeast, northwest
			Vacant area	100 m to the east, southeast, south, and southwest
CS-4	Al Selai: Dubai Wholesale City Extension	Located along E611 Emirates Road	E77 Expo Road and E611 Emirates Road (infrastructure)	~600 m to the north
			Palace (residential/ VIP)	~1 km to the east
			Vacant area	~300 m to the southeast and south
			The Villages Dubai South (residential)	~300 m to the northwest, west, and southwest
CS-3/RS	Arabian Canal City Phase II	Located along E611 Emirates Road	Remraan (residential)	~900 m to the north and northwest
			The Oasis by Emaar – under construction	~600 m to the west and southwest

Shaft	Location	Description	Existing Land Uses	Distance
			(residential)	
			Vacant area	~100 m to the south, southeast, and east
			E611 Emirates Road and vacant area	~100 m to the northeast
CS-3A/RS	Al Barsha South 3	Located along a strip of vegetation and major roads	Al Barsha South 3 (mixed-use – residential, commercial, and education)	~100 m to the northeast and east
			North Anglia International School – Al Barsha South 3 (education)	~800 m to the north
			Business Park Motor City (commercial)	~450 m to the southeast
			Sports City Interchange and E311 Sheikh Mohammed Bin Zayed Road (infrastructure)	~450 m to the south and southwest
			Jumeriah Village Circle (residential and commercial)	~600 – 700 m to the west and northwest
CS-2A/RS	Mohammed Bin Rashid City	Located along D63 Umm Suqeim Road and in a vegetated area	Construction offices and vacant area	~350 m northeast
			Vacant area with sparse vegetation	~200 m to the east
			Arabian Ranches Interchange and E311 Sheikh Mohammed Bin Zayed Road (infrastructure)	~200 – 400 m to the south
			Arabian Ranches (residential)	~700 m to the southeast
			Arjan – Al Barsha (residential)	~350 m to the west
			Vacant area	~500 m to the north
			Arabian Ranches Interchange and E311 Sheikh Mohammed Bin Zayed Road (infrastructure)	~400 m – 900 m to the southwest
MS-34 CS/RS	Mohammed Bin Rashid City		Dubai Hills Estate (residential, recreational, and commercial)	~500 m to the north and ~1.7 km to the west
			Vacant area	~100 m to the west
			Vacant area with patches of vegetation	~600 m to the south ~400 m to the southeast ~700 m to the northeast
MS-31, MS-31 (CS/RS)	Mohammed Bin Rashid City	Located in a vacant area near 34th Street (D67). Several transmission lines are also observed near the location of the shaft.	National Power Construction (construction)	~200 m to the south
			Construction sites (various)	~600 m to the south
			Substation (utility)	~300 m to the east
			Construction site (construction)	~500 m to the northeast

Shaft	Location	Description	Existing Land Uses	Distance
			Al Quoz 2 (residential)	~750 m to the north
			Al Quoz Industrial Area 2 (residential, offices, and industrial) and E44 – Al Khail Road (infrastructure)	~700 m – 1 km to the west
			E44 and D67 roads (infrastructure)	~700 m to the northwest
MS-3	Al Quoz 2	Located outside a residential house and along E44 (Al Khail Road).	Ghadeer Al Tair Lake – Al Quoz Pond Park (waterbody and recreational)	~1 km to the northeast
			Al Quoz 1 (residential and commercial)	~700 m to the northwest
			Al Quoz 2 (residential)	~5 m to the north
			Al Quoz 2 (residential)	~40 m to the south
			Al Quoz 4 (residential)	~400 m to the west and southwest
			Al Kahil Heights	~800 m to the west
MS-1/RS	Dubai One Tower Precinct	Located in a sparsely vegetated strip of land. It is along E44 (Al Khail Road) and Financial Center Road.	Bay Square (residential and commercial)	~700 m to the northwest
			Holiday Inn Hotel, Hilton Garden Inn (hospitality)	~800 m to the west
			MBR District One (residential/commercial)	~1 km to the southwest
			Vacant lot	~200 m to the south
			Paramount Hotel (hospitality)	~700 m to the northeast
			Vacant lot	~500 m to the east
			Vacant lot and patches of vegetation	~400 m to the east
CS-1	Dubai Design District	Located along E44 (Ras Al Khoor Road) and adjacent to Merkadh Power Station, which is in a vacant area.	Merkadh Power Station (industrial)	~70 m to the north
			E44 Ras Al Khoor Road Road (infrastructure)	~80 km to the south
			Sobha Hartland (residential and commercial)	~250 – 900 m to the south and southeast
			Azizi Riviera (Residential)	~1 km to the south
			Dubai Design District Phase 1 (commercial)	~850 m to the northwest
			Bu Khadra Interchange (infrastructure)	~800 m to the east and northeast
			E66 Oud Metha Road (infrastructure)	~940 m to the northeast
			Al Zabeel creek extension (waterbody)	~880 m to the north
			E44 Ras Al Khoor Road Road (infrastructure)	~260 m to the west

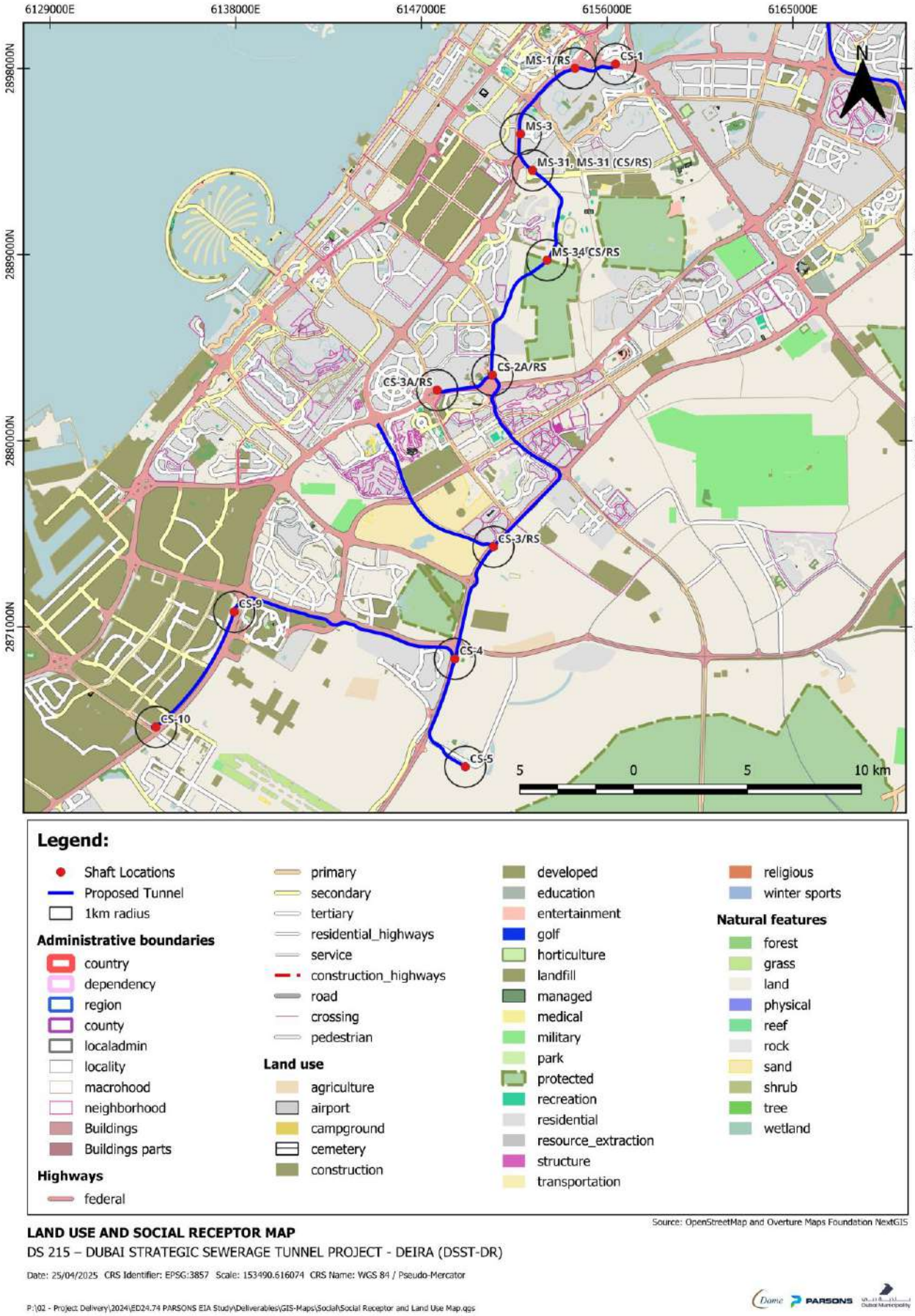


Figure 5.31 – Land-use Map for the Proposed Sewerage Tunnel Route

5.6.2.2 Socio-economic Activities

Dubai is generally considered as key world, trade, commercial and tourism hub. Most of the Emirate's GDP is non-oil based with significant contributions from finance, real estate, and logistics.

The proposed sewerage tunnel will generally run under highly developed areas in Dubai and will pass adjacent to major residential areas. There are, however, areas along the where commercial and industrial activties are present (i.e., malls, airports, small to medium scale industrial establishments/warehouses, public transport facilities, etc.). Nonetheless, considering the nature of the proposed Project (i.e., underground sewerage tunnel), its implementation is not expected to directly affect any socio-economic activities along the proposed route. As previously noted, the proposed route is generally adjacent to major roads and highways, which is typically allocated for public utility lines and under infrastructure. The proposed shafts locations are also located on vacant areas within utility corridors and thus, the construction will not result in any direct effect to any civilian activties.

5.6.2.3 Description of Nearest Residential Areas

In terms population, it is estimated in 2024 that Dubai has a total of 3,863,600 that is comprised of 2,647,900 males and 1,215,700 female. Similar to UAE population in general, Dubai population is primarily comprised of expatriates (i.e., 3,564,000 or about 92%). The Emirates local population is estimated at 299,600 (about 8% of the total) in 2024. Considering the metropolis area of 4,114 km^2, the Emirates current population density can be estimated as about 940 capita/km^2.

In regard to the proposed Project, the residential areas where the proposed shafts will be in close proximity are primarily comprised of residential villas. These communities are located at the primary residential areas of Dubai, including luxury residential areas.

In general, the actual population composition is a mixture of UAE nationals (house owners owners) and expatriates' workers (household workers, including farm caretakers, drivers, etc.). In terms of household workers, it is comprised mainly of middle-aged female of Asian and African descent (except for drivers and maintenance workers that are mainly middled-aged males). The following provides the 2023 population in the nearest residential areas to the Project route (Dubai Statistics Center, dsc.gov.ae):

- Al Barsha 3 – 16,751 with population density of 3,386.2 person/km^2
- Al Qouz First – 23,088 with population density of 6,465.1 person/km^2
- Ghadeer Al Tair – 6,103 with population density of 1,197.8 person/km^2
- Al Merkadh – 15,718 with population density of 1,517.9 person/km^2
- Al Barsha South 2 – 8,251 with population density of 1,730.7 person/km^2
- Al Barsha South 4 – 34,010 with population density of 4,999.1 person/km^2
- Wadi Al Safa 7 – 10,304 with population density of 1,152.9 person/km^2
- Al Hebiah 6 – 2,730 with population density of 835.3 person/km^2
- Al Hebiah 5 – 11,668 with population density of 1,441.7 person/km^2
- Madinat Al Matar – 16,193 with population density of 114.2 person/km^2
- Dubai Investment Park 1 – 63,392 with population density of 3,692.7 person/km^2

UAE, in general, has a unique socio-cultural characteristic, primarily due to the structure of its population that is dominated by expatriates (majority are male expatriates). The Emirati culture is generally based on Arabian culture, with influences from both East Africa and Indian subcontinent region (Hurriez, Sayyid Hamid, 2013).

The religion of Islam, the country's official religion has major influence on local culture, including architecture, music, attire, cuisine, and lifestyle. Nonetheless, the country values tolerance and also allows practice of other religion, which consequently influences local socio-cultural dynamics. The relatively modern and technological advance lifestyle in the country also influences its socio-cultural perspective. The country also has a high-quality social infrastructure, including healthcare, education, subsidized electricity, water, etc. The socio-cultural characteristics are a blend of natural and cultural heritage associations.

6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

6.1 Environmental Impact Assessment

6.1.1 Ambient Air Quality Impact Prediction and Evaluation

The potential impact of air emissions during construction phase is dependent on the proximity of air sensitive receptors (ASRs) to the emission sources. An ASR is "any residence, building or location occupied or frequented by persons who, due to age, infirmity or other health-based criteria, may be more susceptible to the deleterious effects of a toxic air pollutant than the general population including, but not limited to, elementary and secondary schools, day care centres, playgrounds and parks, hospitals, clinics and nursing homes" (SIP – IDAHO – 58.01.01.007).

The impacts on sensitive receptors will vary throughout the Project implementation. These receptors include developments near the shaft locations (i.e. the only areas of active groundworks), primarily along existing highways, as well as road users and individuals (visitors, employees) in the vicinity. Air quality impacts from the proposed Project construction works will mainly from activities such as excavation, earthworks (i.e., site preparation for shafts construction), temporary lay down areas, stockpiling & material handlings etc. and from the operation of construction vehicles / equipment.

6.1.1.1 Ambient Air Quality Impacts during Construction Phase

Dust Emissions during Construction Phase

Dust emissions during the project's implementation will primarily result from earth movement during site preparation for shafts construction and temporary lay down area including excavation, grading, etc., vehicle movement on unpaved roads, materials stockpiling, and loading/unloading activities. These emissions are expected to vary daily and hourly, depending on construction intensity, equipment used, and meteorological conditions such as wind speed and direction. In addition to the shaft construction works, link sewers and their associated components may also contribute to dust generation mainly during excavation, pipe laying, and backfilling activities.

Also, dust re-suspension is expected, particularly, when the earth-moving activities will be undertaken as part of decommissioning, including the removal of existing utilities such as the relevant existing pump station.

During the decommissioning of the pumping stations, the following activities may temporarily impact air quality levels:

- Operation of diesel-powered machinery and equipment
- Handling and transport of waste materials.

Construction-phase impacts on ambient air quality are expected to be temporary and localized, confined to the immediate vicinity of the project site. Dust generated will largely consist of large-diameter particles (>100 µm), which tend to settle within 6–9 meters of the emission source at typical wind speeds (16 km/h, per USEPA AP-42). Consequently, the effect of dust emissions on air quality is expected to remain localized and limited.

The limited number of construction vehicles and equipment, coupled with phased implementation of activities, will further minimize dust generation. Impacts are expected to be short-term and intermittent, varying with the scale of work and prevailing weather conditions. Adverse dust impacts during the construction phase will be temporary, limited to shaft construction. Although the excavation of sand during shaft construction may lead to significant localized dust generation, the application of dust control measures will mitigate cumulative impacts. Effects on nearby residences will depend on meteorological conditions

(e.g., wind speed and direction). Any temporary increase in suspended particles is not anticipated to pose significant environmental or health risks, provided recommended control measures are implemented.

It is essential that appropriate dust control measures are strictly implemented to ensure that cumulative effect will be at minimum. The recommended mitigation measures are discussed in Section 6.1.2 of this Report. Considering appropriate implementation of the recommended measures, impact of dust generation is considered to be temporary and will not be significant.

Combustion Emissions during Construction Phase

Gaseous emission during Project construction phase (i.e., including NOx, SO_2, CO, and particulates) will be the mainly from the heavy equipment, construction equipment, by vehicles hauling construction materials, supplies, equipment and personnel to the construction site and construction materials laydown area. Construction equipment will mainly include heavy equipment, such as tower cranes, boring machine, shaft gantry crane, trailer compactors, and graders (actual number of units to be defined by the contractor) etc., Heavy equipment will be primarily used during site grading and preparation activities. Temporary diesel generator sets contribute also to the gaseous emission of pollutants during construction. Link sewers and its associated components construction activities are expected to contribute similarly to the construction related emissions described above.

In addition, heavy equipment used during decommissioning activities, including the removal of existing utilities such as the relevant existing pump station. Use of machinery and transport vehicles may lead to a temporary increase in gaseous emissions, but these are expected to remain within permissible ambient air quality standards due to the limited scale and duration of activities.

NOx is expected to be the main gaseous emission during construction phase. NOx is generally the pollutant of concern in diesel engines due to the high temperatures in the fuel combustion processes that cause the nitrogen in the air to oxidize. The emissions of SO2 will be dependent on sulfur content of fuel, which is expected to be low considering the low sulfur content of diesel in the UAE. Other emissions (CO and particulate) are mainly dependent on combustion efficiency and equipment condition. The quantity of gaseous emissions is dependent on the number of combustion sources to be deployed onsite and corresponding hours of operation. It should be noted that construction contractor is not yet appointed and thus, the actual fuel generation for the combustion units are not yet available.

Given the quantity of on-site construction equipment and movement of construction vehicles will be limited to shaft construction site to be implemented in phases any potential impacts of gaseous emissions are considered to be generally small and localized. For the stationary sources of emissions such as diesel generator sets, potential impacts to ASRs can be controlled through ensuring proper maintenance regimes, careful site location and keeping appropriate distance (i.e., downwind of ASRs). For instance, any temporary facilities (i.e., laydown areas, offices), should be sited as far as practicable from any nearby potential receptors.

Based on the above, considering that the Project activities are temporary, any impacts from gaseous emissions are generally intermittent, small scale, reversible and will have only temporary localized effects on air quality, not expected to cause significant deterioration. Best practice and other measures to ensure that potential impacts from gaseous emissions will be at minimum are provided in Section 6.1.1.4 of the ESIA Report (Mitigation Measures).

Fugitive/Odor Emissions

Considering the nature of the proposed Project construction works, any fugitive emission from chemical and waste handling will have generally localized impact on air quality as the quantity that will be emitted is not expected to be significant and can be easily dispersed. The actual emissions during the construction of the Project cannot be quantified as the total amount of chemical to be used is not yet known at the time of preparation of this ESIA. It should be noted fugitive emissions are released at ground level and at relatively low velocity, the primary receptors of these emissions are the construction personnel that will be involved in the application. Given the waste materials from sanitary facilities and temporary site areas should be removed regularly, emission of foul odor from the area will not be envisaged. Any emission of foul odor will be diluted due to the wind and will not adversely impact any existing ASRs.

During the decommissioning of the pumping stations, the following activities may temporarily impact odour levels:

- Removal and cleaning of wastewater-contaminated infrastructure
- Disturbance of residual sludge and organic material

These temporary odour release may occur during the cleaning and removal of wet wells, sludge, and associated pipelines. Odour intensity will vary based on the state of residual organic matter, weather conditions, and proximity to sensitive receptors (residences, schools, etc.). It should be noted that no long-term odour impacts are expected post-decommissioning, as all sewage will be redirected through the new deep tunnel network. However, short-time instantaneous odor emissions can still occur and may be significant, although temporary. These emissions have the potential to result in community complaints, particularly where activities occur near sensitive receptors. Odor intensity and dispersion will vary based on:

- The condition and composition of residual organic materials
- Meteorological factors (e.g. wind direction, humidity and temperature)
- Proximity to and density of nearby sensitive receptors

Nonetheless, best practice and other measures to ensure that potential impacts from gaseous emissions will be at minimum are provided in Section 6.1.1.4 of this ESIA Report (Mitigation Measures). Through the implementation of these mitigation strategies, the potential for both prolonged and short-term nuisance odour impacts will be minimized to the greatest extent practicable.

6.1.1.2 Ambient Air Quality Impacts during Operation Phase

As previously noted, the proposed Project is construction and operation of sewer line and terminal pumping station. The applicable Project activity during operation will be only limited to infrequent maintenance and repair works, as required. During operation, the source of air quality impacts is mainly odor from installed odor control facilities (OCF) to be located at terminal pumping station and along the tunnel alignment. In addition, operation of standby fuel turbine will used as backup power sources during emergencies or when the primary power supply fails. The standby turbine generators will be used intermittently, primarily for backup power during emergency situations. As such, the environmental impact of these generators is not significant due to their limited operational time. The intermittent use of the turbines ensures that their fuel consumption, emissions (NOX, CO, PM, CO2) are minimized. Any impacts from gaseous emissions are generally intermittent, small scale, reversible and will have only temporary localized effects on air quality, not expected to cause significant deterioration. Nonethless, with appropriate mitigation measures, emission can be minimized to ensure compliance with environmental standards.

Odor emissions from sewage result from the anaerobic decomposition of organic matter containing sulfur and nitrogen, releasing gases such as H_2S, NH_3, CO_2, CH_4, and trace organic vapors (e.g., indoles, skatoles, and mercaptans). Among these, H_2S and NH_3 are the most significant malodorous gases.

The potential impacts of odor emission during the operation of the OCF were assessed through air dispersion modeling using AERMOD in the EIA report and the review & approval process are ongoing at the time of development of this report. Hence not discussed further.

Please note that as airflow within the sewer tunnel will increase over time, the concentrations of odor-causing substances such as hydrogen sulfide (H_2S) and ammonia (NH_3) will naturally dissipate. In addition, installation of advanced biological odor control systems to handle anticipated odor loads during both the start-up and ultimate flow phases of the project. These systems will be engineered to process and neutralize odor emissions effectively, ensuring compliance with established treatment requirements. Even during peak flow conditions, when odor loads are at their highest, the systems are capable of maintaining efficient performance.

Given the progressive decrease in odour concentrations due to increased airflow, the high efficiency of the biological odour control systems, odour impacts during the Project's operational phase are expected to be minimal and effectively managed through appropriate design and mitigation measures.

Cumulative Impacts

The potential impacts on air quality during the construction phase of the Project are not expected to result in significant cumulative impacts. Although, the construction activities may generate dust, its impacts will generally be short term and reversible. The implementation of standard dust control measures is also expected to appropriately control dust generation to acceptable level.

During the operational phase of the proposed Project, odour emissions from the pumping station are expected to be effectively managed through the implementation of well-designed odour control systems, best practices in odour management, and effective monitoring. While there is an existing background odour from the STP, the additional contribution will be addressed through appropriate design and operational controls to ensure that cumulative odour impacts remain within acceptable limits for surrounding sensitive receptors.

6.1.1.3 Ambient Air Quality Impacts during Decommissioning Phase

The potential ambient air quality impacts during the implementation of the proposed Project are generally similar to the construction phase, which will include dust generation and emissions from equipment and vehicles to be deployed during this stage. The actual magnitude of impacts from these sources will be dependent on actual activities to be undertaken (i.e., for dust generation, rate of emission would be dependent on actual ground disturbance, such as any need for grading). This is similar to equipment and vehicular emissions, which will be mainly dependent on the type of sources (could include trucks, generator sets, support vehicles, etc.) and number of units to be deployed.

Considering that the decommissioning will happen after the design life of the facility (in 120 years), the actual impacts cannot be accurately identified and assessed at this stage. Thus, to ensure that specific measures would be defined in line with most recent environmental regulations, it is recommended that the potential ambient air quality impacts during decommissioning phase be assessed in a separate study that should be conducted for this phase of the Project. Accordingly, mitigation measures should be defined in an appropriate Decommissioning Environmental and Social Management Plan (DESMP).

6.1.1.4 Mitigation Measures

Table 6.1 presents the proposed mitigation measures to address the potential ambient air quality impact during the construction and operation phase of the Project. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.1.5 of this ESIA Report.

Table 6.1 – Mitigation Measures addressing Potential Ambient Air Quality Issues

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
1	Dust Generation	• Good site practices, including minimization of material drop heights, should be implemented. • Dust suppression should be undertaken. Covering or damping (spraying) with water of exposed stockpiles of soil or other materials that could result in dust release due to wind. • Apply eco-friendly polymer emulsions to bind soil particles, reducing dust emissions and improving surface stability in unpaved areas. • Install geotextile fabrics with gravel overlay (where feasible) to reinforce unpaved roads and reduce dust dispersion from vehicle movement • Covering of lorry loads and minimizing material drop-height during loading/unloading. • All temporary roads leading to active areas will be regularly sprinkled with water to avoid further road dust emission. • Application of wind barriers including solid board fence, burlap fences, and other similar materials in the areas such as material stockpiles, excavation activity etc., • Avoid dust generating activities during excessively windy periods. • Minimize storage time of materials on site. • Cover and protect stockpiles from wind. • Regularly inspect exposed work areas and construction work practices. • Provision of temporary fences around the active sites, to serve as wind barrier thus minimizing blowing of dust on open areas during strong wind events. • Lay down areas will be provided with hardstand surface. • Provision of appropriate PPE (e.g. safety mask, safety glasses) for the construction workers, to be worn especially during the operation of dust generating activities. • Apply dust suppression (e.g., water spraying) during demolition	During the entire duration of the Project construction works	Construction Contractor
2	Gaseous Emissions	• Implementing a proper inspection and maintenance program to ensure that vehicles and machinery operate and run efficiently • Low sulphur fuel will be used in accordance with relevant UAE regulations. • Vehicles and machinery should be turned off	During the entire duration of proposed Project construction works	Construction Contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
		when not in use. • Generator sets should have appropriate stack emission height to allow proper dispersion. • Temporary site facilities (laydown areas, site offices) with stationary emission sources should be sited downwind and as far as practicable from identified ASRs. • Diesel to be used must comply with the UAE quality on low sulphur content of 0.05% or 500 ppm. • Using the best available techniques like catalytic converters, improved and better performance engines, and diesel particulate filters.		
3	Fugitive/Odor Emissions	• The waste materials from sanitary facilities and temporary site areas should be removed regularly • Segregate waste streams to ensure proper disposal and minimize risks of emissions or leaks. • Secondary containment systems (such as bunded areas or spill trays) should be used for storing fuel/liquid chemicals. • Spill response plan for chemical spills or leaks to ensure containment and to minimize emission	During the entire duration of proposed Project construction works	Construction Contractor
Operational Phase				
1	Odor Emission	• Effective design of odor control systems and installation • The sewer line/terminal pump station should be equipped with odor control units. • The odor control units should be regularly maintained in accordance with the manufacturer's specifications to ensure efficiency. • Implement a proper inspection and maintenance program. • A comprehensive odor management plan (OMP) must be developed including contingency measures for odor control system failures or unexpected emission during Project implementation. • Consider the inclusion of redundant odor control units (OCUs), in line with international best practices, such as those implemented in Singapore and London. • All OCUs shall equipped with real time monitoring systems measuring both concentration and flow and should be connected to DECCA's air quality monitoring network	During Operational Phase	Dubai Municipality (DM) and/or DM appointed contractor
2	Operation of emergency standby gas	• Use of low-emission fuels (e.g., natural gas). • Installation of selective catalytic reduction systems to reduce NOx emissions.	During Operational Phase	Dubai Municipality (DM) and/or DM appointed contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
	turbine generators	• Installing low-NOx combustion burners in the turbines can reduce the formation of NOx during combustion • Regular maintenance and tuning of turbines to ensure optimal performance and minimal emissions		
Decommissioning Phase - odor				
1	Odor Emission	• Re-cleaning of wet wells using vacuum tankers with odor containment • Implementation of rapid containment and removal procedures for exposed sludge or organic matter • Use of odor neutralizing sprays or activated carbon filters during de-sludging • Scheduling works during favorable meteorological conditions (e.g., avoiding temperature inversions) • Advance notification and communication with the local community to manage expectations	During decommissioning Phase	Decommissioning Phase contractor

6.1.1.5 Monitoring Program for Air Quality Impacts

Table 6.2 presents the proposed ambient air quality-monitoring program during the implementation of the Project. This monitoring program is deemed sufficient to address any potential cumulative and residual ambient air quality impacts. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.2 – Ambient Air Quality Monitoring Program

Monitoring Requirement	Frequency	Implementation	Corrective Action	Responsibility
Construction Phase				
Visual dust monitoring of the entire project site, in particular access roads and active construction site.	Daily	Entire duration of construction works	In case of high dust generation, sources should be identified and rectified: - Conduct water spraying of the source; and - If dust is from a materials stockpile, the need to provide cover or reduce height should be identified. As necessary, work in relevant areas should be stopped until dust suppression is completed.	Construction Contractor
Dust monitoring (i.e. using a hi-volume sampler or an equivalent device) should be conducted in response to specific complaints at the location of sensitive receptors.	As required (in case of complaints)	Entire duration of construction works		
Visual monitoring of smoke emissions from vehicles and other construction equipment.	Daily	Entire duration of construction works	In case of black and opaque smoke, the vehicle/equipment operation should be stopped and sent for maintenance	
Equipment/vehicle emissions testing	As required by permit	As required by permit	Replace equipment or vehicles not complying with limits	
Operation Phase				
Periodic odor monitoring at Nearest ASR from each odor control	Periodic (yearly)	Operation	In case of exceedances, necessary repairs should be	Dubai Municipality (DM) and/or

Monitoring Requirement	Frequency	Implementation	Corrective Action	Responsibility
facilities. All OCUs shall equipped with real time monitoring systems measuring both concentration and flow and should be connected to DECCA's air quality monitoring network			carried out.	DM appointed contractor

6.1.2 Marine Water Quality Impacts Prediction and Evaluation

The Project site is about 5 km away from the coastal area of Dubai. In addition, during the construction and operation phases, there are no aspects of implementation that will have direct or indirect effects on marine waters (i.e., no effluent discharge into the marine waters). Thus, this aspect is scoped out in the ESIA study.

6.1.3 Waste Management Impacts Prediction and Evaluation

6.1.3.1 Waste Generation during Construction Phase

Solid wastes generated from proposed ground & earth works activities and temporary laydown areas and decommissioning works including utilities removal & demolition can be divided into three (3) main categories: general construction waste, domestic waste and hazardous waste. Construction waste is a key issue in Dubai and in the UAE as a whole, as it dominates the solid waste generation in the Emirate (i.e. it accounts for more than 95% of solid waste generated in the second quarter of 2024 based on Dubai Statistics Centre data).

Domestic wastes generated on-site mainly include food containers such as beverage cans, coffee cups, paper bags and plastic/aluminium wrappers. The volume of domestic waste generated is dependent on the number of construction personnel to be deployed on site. It should be noted, that actual waste generated on site will be lower since the construction workforce will be accommodated offsite and will not spend many hours on site. The actual domestic waste to be generated at site will be minimal.

General waste (non-hazardous) includes excess excavated material (known as "muck")), loose materials products, over-ordering, damaged and spoiled materials, left over items and scraps, used materials including cement, concrete, wood, non-hazardous equipment parts, and other materials used to transport, metal scraps, steel, pipe and electrical cuttings, waste from temporary site offices on-site, package construction materials, and equipment. The volume of general wastes to be generated during the proposed project activities cannot be estimated but could be significant if not properly controlled. Hazardous wastes to be generated during the construction phase will mainly include slurry produced as a by-product of the pipe-jacking activities, maintenance waste such as used lubricants and oil, empty containers of chemicals and paint, oil-soaked rags, oil contaminated materials, paint, used batteries, etc.,

In order to properly manage the waste to be generated as part of construction it is essential to develop a Project-specific Waste Management Plan (WMP). The WMP should include waste management hierarchy – avoidance, minimization, reuse, recycling, treatment and disposal, and should be developed in accordance with the requirements of DM. Provided that a WMP will be developed and strictly implemented; the environmental impacts associated with construction waste are not expected to be significant. Details of the proposed WMP are provided in Section 6.1.3.3 of this Report.

6.1.3.2 Waste Management Impact during Operation Phase

During the operation of the proposed sewer line and TPS, which involves no manufacturing, waste generation is expected to be minimal. Most waste will arise during infrequent maintenance activities. Types of waste anticipated include:

- Effluent from odor control facilities, which may require treatment depending on its composition
- Spent filter media from air or water filtration systems (periodic replacement)
- Collected solids from screen bars at terminal pumping stations
- Discharges and sludge from water treatment processes
- General maintenance waste such as cleaning residues, used personal protective equipment (PPE), and debris

All generated waste will be handled, stored, and disposed of through licensed waste contractors in accordance with DECCA regulatory requirements. An operational waste management plan will be developed to detail waste types, volumes, storage methods, and disposal method.

Cumulative Impacts

The volume of waste to be generated during the implementation of the Project will add to the total volume of waste generated in Dubai. However, expected waste generation of the development is not expected to significantly affect existing infrastructure. In addition, the existing waste management practices and regulations in the Emirate and the measures to be implemented as part of the Project implementation are deemed sufficient to appropriately handle the potential waste management issues. As such, cumulative impacts are expected to be minimal and not significant.

6.1.3.3 Waste Management Impact during Decommissioning Phase

Considering that the decommissioning will happen after the design life of the facility (in 120 years), the actual impacts cannot be accurately identified and assessed at this stage. Thus, to ensure that specific measures would be defined in line with most recent environmental regulations, it is recommended that the potential waste management impacts during decommissioning phase be assessed in a separate study that should be conducted for this phase of the Project. Accordingly, a specific decommissioning phase WMP should be developed.

6.1.3.4 Mitigation Measures for Waste Management Impacts

Table 6.3 presents the proposed mitigation measures to address the potential waste generation and management impacts during the Project implementation. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.3.5 of this ESIA Report.

Table 6.3 – Mitigation Measures addressing Potential Waste Management Issues

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
1	Construction works & Decommissioning works - Waste Generation	A project-specific WMP for the construction and decommissioning works should be developed. This plan should include the following measures, as minimum: • Provision of sufficient number and size of waste bins and skips at strategic locations within the work sites and temporary facilities (site offices). These waste containers should have appropriate lid/cover. • Establishment of a designated temporary storage area at the site provided with impervious flooring. • Waste segregation scheme that includes labelling and color coding of waste bins	During the entire duration of Project construction works	Construction Contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
		and skips. • Provision of signage encouraging waste reuse and recycling of waste. • Waste re-use and recycling scheme. The types of waste that can be reused and recycled should be identified. • Prohibit burning of waste and no waste to be disposed of or buried onsite. • Waste generated on site should be disposed through a licensed waste contractor (DM-approved waste contractors and facilities). • Documentation of wastes handling and disposal allow monitoring the type and volume of wastes generated onsite. • The slurry will be discharged onto a de sander unit where the large particles and sand will be filtered and stockpiled for use as backfill material or disposal off site via DM authorized waste hauler. • Wastewater will be discharged via DM authorized waste hauler for disposal to an approved designated area. • Separate slurry storage to be provided on site with sufficient capacity and proper secondary containment. • Identify and categorize debris into rock, soil, concrete, metal, wood, and hazardous materials to determine appropriate disposal or reuse methods. • Designate areas for temporary storage, segregation, and loading of debris while ensuring minimal site disruption. • Recyclable materials (metal, concrete, asphalt) will be sent to authorized recycling facilities. • Excavated soil and rock reuse for site grading or backfilling if suitable. • Non-recyclable waste disposed of at DM-approved landfill site via authorized hauler		
2	Waste Generation	• A project-specific Waste Management Plan (WMP) for the operation should be developed • Regular maintenance program should be implemented • Regular monitoring and inspection of waste handling processes to ensure compliance with DECCA regulations. • Training will be provided to operational staff on proper waste segregation, storage, and disposal practices. • Reduce waste and ensure timely maintenance to avoid unnecessary waste accumulation. • Waste generated should be disposed of	During operational phase	Dubai Municipality (DM) and/or DM appointed contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
		through a licensed waste contractor (DM-approved waste contractors and facilities). • Documentation of wastes handling and disposal allow monitoring of the type and volume wastes generated onsite.		

6.1.3.5 Monitoring Program

Table 6.4 presents the proposed monitoring plan during construction and operational stages of the Project. This monitoring plan is deemed sufficient for controlling cumulative and residual impacts from the project's implementation. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.4 – Monitoring Program for Waste Generation

Aspect	Monitoring Requirement	Method	Frequency	Responsibility
Construction Phase				
Waste generation / management	Monitor and record the amount and type of generated waste. Check proper segregation and temporary storage in appropriate skips. Ensure waste bins/skips are properly covered.	Visual observation/ inspection Waste recording/ waste manifest	Daily	Construction Contractor
Operation Phase				
Waste generation / management	Waste generation and disposal	Monitor and record the amount and type of waste generated and disposed	Monthly	Dubai Municipality (DM) and/or DM appointed contractor
	Inspection and monitoring to ensure implementation of the waste management plan, such as segregation, storage, collection, and final disposal.	Conduct orientation or induction to all concerned staff assigned to implement the waste management plan	Weekly or as often as necessary	

6.1.4 Soil and Groundwater Impacts Prediction and Evaluation

6.1.4.1 Soil and Groundwater Quality Impacts during Construction Phase

During construction phase, potential impacts to soil and groundwater are primarily associated with improper handling which could result in accidental spills or unintended release of waste streams. In addition, during decommissioning phase, soil contamination from leaks and any spills from old fuel tanks or oily machinery. Under normal conditions, there will be no direct discharge of liquids to soil or groundwater. The key sources of potential contamination during construction will include liquid effluents (such as sewage, dewatering, excess water, concrete wash water, hydrotest water, slurry, cleaning, flushing wastewater etc.), materials storage (such as fuel, oil, chemicals), and solid waste. It is important to note that the management of solid waste is addressed in Section 6.6 of this report.

Sewage Generation

Sewage during the construction phase of the Project implementation will mainly be generated from the portable toilet and sanitary facilities to be deployed at temporary site facilities and active construction areas. It is expected as normally practiced, that portable toilets, equipped with temporary holding tanks will be deployed for this purpose. At peak construction, about 360 m^3/day of sewage will be generated. It should be noted that this sewage generation is not really attained during actual construction. it could be less than

expected. As previously noted, however, the construction workforce will be accommodated in an offsite facility (labour camp) and thus, the actual sewage generation at site would be relatively minimal. The proposed mitigation measures for this aspect are provided in Section 6.4.3 of this Report. The implementation of the proposed measures is essential to ensure that impacts from this aspect are controlled to acceptable level.

Dewatering

As previously noted, dewatering works will be carried out to ensure the excavations, headings and tunnels shall be kept free of water. During construction, the contractor will dispose of dewatered effluent in accordance with the Project NOC conditions related to dewatering for the Project. Strict measures should be enforced to ensure that dewatering effluent remains uncontaminated throughout the pumping process. Typically, for dewatering activities, the pumps are connected to settling tanks, where the sediment is extracted prior to disposal. If required, the dewatering water is expected to be diverted into the retention pond. However, prior to the commencement of any dewatering activities, the contractor must apply for a permit from DM for the discharge. The contractor, during project implementation, shall select the most suitable option and adhere to the Project NOC conditions regarding dewatering and dispose accordingly. Considering that the recommended mitigation measures will be properly implemented, impacts from dewatering effluent is not expected to be significant.

Hydrotesting

As previously noted, sewerage tunnel and TPS shall be inspected for leaks and the integrity of pipes, tunnels, and pressure systems. Water used in hydrotesting process will be recycled or made up for some losses during testing to its required volume for subsequent examination. The used hydrotest water will be disposed offsite through DM approved contractor.

Cleaning and Flushing

As previously noted, after hydrotesting all pipelines shall be cleaned to remove debris, construction materials or sediment within the tunnel prior to operation. Used water from cleaning and flushing will be disposed of offsite through DM approved contractor.

Leaks and Accidental Spillage

During construction, soil contamination may result from accidental spillages of fuel, oil leaks, chemicals, concrete etc., Fuel for various equipment and machinery, including electric power generators and vehicles, will be stored in temporary storage tanks onsite, particularly at the temporary site facilities/laydown areas. Chemicals to be stored onsite are expected to be minimal and mainly include lubricants for equipment maintenance, paints, etc.

All active shaft construction work area is expected to have a temporary storage area with a hard flooring material for fuels and chemicals provided with secondary containment, to prevent percolation in case of any accidental spillage. Dewatering works are expected to prevent contamination of underlying groundwater. It should be noted that diesel fuel oil may be used at some shaft locations where a DEWA connection is unavailable. The magnitude of the impact will depend on the quantity of fuel or chemical spilled. Fuel that will be stored onsite will be mainly diesel fuel and for chemicals, these are mostly stored in individual containers (with capacity of few gallons). In addition, it is not expected that large volumes of paints and solvents will be stored and used at the site at a given time. Moreover, equipment maintenance and washing (if any) will be carried out off-site.

Assuming proper application of good site practice for prevention of spillage, protection measures and enforcement of necessary environmental management procedures, the risk of accidental spillage can be adequately controlled. Potential impact from accidental spillage

of fuel and chemicals is therefore considered of minor significance. Details of mitigation measures are provided in Section 6.1.4.4 of this Report.

6.1.4.2 Soil and Groundwater Quality Impacts during Operation Phase

Accidental events and any spills during infrequent maintenance works of sewer line TPS may could subsequently lead to groundwater contamination. As previously noted, installation of appropriate monitoring equipment and safety features included in the design of DSST system, the probability of such event to happen very minimal. Thus, impact from this aspect is not expected to be significant.

Cumulative Impacts

The nature of potential impacts to soil and groundwater during the implementation of the Project is mainly related to accidental events, such as spillage. The assessment conducted concluded that through proper handling and disposal, can be minimized if not eliminated. Thus, no significant cumulative impacts are expected from the aspect of soil and groundwater contamination.

6.1.4.3 Soil and Groundwater Quality Impacts during Decommissioning Phase

The primary soil and groundwater issue that could arise during the decommissioning phase is the potential ground contamination (sewerage system), which is a key issue for any industrial facilities at the end of its operating life. In order to address this aspect, it is recommended that a Contaminated Land Assessment (CLA) should be undertaken as part of the decommissioning phase in order to identify presence of any contamination and if present, define its extent and any need for site remediation. The CLA shall be undertaken as part of the overall environmental assessment to be undertaken during this phase.

6.1.4.4 Mitigation Measures for Soil and Groundwater Impacts

Table 6.5 presents the proposed mitigation measures to address the potential soil and groundwater impact during the implementation of the Project. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.4.5 of this ESIA Report.

Table 6.5 – Mitigation Measures addressing Potential Soil and Groundwater Issues

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
1	Sewage	• Toilets and sanitary facilities to be deployed should be provided with temporary holding/collection tanks, appropriately sized based on the actual number of personnel deployed. • Collection tanks should be regularly inspected for any leaks and any overflow. Any tanks with leaks should be repaired or replaced immediately. Spilled sewage and any contaminated soil should be collected and disposed of as part of sewage. • In case of accidental spillage or leakage, disinfectants should be used to clean the affected area or removal of affected soil, for disposal into an appropriate disposal site via third licensed party. • If an underground collection tank is installed, sewage in the collection tanks should be regularly emptied and disposed of to an approved disposal/treatment facility.	During the entire duration of construction phase	Construction Contractor
2	Dewatering	• Dewatering operations should be undertaken through licensed contractors. • Dewatering operation should be appropriately planned to avoid any erosion or ground instability. • Implement dewatering in stages, reducing the volume of	During the entire duration of construction phase	Construction Contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
		water pumped and preventing rapid, significant drops in the water table and minimizes the risk of disturbing the surrounding environment. • Ensure a controlled pumping rate to meet construction requirements. Excessive dewatering may cause unnecessary drops in the water table. • All equipment should be appropriately maintained to avoid contamination of dewatering effluent. If any oil or grease contamination is observed, operation should be immediately stopped. • If any contaminated dewatering effluent is found, discharge must stop until the problem is fixed. Any polluted water should be disposed of off-site or decontaminated by placing it in a dedicated storage tank. • Dewatered water with high TSS should be fed through a sedimentation tank to allow for settlement of suspended solids. • Excess dewater shall be disposed of in accordance with NOC conditions and DM requirements. • Prior to the commencement of any dewatering activities, the contractor must apply for a permit from DM for the discharge of groundwater.		
3	Hydrotesting	• Water used in this process will be recycled or made up for some losses during testing to its required volume for subsequent examination. • The used hydrotest water should be disposed offsite through DM approved contractor	During the entire duration of construction phase	Construction Contractor
4	Cleaning & Flushing	• Used water from cleaning and flushing will be disposed of offsite through DM approved contractor	During the entire duration of construction phase	Construction Contractor
5	Accidental Spillage of Fuels and Chemicals	• Pre-demolition site inspection/assessment to identify sources • Remediate contaminated soil if detected • Store hazardous materials in impermeable containers • No servicing/maintenance of vehicles and construction equipment to be undertaken within the Project site. Any equipment/vehicle requiring servicing/maintenance should be sent to an appropriate workshop outside the site. • Re-fueling of construction vehicles to be done offsite, if possible, to limit the amount of fuel stored onsite. • Volumes of inventory of fuel/chemical on site should be at minimum. • The fuel and chemical storage area should be provided with an impermeable surface and secondary containment. • As per DECCA (Guidance on EC requirement's), "Any liquid fuel, oil and chemical shall be stored within impermeable secondary containment (bunded area). For a single-walled fuel tank, the secondary containment shall be at least 110% of the tank. For multiple drums and containers, the secondary containment must be 110% of the largest drum or 25% of the combined full capacity of all drums and containers. • Audible alarms and sewage tank level indicators shall be used to monitor effluent overflow. • Drip trays should be provided at fuel/chemical transfer points and refueling areas. • A spill containment kit and equipment should be provided fuel storage areas. • Ensure immediate response to spills or leaks to prevent groundwater contamination and minimize environmental impact.	During the entire duration of construction phase	Construction Contractor

No	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
		• Spilled chemicals should be collected immediately (including the contaminated soil) and disposed of as hazardous waste. • Training workers on correct transfer and handling of fuels and chemicals and on the appropriate response to spills. • An emergency pump should be available onsite for emptying bunds and drip trays in the event of spilling. • Appropriate response procedures should be developed to address fuel and chemical spillage events.		
Operation Phase				
3	Soil and Groundwater Impacts	• Effective installation of system wide controls and monitoring to determine any leakage • Appropriate response procedures should be developed to address spillage events • Regular maintenance program should be implemented • Unlike pump-based system, a gravity sewer system significantly reduces the need for energy-intensive pumping stations. This leads to lower energy consumption and reduce the need for frequent maintenance. In addition, a gravity sewer system ensures system reliability and longevity.	During operational phase	Dubai Municipality (DM) and/or DM appointed contractor

6.1.4.5 Monitoring Program for Soil and Groundwater Impacts

Table 6.6 presents the proposed monitoring program to address soil and groundwater impacts during the implementation of the Project. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.6 – Environmental Monitoring Program for Soil and Groundwater

Monitoring Requirement Construction	Frequency	Implementation Phase	Required Actions in case of non-conformance	Responsibility
Construction Phase				
Visual inspection of all areas used for storage of fuels/chemicals for leaks. Check the integrity of bunded containment facilities.	Weekly	Construction	In the occasion of an incident, i.e., any spillage, the spill should be contained immediately, and the source of the spillage should be rectified.	Construction Contractor
Inspect sewage collection tanks for leaks, overflow, and spill. Any leaks/spill should be immediately addressed.	Weekly	Construction		
Inspect construction machinery to ensure it is in a good state of repair and is not leaking oil or fuel.	Monthly	Construction	Any spilled oil or chemicals should be cleaned and disposed of as hazardous waste through DM approved ESP.	
As necessary depending on the scale of any spillage, soil and groundwater testing should be carried out	As required	Construction		
Ensure that sample collection and analysis is carried out for all imported fill materials.	Once prior to import	Construction	If found contaminated, the soil should not be brought and used at the site.	
Visual observation of dewatering effluent for traces of oil and grease contamination	During dewatering activities	Construction	If contaminated, dewatering should be stopped until the source of oil or grease is rectified.	
Operation Phase				
Determine leakages via the system wide instrumentation control & monitoring)	Continuous	Operation	In case of leaks or potential problems in system integrity, the department concerned should be notified, and	Dubai Municipality (DM) and/or DM appointed contractor

Monitoring Requirement Construction	Frequency	Implementation Phase	Required Actions in case of non-conformance	Responsibility
			the issue should be immediately rectified.	

6.1.5 Marine Ecology

The Project site is more than 7 km away (towards northwest direction) from the coastal area of Dubai. In addition, during the construction and operation phase, there are no aspects of implementation that will have direct or indirect effects on marine waters (i.e., no effluent discharge into the marine waters). Thus, this aspect is scoped out in the ESIA study.

6.1.6 Terrestrial and Coastal Ecology Impacts Prediction and Evaluation

6.1.6.1 Construction Phase Terrestrial Ecology Impacts

Habitat Loss

The severity of impact of habitat disturbance and loss is dependent on the ecological sensitivity of habitat that would be affected by an activity or a development. As previously noted, the shaft locations will be the only areas of active groundworks. Most of these locations are adjacent to a major highway barring few locations. The survey results identified Sand sheets and dunes with dwarf shrub cover as the dominant habitat type in the project area followed by Sand sheets and dunes with shrub cover which are least concern according to IUCN Red List of Ecosystems. However, the location of maintenance shaft (MS-2/VDS-1 and MS-41(CS/RS) & VDS-09) existing conditions shown presence of Sand sheets and dunes with tree cover habitat type which is conservation significance according to IUCN red list of ecosystems. Also, survey results shown, none of the floral species at the whole Project area have conservation significance except Ghaf tree (Prosopis cineraria) which is located at (MS-2/VDS-1 and MS-41 (CS/RS) &VDS-09).

The survey results also identified Zygophyllum qatarense as the dominant perennial shrub species in the project area which is a very common species. In addition, the presence of invasive alien tree species Prosopis juliflora showing that human pressure generated ideal microhabitats for invasive species growth. This species occurrence may indicate the likely expansion of the alien species, which may result in homogeneous vegetation in the future. Thus, removing and regulating Prosopis juliflora vegetation patches contributes to reducing future potential invasion risk.

It should be noted that inside diameter of a construction shaft will likely range from 20 to 27 m, while for receiving shafts, it will range from 12 to 10 m. Therefore, the construction works will not require clearing out of large areas of land. However, National Ghaf tree (Prosopis cineraria) at both location area's must be properly managed and translocated (if required) in accordance with DECCA and the relevant UAE Federal Law Guidelines.

Based on the above, although impacts on the aspect of habitat loss are unavoidable, it is not expected to be a concern in terms of overall ecological value (i.e. the habitat and vegetation to be affected is typical in the areas of Dubai). Considering the above, any loss of remaining natural habitat and vegetation in the area is not considered to be a significant concern. Nonetheless, the implementation of appropriate mitigation measures could significantly reduce the severity of the potential impacts.

Disturbance to Terrestrial Fauna

For the aspect of disturbance, impacts are dependent on specific faunal species to be affected. Vehicular movement, influx of workforce and noise (from equipment & vehicles) to be generated during project construction works could potentially result in disturbance of terrestrial fauna. The results of the terrestrial ecology survey confirmed, Arabian gazelle found only at MS-2/VDS-1 area (located adjacent to highway) which is categorized as

'Vulnerable' in the UAE National and IUCN Red Lists. It should be noted that, for larger mammals (such as the gazelle present in the area) are expected to exhibit avoidance behaviour and will relocate to adjacent open and less disturbed plots nearby/surroundings of the Project site, as they have similar habitat characteristics.

The survey results also shown avifauna species sighted during the survey period in the project area are common resident bird species such as Laughing dove (Spilopelia senegalensis) and Collared dove (Streptopelia decaocto). Also, non-native bird species such as Acridotheres tristis, Corvus splendens, and Columba livia were sighted during the survey period. All the reported avifauna species are Least Concern according to the UAE National and IUCN Red Lists. It should be noted that birds are significantly more mobile than small mammals and reptiles and may avoid areas with ongoing activities and may transfer to nearby similar and suitable habitat. Also, they may return once the project works completed.

Reptiles are susceptible to direct vehicular hit, including destruction of burrows during site leveling and road establishment (which could ultimately result in fatality). The survey results showing sighting of Hadramaut sand lizard (*Mesalina adramitana*) were recorded in the Sand sheets and dune with tree cover habitat type at MS-41(CS/RS) & VDS-09 which is classified as 'Least Concern' on both the IUCN and UAE National Red Lists. However, it should be noted that reptiles are sensitive to ground vibrations and noise from machinery, often prompting them to move toward areas with better cover, avoiding exposed or cleared zones.

While disturbances to fauna during construction are inevitable, they will be temporary. Key mitigation measures include clearly defining and fencing construction areas and restricting equipment and personnel movement within these boundaries. Details are outlined in Section 6.1.6.3 of this report. Hence, based on the above, the potential environmental impacts from disturbance to fauna due to construction activities are assessed as not significant.

6.1.6.2 Terrestrial Ecology Impacts during Operation Phase

No adverse impacts on terrestrial ecology with respect to the Project's operation phase are envisaged. As previously noted, the proposed Project is installation and operation of sewer lines and TPS. The applicable Project activity during operation will be only limited to infrequent maintenance and repair works, as required. Thus, impact on the terrestrial ecology during the operation phase of the project is not envisaged. Hence, not discussed further.

6.1.6.3 Terrestrial Ecology Impacts during Decommissioning Phase

In terms of terrestrial ecological impacts, the potential issue during decommissioning phase is mainly related to potential disturbance to surrounding areas. This aspect would be mainly related to the actual site conditions during this phase, including any other developments that could have taken place in the surrounding areas during the operating life of the facility. Disturbance could potentially affect faunal species in the surrounding areas and depending on actual site work to be undertaken, could also result in disturbance of terrestrial habitat.

Based on the above and considering the dependency of impacts to actual site conditions in the future, this aspect shall be assessed in a separate environmental study. This study should also include a site assessment to clearly define actual ecological conditions prior to decommissioning. In addition, the actual plan for the decommissioned sited should also be defined and assessed. For instance, if there will be no planned developments in the area after the decommissioning, then a habitat restoration plan should be developed and implemented.

6.1.6.4 Proposed Mitigation Measures for Terrestrial Ecology Impacts

Table 6.7 presents the proposed mitigation measures to address the terrestrial ecology impact during the implementation of the Project. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.6.5 of this ESIA Report.

Table 6.7 – Mitigation Measures addressing Potential Terrestrial Ecology Issues

No.	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
1	Loss of Habitat	• All activities should be confined within the pre-defined construction works corridor. The work areas should be demarcated to ensure unnecessary entry and undue damage to the immediate surroundings. • The location of temporary facilities (such as lay-down areas) is as near as possible to the actual Project areas in order to minimize project footprint. • Introduction of alien or non-native species of fauna and flora into area should be prohibited. • Clearing of vegetation should be minimized as much as practicable. • Appropriate signage (i.e., NO ACCESS) will be installed at strategic locations, to limit the movement of the workers and vehicles. • General Environmental awareness training program will be implemented for all site personnel. • Hunting by personnel and workers will not be allowed and prohibited. • Relocation of National Ghaf tree (*Prosopis cineraria*) (if required) must be properly managed and translocated in accordance with DM and the relevant UAE Federal Law Guidelines. • The relocation shall be undertaken by a qualified ecologist and coordinated with DM to ensure that the recipient relocation site will not be affected. • Ghaf trees translocation should be done according to the NRS Technical Guideline on Wildlife Handling Management and in coordination with the DM-Agriculture Department. • Where Ghaf Trees cannot be successfully translocated an appropriate ratio of planted Ghafs to mature Ghafs (e.g. 3 or 4:1) should be followed to offset the impacts of the loss of Ghafs.	During the entire duration of Project construction works	Construction Contractor
2	Disturbance to Terrestrial Fauna	• All site activities (vehicle movement, laydown areas, etc.) and other activities should be confined within the pre-defined project areas/boundaries. • All drivers and heavy equipment operators should be made aware of vehicle or equipment movement limitations / restrictions. • Install/erect barriers around active construction areas to restrict animal movement and minimize disturbance from construction activities. • Hunting by personnel and workers should be strictly		

No.	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
		prohibited. • Any animals that are accidentally trapped within work areas (i.e. within site fences) should be released. No animals to be kept in the Project site • General Environmental awareness training program will be implemented for all site personnel. • Traffic plans for construction should be developed to ensure unnecessary access of areas outside the ROW.		

6.1.6.5 Monitoring Program for Terrestrial Ecology Impacts

Table 6.8 presents the proposed monitoring program to address terrestrial ecological impacts during the construction phase of the Project. This monitoring program should be implemented by a qualified site environmental engineer by the construction contractor. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.8 – Environmental Monitoring Program for Terrestrial Ecology during Construction

Monitoring Requirement	Frequency	Required Actions in case of non-conformance	Responsibility
Regular site inspection should check the implementation of the recommended mitigations measure for ecological aspects.	Daily	Site supervisor should be notified of any non-compliance, which should be immediately closed out.	Construction Contractor (Environmental Engineer)
Monitoring for any trapped/entangled animals within the Project areas.	Daily	Any trapped or entangled animal should be released. Any injury should be reported to DM.	
Monitoring the presence of any wildlife within or near the working areas.	Daily		

In terms of reporting an environmental incident to DM, the following shall be followed by the construction contractor:

- Document and investigate any wildlife/environmental incident.
- Environmental Emergency – site Environmental In-charge should call 800 900 for any wildlife injury or environmental emergency.
- Report Submission – report or notice of any wildlife injury or need to translocated animal or native trees shall be prepared and submitted to DM (reference should be made to the Project ID as per the Environmental Permit to be issued for the Project). Faunal or flora translocation shall only be undertaken by a qualified ecologist after confirmation by DM.

6.1.7 Environmental Noise Impact Prediction and Evaluation

6.1.7.1 Noise Impacts during Construction Phase

The potential environmental impact of airborne noise is dependent on the types of noise sources that will be introduced at the site and on the proximity of noise sensitive receptors (NSRs) such as residential areas, churches, schools, etc. (USEPA, 23 CFR 772). The impacts on sensitive receptors will vary throughout the Project implementation. These receptors include developments near the shaft locations (i.e. the only areas of active groundworks), primarily along existing highways, as well as road users and individuals (visitors, employees) in the vicinity. Sensitive receptors near sewer line development are shown in Figure 3.3.

During construction, noise will mainly from the operation of construction equipment and vehicles to be used for the site preparation works for shafts construction, construction

activities of link sewers and associated components, temporary lay down areas, unloading /loading of construction materials on site, piling works etc. Decommissioning activities, such as demolition and removal of existing utilities, will also contribute to noise levels. This noise is expected to be intermittent and will vary depending on the equipment in operation and the phase of construction.

Noise from these sources will be intermittent and will depend on the number of equipment operating onsite, which will vary depending on the type of construction activities being carried out at the site. The noise generated will vary depending on the type of shaft and the number of equipment in operation. As the contractor has not yet been appointed, details on the exact types and numbers of equipment to be used are not yet available. Typical construction equipment and machineries that are likely to be used during the construction phase have been identified (see Table 6.9). The noise levels generated by the equipment are taken from the British Standards: Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228-1: 2009 + A1:2014).

Table 6.9 – Noise Level of Typical Construction Equipment

Equipment	Sound Pressure Level (SPL), dB(A)*
Tunnel Boring Machine and supporting gantries	90
Compressors	80
Sump Pumps	70
Tower Crane and crawler cranes	75
Shaft Gantry Crane	75
Concrete / grout batching plant	80
Conveyor	82
Ventilation fans	85
Dump trucks	78
Flat Trailer (low-loader)	80
Bobcat (skid-steer)	78
Vibrator (roller/concrete)vibrator)	79
Tankers (HGV tanker)	80
Pickup (light vehicle)	72
Power supply equipment (static plant/transformer)	75
Temporary Diesel Generators	78

*A-weighted SPL at 10m from the equipment *(Source:* BSI, British Standards (BS 5228-1: 2009 + A1:2014).

Considering all equipment listed in Table 6.9 (16 units) operating simultaneously (worst-case), the combined A-weighted sound pressure level at 10 m is 93.5 dB(A). The resultant noise levels at selected distances are 20 m = 87.5 dB(A), 50 m = 79.6 dB(A), and 100 m = 73.5 dB(A). The combined noise level attenuates to the acceptable criterion of 70.0 dB(A) at approximately 150 m, and to 60.0 dB(A) at approximately 476 m from the source (Bruel & Kjaer, 2001][3]). Given that the nature of work, sensitive receptors located within 150-200 m of the construction works, may experience levels above the 70.0 dB(A) criterion during worst-case simultaneous operation of equipment. Receptors beyond 476 m would experience levels below 60.0 dB(A), which is generally considered acceptable.

However, existing baseline ambient noise levels recorded already indicate elevated background levels (see Table 5.8 & Table 5.9), particularly at locations adjacent to major roadways or active commercial areas.

Hence, it is important to consider the incremental impact of construction-related noise. Although construction noise will be temporary and largely intermittent, the additional noise

[3] SPL (Resultant) = $10*\log(10^{N1/10}+10^{N2/10}+....+10^{Nn/10})$ and Noise Attenuation (SPL) = Sound Power – $20\log_{10}(r)$ – 8 dB

from construction activities during peak periods (e.g., simultaneous equipment use) may raise the already elevated ambient noise levels at locations within 100–150 m of active work zones. This incremental increase is significant, particularly at NSRs already experiencing elevated ambient levels, as it may lead to further degradation of the local sound environment and result in greater annoyance, sleep disturbance (for evening or early morning work), and potential health effects if unmitigated.

At NSRs within 150 meters of active shafts or sewer works, the combined noise from multiple sources may be more noticeable especially if they're not close to busy roads. Traffic noise can sometimes help cover up construction noise near highways, but in quieter areas, the construction noise may temporarily elevate the perceived noise environment beyond acceptable thresholds.

Hence, while the absolute noise levels generated during construction are expected to decline over time, the short-term cumulative effect of elevated baseline plus construction noise may still result in exceedances, unless effective mitigation is implemented.

To minimise these potential impacts, mitigation measures such as temporary noise barriers, use of quieter equipment, careful scheduling of high-noise activities during less sensitive periods, and communication with local stakeholders should be strictly implemented.

Appropriate mitigation measure should be implemented to ensure that noise generation will be at minimum. The proposed mitigation measures are provided in Section 6.1.7.5 of this Report. Considering that the proposed mitigation and monitoring measures will be appropriately implemented, no significant impacts are expected from this aspect.

6.1.7.2 Vibration Impacts during Construction Phase

Vibration during the construction will mainly from site preparation for shaft construction operation of tunnel boring machine and pipejacking activities due to the use of equipment such as hydraulic breaker hammers, pile drivers, vibratory rollers and power packs and MTBM. The vibration levels generated from the equipment is taken from the different references are given below in Table 6.10.

Table 6.10 – Vibration Levels from Construction Equipment

Equipment	PPV (mm/s)	Distance (m)	PPV at 50m (mm/s) *
Excavator	1.8	10[1]	0.36
Dozer	2.2	7.5[2]	0.33
Hydraulic Hammer	2.4	7.6[3]	0.365
Pile Drivers	2.1	5.0[4]	0.21
Jack Hammer	0.9	7.5	0.135
Vibratory Roller	5.3	7.5	0.795
Power packs	2.0	5.0	0.20
MTBM	2.0	7.0	0.28

[1]Cenek, Sutherland, & McIver, 2012, [2]Hanson, Towers, & Meister, 2006, [3]Melbourne Metro Rail, 2016
[4]Hanson, Towers, & Meister, 2006
*Calculation: $PPV_{50}=PPV_0*R_0/R$ (Ex. 1.8*10/50=0.36)

The guidance on assessment of the potential vibration impacts associated with construction activities is provided in British Standards: Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228-1:2009). Table 6.11 below shows the vibration level significance and impact associated with the typical Project construction activities.

Table 6.11 – Vibration Significance

Vibration Level (PPV mm/s)	Impact

Vibration Level (PPV mm/s)	Impact
0.14	Vibration might be just perceptible in the most sensitive situations foremost vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration. (significance – Very low)
0.3	Vibration might be just perceptible in residential environments. (significance – low)
1.0	It is likely that vibration of this level in residential environments will cause complaints but can be tolerated if prior warning and explanation has been given to residents. (significance – medium)
10	Vibration is likely to be intolerable for any more than a very brief exposure. (significance – high)

It should be noted that vibrations generated during construction activities, depending on their intensity, may cause nuisance to the public and, in some cases, damage to nearby structures. As the Tunnel Boring Machine (TBM) progresses along the tunnel alignment, some vibrations may be perceptible at ground level. However, studies indicate that the vibration levels produced by TBMs typically remain below a Peak Particle Velocity (PPV) of 2 mm/s under controlled operating conditions, which is well below thresholds generally associated with structural damage or significant human disturbance (Rallu et al., 2022; Wang et al., 2023).

Table 6.10 shows the vibration level ranges from the proposed construction activities. Using the inverse-distance attenuation equation (Cenek, Sutherland, & McIver, 2012; Hanson, Towers, & Meister, 2006; Melbourne Metro Rail, 2016[4)], the PPV at sensitive receptors was estimated for key construction equipment based on reference distances. The combined PPV at a worst-case receptor located 50 m from surface construction works was calculated using the root-sum-square (RSS5) method to account for multiple sources, resulting in a value of approximately 1.19 mm/s (see Table 6.10). This is below the 5 mm/s cosmetic damage threshold for residential structures but may be perceptible to occupants. This assessment confirms that TBM operations and other controlled construction activities are unlikely to result in structural or perceptible impacts at receptors beyond 50 m (BS 7385: Part 2, 1993).

As shown in Table 6.11, a vibration level of 1 mm/s may lead to complaints in residential environments and is considered to have medium significance. While this level is generally below thresholds associated with structural damage, it can still be perceived as a nuisance, depending on the sensitivity of nearby receptors. Hence, it is important to consider both the nature and duration of the vibration sources. People in nearby commercial/residential areas may experience perceptible vibrations during certain construction activities, particularly those involving shaft construction and surface-level works. To address this, a range of mitigation measures will be implemented, including the use of low-vibration construction methods where feasible, limiting high-vibration activities to daytime hours, and scheduling the most disruptive works over short, defined periods.

The receptors near shaft locations the only areas of active surface groundworks are primarily located along existing highways, with most situated more than 100 meters from the construction area. Vibrations from tunnel boring machine (TBM) operations are typically of low amplitude, continuous, and attenuate significantly with depth and distance from the alignment, particularly in well-engineered ground conditions. Moreover, TBM operations are continuous and predictable, reducing the sudden or impulsive nature of vibrations that often lead to stronger public responses.

[4] $PPVr=PPV_0*R_0/R$
[5] $PPV_{total}= \sqrt{\sum PPV_i^2}$

Surface-level works, such as shaft construction, link sewer, will be of short duration and localized. Standard construction methods like piling, excavation, and crane operations will be used, with high-impact noise or vibration activities being intermittent and of limited duration. These localized activities will further reduce long-term exposure risks to nearby receptors.

Monitoring and Mitigation Measures

Effective implementation of real time monitoring will allow for the detection and management of any noise or vibration exceedances during construction. A detailed monitoring strategy will include noise and vibration surveys, real-time monitoring at the closest residential receptors during high-impact phases, and predefined trigger thresholds based on international best practices. Corrective actions, such as adjusting work hours or changing equipment, will be implemented as necessary.

To further mitigate potential impacts, the project will implement noise and vibration control measures, including time-of-day restrictions for high-noise activities, use of low-vibration equipment, temporary acoustic barriers at shaft sites, and community notification protocols to keep residents informed and engaged throughout construction.

According to international standards, including BS 5228 (Code of practice for noise and vibration control on construction and open sites) and DIN 4150 (Structural vibration - Effects of vibration on structures), receptors located more than 100 meters away from shaft construction or tunnels deeper than 20 meters are generally considered to be outside the zone of significant noise or vibration impact.

Given the project's adherence to international standards and the implementation of real-time monitoring and mitigation measures, the potential noise and vibration impacts will be effectively managed. With these measures in place, no significant impacts from construction vibration are expected, and vibrations at nearby receptors will remain within acceptable and tolerable levels.

Nonetheless, appropriate mitigation measures (provided in Section 6.1.7.5) should be implemented to ensure that vibration generation will be at minimum. Considering that the proposed mitigation measures will be appropriately implemented, no significant impacts are expected from this aspect.

6.1.7.3 Noise Impacts during Operation Phase

During operation, the main source of noise will from operation of terminal pumping station. The DSST-BD tunnel systems include a terminal pump station (TPS), lifts sewage to the Jebel Ali Sewage Treatment Plant (JSTP). The TPS for DSST-BD will have nine (9) duty pumps. Also, operation of standby fuel turbine will used as backup power sources during emergencies or when the primary power supply fails. The standby turbine generators will be used intermittently, primarily for backup power during emergency situations. It should be noted that noise from the turbine operation will be especially during startup and while operating at full capacity. In addition, activity such as infrequent maintenance and repair works, as required. The noise criteria for equipment require compliance with a noise level of 85 dB(A) within a 1-meter radius from any plant item.

The expected noise level from the operation of the Terminal Pumping Station (TPS) for DSST-BD is approximately 94.5 dB(A)6. There are no NSRs within a radius of 2 km from the TPS for DSST-BD. At a distance of about 1,190 meters, the noise level is expected to attenuate to an acceptable level of 50 dB(A), which is the nighttime noise limit for residential areas near highways (refer to Table 4.3). This calculation assumes the noise is generated at ground level. However, the pumps will be installed at a depth of 90 meters,

[6] SPL (Resultant) = $10*\log(10^{N1/10} + 10^{N2/10} + \ldots + 10^{Nn/10})$.

and the TPS structure and other surrounding surfaces will further absorb and reduce noise. In addition, the pumps will be stationed in a building, which will reduce the sound intensity outside of the TPS.

During operation, vibration monitoring and analysing systems, connected to relevant local PLC systems shall be installed on all rotating equipment including pumps, compressors etc. to ensure vibration within the limits. Noise impact from the operation of the TPS is considered to be of low significance.

6.1.7.4 Noise Impact during Decommissioning Phase

The potential noise impacts during the implementation of the proposed Project are generally similar to the construction phase, which will mainly include noise generation from equipment, vehicles, and site activities. Similarly, noise generation will affect any receptors that could be present in the surrounding areas during stage (subject to actual site conditions).

Considering that the decommissioning will happen after the design life of the facility (in 120 years), the actual impacts cannot be accurately identified and assessed at this stage. Thus, regulations, it is recommended that the potential noise impacts during decommissioning phase be assessed in a separate study that should be conducted for this phase of the Project. Accordingly, mitigation measures should be defined in an appropriate Decommissioning Environmental and Social Management Plan (DESMP).

6.1.7.5 Proposed Mitigation Measures

Table 6.12 presents the proposed mitigation measures to address the potential noise impact during the implementation of the Project. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.7.6 of this ESIA Report.

Table 6.12 – Mitigation Measures addressing Potential Noise and Vibration Issues

No.	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
1	Noise from Construction Equipment and Activities	• Use of less vibration-generating machinery whenever possible, (e.g., mini-vibrio excavator etc.,). • Minimize the use of hydraulic hammers and vibration generating equipment, where possible. • Proper scheduling of vibration generating works to minimize the disturbance. • Installation of Temporary Noise Barriers (i.e, acoustic barriers or sound walls) around active construction area to reduce noise transmission to nearby receptors. • Ensure vibration levels within acceptable thresholds and prevent any damage. • Careful position of noisy equipment away from sensitive areas and use temporary enclosures to minimize noise • Low noise equipment/machinery should be used where possible, particularly for high noise generating equipment such as diesel generator sets (with acoustic enclosures), compressors, etc. • Use of well-maintained low noise equipment machinery with noise-reducing features like mufflers and silencers.	During the entire duration of proposed Project construction works	Construction Contractor

No.	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
		• All equipment, particularly engines, that generate high noise levels should be fitted with acoustic hoods, and these are to always remain closed during operation. • All vehicles, equipment and machinery will be maintained in good condition, in accordance with the manufacturer's instructions. • Noise generating equipment should be throttled down or switched off when not in use, i.e. vehicles, etc. • Proper scheduling of vehicle movements to avoid accumulated noise from vehicles. • Regular maintenance of machinery should be undertaken in accordance with the manufacturer's instruction. • Install sound barriers or enclosures around noisy equipment or construction areas to attenuate noise levels. • Night-time construction activities should be avoided as much as possible. • If nighttime activities are necessary, noise impacts will be minimized by restricting high-noise operations, such as pile driving, heavy machinery use, and material loading/unloading, to daytime hours whenever possible. • For essential nighttime work, quieter construction methods, noise barriers, and sound-dampening equipment will be implemented. • All pneumatically operated tools will be fitted with properly maintained mufflers or silencers of the type recommended by the manufacturers. • Appropriate training should be provided to relevant personnel with regards to noise control and management. • Location of underground services shall be mapped and shall be included as one of the basis in finalizing access routes and establishment of facilities. • Temporary power generators will be fitted with muffler and enclosure and should be strategically located away from any identified NSR.		
Operational Phase				
1	Operation noise	• The sewer tunnel and associated equipment, such as pumps and ventilation systems will be located underground. Hence, no significant transmission of noise to the surface. • All equipment shall operate without undue vibration and with the least possible amount of noise and shall not cause nuisance. • Vibration monitoring and analyzing systems, connected to relevant local PLC systems, shall be installed on all rotating equipment including pumps, compressors etc. to ensure vibration within the limits	During operation phase	Dubai Municipality (DM) and/or DM appointed contractor

No.	Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Phase				
		• All equipment subject to vibration shall be provided with restrained spring-type vibration isolators or pads in accordance with manufacturers' recommendations. • Vibration dampers comprising steel spring shall be used for the installation of generators, compressors and any other equipment which may cause vibration during operation. • The pump sets complete with all its auxiliaries shall be capable of being operated at all loads without any undue and inadmissible vibration and vibration measurements shall comply with American National Standard Institute (ANSI) /HI 9.6.4 - Design and Application of Balancing Devices for Pumps. • Sound attenuators to be provided, as necessary, on ventilation main supply and return ducts • Tunnel lining, pumping stations, and other infrastructure must be provided with effective sound insulation • Use of advanced pumps and ventilation systems to operate at low noise levels • All TPS stations are provided with dedicated houses to confine any noise due to operation. • Installation of soundproof enclosures and acoustic barriers • Optimize the operation schedules and limit use to only when absolutely necessary to limit any noise emission • Regular maintenance and tuning of turbines to ensure optimal performance to minimize noise		

6.1.7.6 Monitoring Program for Environmental Noise

Table 6.13 presents the proposed noise monitoring program during the implementation of the Project. These measures should form part of the environmental management plan to be developed for the Project. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.13 – Noise Monitoring Program

Monitoring Requirement Construction	Frequency	Method	Required Actions in case of non-conformance	Responsibility
Construction Phase				
Ensure that equipment and vehicles are regularly maintained as required. Checking maintenance record.	Weekly	Checking maintenance record	Identify significant noise sources and rectify accordingly (i.e., repair or replacement)	Construction Contractor
Noise measurement. Using calibrated noise meter active site works boundary	Quarterly	Using calibrated noise meter at site boundaries		
Monitor noise levels at nearest sensitive receptors	Weekly			
Complaints - Address and investigate all	As required (in case of complaints)	Using calibrated noise meter at		

Monitoring Requirement Construction	Frequency	Method	Required Actions in case of non-conformance	Responsibility
noise-related complaints		site boundaries		
Operation Phase				
Noise level at the perimeter (fence line) of the TPS	Annually	Using calibrated noise meter at site boundaries	Identify significant noise sources and rectify accordingly (i.e., repair or replacement)	(DM and/or DM appointed contractor

6.1.8 Traffic Issues and Assessment

6.1.8.1 Construction Phase Traffic Impacts

As previously noted, DSST-BD tunnel alignment runs parallel to Al Khail Road, while the southwestern section connects to E-611, extends along Emirates Bypass Road, and terminates at the Jebel Ali Pumping Station. Due to the area needed at each shaft location, temporary lane closures and diversions may disrupt traffic. However, as the shaft sites are near major roads, there will be adequate space for truck maneuvering and parking, minimizing traffic and community impact. The contractor will design access and haul roads, subject to RTA approval.

In addition, transportation of construction workers and personnel from the site to the offsite accommodation and delivery of construction materials will result in an increased traffic volume and result in localized traffic congestion. Buses are expected to be used for the transportation of the construction workers, which will be twice daily (morning and afternoon). Nonetheless, this is only expected to occur in the morning when the workers report for work and in the afternoon when they leave the construction sites. In addition to workforce transportation, materials delivery could also pose potential traffic issues. Delivery of construction materials into a laydown area will be carried out during the evening time to avoid any congestion along the roads.

In order to minimize impact on traffic flow during construction phase, a traffic management plan should be prepared and should include the measures in managing traffic flow and define the primary access route to the site, particularly for materials delivery. Provided that a traffic plan will be developed and strictly implemented and appropriate planning in coordination with RTA, the environmental impacts associated with this aspect are not expected to be significant. Details of the proposed mitigation measures are provided in Section 6.1.8.3 of this Report.

6.1.8.2 Traffic Impacts during Operation Phase

The nature of the proposed Project, limited to installation and operation of sewer line and TPS. The applicable Project activity during operation will be only limited to infrequent maintenance and repair works, as required. No impacts on traffic are anticipated during the operational phase of the project.

6.1.8.3 Traffic Impact during Decommissioning Phase

Potential traffic impacts during decommissioning phase could potentially occur during the mobilization and offsite disposal of the decommissioned materials and equipment. Similar to the construction phase, this aspect can be appropriately controlled through proper scheduling (i.e., avoiding busy hours) and defining a route that avoids residential areas, city proper, etc. Accordingly, it is recommended to develop an appropriate traffic management plan for decommissioning phase based on actual disposal method of the waste to be generated during this phase.

6.1.8.4 Proposed Mitigation Measures

Table 6.14 presents the proposed mitigation measures to address the potential traffic impacts during the Project implementation. The recommended monitoring measures that aim to assess the effectiveness of the recommended mitigation measures are provided in Section 6.1.8.5 of this ESIA Report.

Table 6.14 – Mitigation Measures addressing Potential Traffic Issues during Construction Phase

Aspect	Mitigation Measures	Implementation Schedule/Frequency	Responsible Party
Construction Traffic	In order to minimize impact on traffic impacts during construction phase, a traffic management plan should be prepared and should include the following measures, as a minimum: • Separate exit and entrance points to the construction work area and temporary facilities, in order to avoid choke points • Signage and visibility signs (cones, tapers, etc.) should be installed at strategic locations along access roads, particularly at the entrance and exit points • When temporary obstruction of roadways is required, temporary delineation in the form of traffic cones, cylinders etc. should be used • A designated delivery area and parking area for delivery trucks should be established • Delivery of materials to the site should be properly scheduled avoiding busy and rush hours • Access roads should utilize existing tracks as much as practicable and should avoid passing through any potential sensitive receptors (i.e., residential areas, schools, etc.) In addition to the above, the contractor should ensure that the traffic management being developed for the construction phase is approved by relevant authorities (RTA) before implementation.	During the entire duration of proposed Project works	Construction Contractor

6.1.8.5 Monitoring Program for Traffic Impacts

No specific monitoring plan for traffic impacts is deemed necessary during Project implementation. However, it is recommended to monitor the effectiveness of the traffic management plan during the construction phase and appropriate adjustments should be implemented in coordination with relevant authorities.

6.1.9 Sustainability

The sustainability assessment is generally qualitative and lifecycle carbon footprint assessment cannot be undertaken since the Project is currently in design stage and specific information in regard fuel consumption and electricity consumption are not available.

6.1.9.1 Water Usage

Water usage during the construction phase is mainly associated with domestic usage and for construction activities (i.e. cleaning water, potable water for drinking, etc.). Based on the current practice in Dubai, the water to be used during this phase will be sourced from existing supply facilities (i.e. DEWA for potable water and for industrial water use, i.e. TSE). No groundwater extraction at the site or offsite location is expected during construction phase.

The total volume of water required during construction phase will be dependent on actual construction works and number of personnel. In terms of potable water consumption, there is no data available that is specific to construction phase. In UAE, however, the domestic water per capita consumption is 500 l/day. Considering a construction project, most of the potable water will be utilized at the labor camp where the construction workers' personal hygiene activities (shower, etc.) and food preparation will take place. As previously noted, the labor camp will be located offsite (it is expected that an existing camp will be utilized for this purpose). At the construction site, the actual potable water consumption will be mainly used for sanitary purposes (i.e. toilet, ablution, etc.) and will be minimal.

The water to be used for construction purposes cannot be estimated. However, considering the limited civil works to be undertaken (i.e. main activities will involve equipment installation), it is not expected to be a concern. Also, as typically practiced in Dubai, it is expected that treated wastewater will be primarily used for construction purposes including water dampening of roads and open areas (dust control).

Based on the above, it is not expected to be a concern in terms of its impact on the existing supply within Dubai and can be accommodated through the existing water generating facilities in the Emirate. In addition to this, DM will carry out environmental auditing during the construction of the Project, in which water conservation measures are a key aspect that will be monitored.

During operation, potable water will be mainly used for sanitary purposes (i.e. toilet, ablution, etc.) and will be very minimal (generally about 100 liters per day). Potable water will be supplied through the existing distribution mains of DEWA (coordination regarding connection is undertaken separately as part of design). Based on this, the water consumption during the operation is minimal and is not expected to impact existing supply.

Mitigation Measures

Based on the above and considering the water use reduction measures incorporated in the design of plant, impacts related to water usage are not expected to be a concern. Nonetheless, the following best practices are further recommended to ensure that water usage will be further reduced during construction and operation (see Table 6.15).

Table 6.15 – Potential Mitigation Measures for Water Usage Impacts

Location	Potential Mitigation Measures
Construction Phase	
Construction activities	▪ During construction, contractors should limit potable water to domestic use and use industrial grade water, as much as possible, for construction works. ▪ During construction, washing of vehicles at sites should be limited. Dry cleaning techniques should be adopted. ▪ During construction, all water storage tanks should regularly be inspected for leaks and any as required should be repaired/ replaced immediately.
Operation Phase	
Pant Operation	▪ Develop or adopt water usage efficiency/reduction program. ▪ Personnel should be trained in water usage reduction.

Monitoring Program

Table 6.16 presents the proposed monitoring program during the construction and operation phases of the Project for the aspect of water usage.

Table 6.16 – Water Usage Monitoring Program during Construction

Aspect	Monitoring Requirement	Method	Frequency	Corrective action required in case of non-compliance	Responsibility
Construction phase water usage	Inspect water storage and transfer facilities for any leaks	Visual inspection as part	Weekly	Repair or replace equipment in case of leaks	Construction Contractor
	Monitor and record water consumption at the site	Review of records	Monthly	Implement reduction measures in case of increase in monthly consumption	
Operation phase water usage	Inspect water storage and transfer facilities for any leaks	Visual inspection as part	Weekly	Repair or replace equipment in case of leaks	Dubai Municipality (DM) and/or DM appointed contractor
	Monitor and record water consumption of the entire facility	Review of records	Quarterly	Implement reduction measures in case of increase in monthly consumption	

6.1.9.2 Electricity Usage

Electricity during the construction phase of the Project will be mainly used in temporary facilities to be constructed at the site and for various construction equipment. As previously noted, construction workforce will be billeted in offsite accommodation (not included in the scope of this ESIA study). The electricity requirements during construction phase will be supplied through diesel generator sets to be deployed at the site (off grid). Based on this and since the construction phase is temporary, electricity usage during construction is not expected to be of concern and will not affect local supply.

During operation, being a power generating facility, the proposed PV plant will not require additional power from the grid. From a sustainability perspective, the design to incorporate the integration of energy-efficient systems, such as variable-speed pumps, LED lighting, use of feasible renewable energy sources (solar panels etc.,) and advanced monitoring technologies, to minimize electricity consumption. Also, installation of automation monitoring systems to track and optimize resource usage and prevent overuse of electricity or water. Based on the above, the potential impact of electricity usage is not expected to be a concern. No additional mitigation measures are recommended for the aspect of electricity usage.

6.2 Social Impact Assessment

In general, the overall socio-economic impact of the Project is expected to be positive, particularly in the aspect of job generation (both during construction and operation) and on the overall sewage management and sustainability initiatives of the Dubai Government. As previously noted, once fully completed, the system significantly enhance the sewerage system in the Emirati, which is expected to consequently reduce the overall carbon emissions from the sewage handling and treatment process. This will streamline operations, enhance efficiency, and reduce maintenance complexity by transitioning from a pumped system to a gravity-based system.

Also, considering its design life of 120 years, it ensures long-term sustainability and adaptability to evolving urban needs.. Additionally, it prioritizes operational simplicity, cost reduction, and integration with smart infrastructure systems, ultimately contributing to a more sustainable, efficient, and future-ready urban environment.

In addition to the above, it is to be noted that the proposed Project will not directly impact any civilian population or any other civilian related socio-economic activities. Any impact during construction is temporary and would be reversible. Land use is also not a concern

since the proposed Project is underground and its construction and operation will not affect any above ground structures. Furthermore, the proposed above-ground Project components (i.e., shafts) will be mainly located in defined road-side utility corridors that are managed by the municipality.

During operation, the facilities will not have any direct interaction with any civilian infrastructure and thus, no negative socio-economic impacts are expected. Details of social impact assessment are provided in the following paragraphs.

6.2.1 Construction Phase Social Impacts

6.2.1.1 Existing Land-uses

As discussed in the preceding sections, land-use issue is not a concern for the Project considering its nature (i.e., underground tunnel). It should also be noted that its route was specifically selected and designed to avoid any underground utilities and infrastructure. Furthermore, its construction and operation (including its depth that is ranging 35 to 80 meters) were specifically designed to ensure that there will be no impact on any above-ground and underground structures throughout its route.

In regard to the location of the above-ground components, as previously mentioned, the construction shafts (CSs), receiving shafts (RSs), maintenance shafts (MSs), and vortex drop shaft (VDS) sites will be located within the roadside utility corridors and there will be no direct impacts to any civilian land-uses or activties. These utility corridors are managed by Dubai Municipality and is intended for public infrastructure.

Based on the above, impact from land-uptake and land-use alteration during construction of the Project is considered negligible and will not result in any socio-economic concern.

6.2.1.2 Travel Routes and Traffic

The aspects of traffic during both construction and operation are already assessed in Section 6.1.8 and thus, not further assessed in this Section. DM, through its appointed contractors, nonetheless, should ensure that all recommendations are implemented to ensure that traffic generation during construction and operation will not result in significant social concerns. The key mitigation measure is develop a traffic management plan and to ensure that permit is acquired for any traffic obstruction during construction phase. The construction contractors should ensure that all requirements of traffic authorities are strictly implement in case of any potential traffic obstruction.

6.2.1.3 Socio-economic

As previously noted, there are no socio-economic activities within or in the immediate surrounding areas of the proposed sites that could be impacted by the construction of the Project. The proposed tunnel will be located underground and the above-ground facilities will be within designated utility corridors. There are no commercial, industrial or any livelihood land-uses or activties that is expected to be directly affected by the Project.

On a positive aspect, employment opportunities for UAE nationals are expected during construction in line with Emiratization program. These employment opportunities, however, may not directly affect the communities in inhabited areas near the Project areas. In general, hiring is through Emirate or national level and provides equal opportunities to all qualified local citizens. The UAE government also puts great emphasis on ensuring security of employment for locals through the Emiratization Program (Ministerial Resolution No. 663 of 2022 Regarding Compliance with Emiratization Regulations in the Private Sector), which is one of the highest priorities of the government.

This program requires the private sector to have a two (2) percent Emiratization rate annually for skilled jobs in private sector establishments with 50 or more employees and to achieve an overall rate of increase of 10 percent by 2026.

6.2.1.4 Stakeholder Engagement

The results of social baseline data gathering showed that the implementation of the proposed Project will not directly affect any communities or livelihood/socio-economic activities and thus, detailed external stakeholder engagement is not required during the Project implementation.

Nonetheless, consultations, information dissemination and acquisitions of NOCs are required to ensure that the implementation of the construction works will not result in negative social effects and will not affect any other developments that are ongoing or planned within the general area of the Project sites. Acquisition of NOCs from municipality planning department, utilities providers, security agencies, etc. is particularly important to ensure that construction works will not damage any existing infrastructure (both .

Consultations and acquisition of permits, on the other hand, are important in relation to relevant departments of DM, who manages all public services and related infrastructure. Continuous coordination and interaction are required with DM in the next stages of the Project implementation, particularly for the construction activities.

Information dissemination is also necessary for the residential areas in the proximity of the proposed locations of the construction shafts and other above-ground structures. This is essential to ensure that they are aware of the activities that will take place, particularly the schedule of activities. Table 6.17 provides the summary of the entities to be consulted during the construction phase of the Project that were identified as part of social baseline data gathering.

Table 6.17 – List of Stakeholder Groups during Construction Phase

S. No.	Stakeholder Groups / Location	Entities /Parties	Interest / Concern
Residential Areas			
ESC.1	Residential areas in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners ▪ Land / real estate developers ▪ Dubai Municipality	▪ Potential nuisance due to traffic during construction phase. ▪ Potential noise and dust issues in case of high winds conditions
Private Industrial and Commercial			
ESC.2	Commercial establishments in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners ▪ Land / real estate developers	▪ Potential operation disturbance during construction phase (including dust generation impacts). ▪ Potential damage to existing infrastructure during construction/ excavations. ▪ Potential effect/impact on future/planned projects. ▪ Potential noise and dust issues in case of high winds conditions
ESC.3	Industrial establishments in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners	
Protected Areas and Archaeology			
ESC.4	Archaeological sites	▪ Dubai Art and Culture Authority	▪ Potential damage to sites
Government / Services Providers Companies			
ESC.5	Police and Military (Security)	▪ Dubai Police ▪ UAE Armed Forces GHQ	▪ Potential damage to underground infrastructure during construction. ▪ Disturbance to security / military related activities within the general area.
ESC.8	Dubai International Airport	▪ Dubai International Airport	▪ Potential to any airport related infrastructure

S. No.	Stakeholder Groups / Location	Entities /Parties	Interest / Concern
ESC.9	Utility infrastructure and services providers	▪ DEWA ▪ DM Public Facilities Department ▪ DM Planning & Governance Sector ▪ DM Environment, Health & Safety Agency ▪ DM Buildings Regulation & Permits Agency ▪ Emirates Telecommunication Group Company PJSC (Etisalat) ▪ Emirates Integrated Telecommunications Company PJSC ("du")	▪ Potential damage to underground and above ground infrastructure during construction. ▪ Potential impacts to future developments

6.2.1.5 Involuntary Resettlement

As previously discussed, the proposed Project will not directly any civilian land-uses or activities. The above-ground structures associated with the Project will also be located within defined utility corridors. Thus, its implementation will not result in any involuntary resettlement.

6.2.1.6 Vulnerable People i.e., Local Communities

IFC (Performance Standard 1) defines vulnerable as "status may stem from an individual's or group's race, color, sex, language, religion, political or other opinions, national or social origin, property, birth, or other status.

This should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources." For the proposed Project, there will be no communities or livelihood/socioeconomic activities that will be directly affected during construction. Thus, no social impacts are envisaged associated with vulnerable people.

6.2.1.7 Cultural Heritage

In terms of cultural and archaeological impacts, the proposed Project will involve development of underground tunnel (35 to 80 m in depth). Thus, there are no archaeological or cultural sites expected within the Project areas. Nonetheless, to confirm absence and to ensure that there will be no damage to any archaeological sites (if any), appropriate consultation with Dubai Culture Department should be undertaken. In case of presence of archaeological sites, any requirements of Dubai Culture should be strictly implemented.

6.2.1.8 Environmental-based Impacts

Visual Impacts

The only component of the Project that will be visible to public are the above-ground part of the proposed shafts. It should be noted that these shafts will be located in fenced areas and since these will be within utility corridors, visual impacts is not expected to be a concern.

Ecosystem Services

The implementation of the Project will not result in any impact to any ecosystem services land-uses. As previously noted, it will involve construction of underground tunnel and the proposed above ground structures will be within defined roadside utility corridors.

Air Emissions

During construction phase, air emissions will be mainly emitted from diesel generators, cranes, and vehicles/heavy equipment (trucks, excavator, pick-up, etc.). Dust emissions will also be generated as a result of dust re-suspension from unpaved roads due to vehicular movement and site preparation works. In general, the air quality impacts from emissions from construction equipment are considered to be temporary and reversible.

It should also be noted that the environmental impact assessment undertaken for the Project (see Section 6.1) concluded that impacts from both combustion emissions and dust would not be significant if appropriate mitigation measures were implemented. Thus, provided that all mitigation measures defined in the ESIA Report are implemented, air emissions are not expected to cause any social concerns during construction.

Noise and Vibration

Noise during the construction phase of the Project will mainly be generated from the operation of construction equipment and construction activities such as site grading, ground compaction, trenching, etc. In terms of noise, the potential receptors are the residential areas in the vicinity of the proposed locations for shafts. For the noise and vibration, the implementation of the mitigation measures as outlined in Section 6.1.7 of this Report is deemed sufficient to ensure that impacts will be within acceptable level.

The risk of damage to any utility lines or other utility infrastructure due to vibration shall be addressed through consultations and NOC acquisition with relevant entities and stakeholders. The required safe working distance and any other safety requirements to be included in relevant NOCs shall be implemented by the construction contractors.

Waste and Effluent

Various waste streams will be generated during the construction phase of the Project implementation which include general construction waste, domestic waste, hazardous waste, and vessel generated waste. It should be noted that in line with DM guidelines, which is required to be followed by DM and its contractors, a Waste Management Plan (WMP) will be as developed by the EPC contractor based on the results of the environmental impact assessment (see Section 6.1) and thus, this aspect is not further assessed in this Section.

Terrestrial Ecology

The aspects of terrestrial ecology have been appropriately assessed in the environmental impact assessment Section (see Section 6.1.5). The results of the assessment identified that the potential ecological impacts are not expected to result in significant biodiversity deterioration due to the relatively developed nature of the areas where the Project will take place.

6.2.2 Operation Phase Social Impacts

6.2.2.1 Existing Land-uses

The aspect of land-use is primarily a concern during the construction phase due to the land uptake of the Project facilities. There are no additional concerns related to land use during the operation of the proposed Project facilities.

6.2.2.2 Travel Routes and Traffic

The aspects of traffic during both construction and operation are already assessed in Section 6.1.8 and thus, not further assessed in this Section. It is worth highlighting that during operation, the traffic movement associated with the Project is very limited (mainly 1 or 2 vehicles to be used during regular maintenance activties).

6.2.2.3 Socio-economic

Similar to construction phase, the operation of the Project facilities will not have any direct impact to any communities and other areas within the Project AoI. On a positive aspect, employment opportunities for UAE nationals are also expected during operation in line with Emiratization program. These employment opportunities, however, may not directly affect the communities within the general area, but nonetheless will contribute to the overall employment rate target for UAE nationals (particularly in Dubai).

6.2.2.4 Stakeholder Engagement

The operation of the proposed Project facilities is not expected to directly affect any communities or civilian/public/private infrastructure and facilities. Thus, external stakeholder engagement is not further required during the operation of the proposed Project. Nonetheless, continuous coordination with the residential areas and other establishments in the vicinity of shafts wherein potential odor issues could arise is essential. Any odor complaints from these potential receptors shall be addressed and investigated during operation.

Table 6.18 provides the summary of the entities to be consulted during the operation phase of the Project that were identified as part of social baseline data gathering.

Table 6.18 – List of Stakeholder Groups during Construction Phase

S. No.	Stakeholder Groups / Location	Entities /Parties	Interest / Concern
Residential Areas			
ESO.1	Residential areas in the vicinity of above-ground structures (see Table 5.14)	▪ Private/individual owners ▪ Land / real estate developers ▪ Dubai Municipality	▪ Potential odor issues during operation
Private Industrial and Commercial			
ESO.2	Commercial establishments in the vicinity of above-ground structures (see Table 5.14)	▪ Private/individual owners ▪ Land / real estate developers	▪ Potential odor issues during operation
ESO.3	Industrial establishments in the vicinity of above-ground structures (see Table 5.14)	▪ Private/individual owners	

6.2.2.5 Involuntary Resettlement

The proposed facilities will not directly affect any communities during operation and that could result in any potential relocation. Based on this, there is no impact expected from this aspect.

6.2.2.6 Vulnerable People i.e., Local Communities

Similar to construction phase, there will be no communities that will be directly affected during normal operation of the proposed facilities. Thus, this aspect is not applicable to the Project.

6.2.2.7 Cultural Heritage

The potential issue related to any archaeological or cultural sites within the AoI of the proposed Project is expected to be fully addressed during the construction phase. Based on this, there is no impact expected from this aspect.

6.2.2.8 Environmental-based Impacts

Visual Impacts

The only component of the Project that will be visible to public are the above-ground part of the proposed shafts. It should be noted that these shafts will be located in fenced areas and since these will be within utility corridors, visual impacts is not expected to be a concern.

Ecosystem Services

The operation of the proposed Project will not result in any additional land-uptake that could result in any direct impact to any ecosystem activities in the general area. As previously noted, it will involve construction of underground tunnel and the proposed above ground structures will be within defined roadside utility corridors. Thus, no significant impact is expected from this aspect.

Air Emissions

The air emission issue during the operation of the Project is the potential odor issues associated with the operation of the shafts (particularly the VDS). However, the results of the odor modeling as presented in Section 6.1.1.2 of this Report showed that odor is not expected to pose any impacts to potential receptors. Nonetheless, continuous coordination with the residential areas and other establishments in the vicinity of shafts wherein potential odor issues could arise is essential. Any odor complaints from these potential receptors shall be addressed and investigated during operation.

Noise and Vibration

The operation of the Project will not involve any high noise generating equipment and thus, noise and vibration is not an issue.

Waste and Effluent

Various waste streams will be generated during the operation phase of the Project implementation which include general operation waste (including maintenance waste), domestic waste, and hazardous waste. Based on the results of the environmental impact assessment (see Section 6.1.3), it is expected that a specific Waste Management Plan (WMP) will be developed for operation.

Terrestrial Ecology

The potential issue related to terrestrial ecology is expected to be fully addressed during the construction phase. As previously noted, the proposed above-ground facilities will be located within defined utility corridors in developed areas of Dubai. Thus, ecological issues is not expected during operation.

6.2.3 Decommissioning Phase Social Impacts

During decommissioning, the social impacts will be mainly associated with the potential disturbance to any surrounding uses that could present within the general area during this stage. Impacts would generally vary from direct disturbance to any civilian activties nearby, or nuisance due to environmental-based social aspects such as noise generation. The mitigation measures for environmental-based social aspects are provided in relevant parts of Section 6.1 of this Report.

Based on this and considering that this stage will occur after 120 years, actual social impacts cannot be accurately assessed at this point. Nonetheless, no significant social impact is expected during this phase since decommissioning activties, in general, do not require additional land-uptake (i.e., no land-use issue) and will not result in any relocation. Nonetheless, to ensure that impacts are appropriately assessed and controlled to within acceptable levels, a separate social impact assessment should be undertaken for the decommissioning phase.

6.2.4 Proposed Mitigation Measures for Social Impacts

Table 6.19 presents the proposed mitigation measures to address the potential social impacts during the implementation of the Project. In regard to the identified environmental-based impacts (i.e., air quality, noise, terrestrial ecology, etc.), the required mitigation and control measures are outlined in Section 6.1 and not further presented in this Section.

Table 6.19 – Mitigation Measures addressing Potential Social Impacts

Social Component	Aspect	Mitigation Measures
Construction Phase		
Existing Land Uses	Land-uptake	▪ Consultations with relevant departments of DM (i.e., public infrastructure and land-use planning departments). ▪ Information dissemination to residents and property developers of residential areas in the vicinity of the proposed shafts.
Travel routes and traffic	Disturbance to vehicular traffic in nearby roads/ highways and routine movement within nearby roads	▪ EPC contractor should develop a traffic management plan based on consultation with Dubai Police – Traffic Department, including mobilization, entry/exit point from major roads/highways, road crossings, etc. ▪ The plan should consider/include the following: - Designate separate exit and entrance points for the Project site (from and to major road), in order to avoid traffic choke points. - Signage and visibility signs (cones, tapers, etc.) should be installed at strategic locations along access roads, particularly at the entrance and exit points. - When temporary obstruction of roadway is required, temporary delineation in the form of traffic cones, cylinders, or barriers, etc. should be used to help drivers to carry out unusual maneuvers. This should be undertaken in coordination with the police traffic department. - Ensure vehicular movement to an absolute minimum and to maintain movement within pre-defined Project areas. - Access roads should utilize existing tracks as much as practicable and should avoid passing through residential areas, farms, forestry plantations and other potentially sensitive receptors. - Strict adherence to speed limits and traffic signs placed along access roads. - Vehicular movement should be limited to predefined access routes and paths. All drivers should be provided with appropriate induction. - Delivery of materials should be appropriately planned in order to avoid traffic congestion. A proper parking area should be developed, and delivery trucks should not be allowed to park alongside roads/highways. - Wheel/tire cleaning prior to entry to roads and highways to avoid carry over of mud. Any mud carryover on entry points should be immediately removed and cleaned.
Stakeholder engagement	Information dissemination, Project introduction, NOC acquisition, etc.	▪ Consultations and acquisition of NOCs from relevant government agencies and utilities providers (DEWA, Etisalat, etc.) are necessary to ensure that the Project activities will not affect any public or private infrastructure that could be present within the general area. ▪ Information dissemination to surrounding communities and facility owners to inform of the Project and its importance in Dubai.

Social Component	Aspect	Mitigation Measures
Socio-economic	Job opportunities and labor protection	▪ The construction contractor should maximize the employment of local people, as far as practicable. ▪ The construction contractor should prioritize local businesses for the supply of construction materials, food, and other construction-related consumables. ▪ Ensure the practices as suggested by UAE labor laws will be complied (e.g., wages, working hours including summer working hour limits, required break and non-discriminatory work practices). ▪ Provide satisfactory and safe working conditions at the work site in compliance with UAE workers' welfare requirements (i.e., provision of appropriate site rest areas, drinking water). ▪ Provide adequate and sufficient accommodation facilities having all basic requirements, including proper sanitary facilities
Cultural heritage	Potential damage to archaeological sites	▪ DM through its appointed contractors to carry out consultation with Dubai Culture to confirm the presence or absence of any archaeological sites within the Project areas. All requirements of the authority shall be strictly followed and implemented. ▪ DM through its appointed contractors to develop Chance Find Procedure.
Environmental-based social impacts	Disturbance to marine habitat (including loss of habitat), flora/fauna	▪ Strict implementation of mitigation measures related to air emissions, noise, terrestrial ecology, and waste management outlined in this ESIA Report.
Operation Phase		
Stakeholder engagement	Information dissemination, NOC / permit renewal, etc.	▪ Continuous coordination with the residential areas and other establishments in the vicinity of shafts wherein potential odor issues could arise is essential. ▪ Any odor complaints from these potential receptors shall be addressed and investigated during operation
Environmental-based social impacts	Ecological impacts, public health issues, public safety, etc.	▪ Strict implementation of mitigation measures related to air emissions, noise, terrestrial ecology, and waste management outlined in this ESIA Report.
Decommissioning Phase		
General	General	▪ A separate social impact assessment should be undertaken for the decommissioning phase and as required; a Stakeholder Engagement Plan should be developed.

6.2.5 Monitoring Program for Social Impacts

Table 6.20 presents the proposed monitoring program to the potential social impacts during the implementation of the proposed Project. A separate monitoring program shall be developed for the decommissioning phase as part of the DESMP.

Table 6.20 – Monitoring Program for Social Impacts

Aspect	Monitoring Requirement	Location and Frequency	Corrective Action	Responsibility
Construction Phase				
General	Monitor progress of site permitting works.	Prior to any site activities	No work to be undertaken in any areas with no proper permit or NOC issued.	EPC Contractor
	Site inspection to check the implementation of the recommended mitigations measure for environmental-based	Daily	Inform construction manager/supervisor of any non-compliance and appropriate timeline should be given to rectify	EPC Contractor

Aspect	Monitoring Requirement	Location and Frequency	Corrective Action	Responsibility
	impacts		issues.	
	Coordination with relevant residents/facility owners, utility providers and government entities (DM) should be maintained throughout the construction phase	Daily or as required in specific NOCs/permits	Stop works if case of any complaints and immediately notify site construction manager/ supervisor	EPC Contractor
Vehicular Traffic	Monitoring of vehicular movement and speed, i.e., Vehicles online (real-time) In-Vehicle Monitoring System (IVMS) integrated with GPS and GPRS	Daily (Continuous)	Any vehicles outside Project areas or over the speed limit should be immediately informed to move within Project areas	EPC Contractor
Operation Phase				
Environmental-based social impacts	Monitoring program in line with the recommendations of this ESIA Report	As per relevant DM requirements	As per DM requirements	Dubai Municipality (DM) and/or appointed contractor

6.2.6 *Risk Assessment*

Table 6.21 presents the risk ranking of the potential social impacts during the implementation of the proposed Project. In the absence of specific social regulations, the risk ranking was undertaken in line with the Social Risk Ranking Matrix provided in ADNOC Social Risk Management Standard (HSE-GA-ST10, see Annex 5).

The ranking showed the potential social risks pose Low to Medium risks. It should be noted that the risk ranking already considered the implementation of the proposed mitigation measures and monitoring program as outlined in the preceding section of this Report (see Section 6.2.4).

Table 6.21 – Summary of Risk Assessment of Potential Social Impacts from Implementation of the Project

Social Component	Aspect	Severity	Likelihood	Risk
Construction Phase				
Existing Land Uses	Land-uptake	Notable	Unlikely	Low
Travel routes and traffic	Disturbance to vehicular traffic in nearby roads/highways and routine movement road users	Minor	Possible	Medium
Socio-economic	Socio-economic Development		Not applicable	
	Livelihood		Not applicable	
	Disturbance to economic activities	Notable	Unlikely	Low
Stakeholder engagement	Information dissemination, Project introduction, NOC acquisition, etc.	Minor	Possible	Medium
Involuntary resettlement	Disturbance to Local Communities / farm owners and workers		Not applicable	
Vulnerable people i.e., local communities	Disturbance to Local Communities		Not applicable	
Cultural heritage	Potential damage to archaeological sites	Minor	Unlikely	Low
Environmental - Visual	Nuisance to public	Notable	Unlikely	Low

Social Component	Aspect	Severity	Likelihood	Risk
Environmental - Ecosystem services	Potential change of land-use	Not applicable		
Environmental - Air emissions	Nuisance to public	Minor	Possible	Medium
Environmental - Noise and vibration	Nuisance to public	Minor	Possible	Medium
Environmental - Waste and effluent	Nuisance to public/ pressure on infrastructure	Minor	Unlikely	Low
Environmental – Terrestrial ecology	Disturbance to terrestrial flora and fauna	Notable	Unlikely	Low
Operation Phase				
Existing Land Uses	Land-uptake	No additional concern during operation		
Travel routes and traffic	Disturbance to vehicular traffic in nearby roads/highways and routine movement of road users	Notable	Unlikely	Low
Socio-economic	Socio-economic Development	Not applicable during operation		
	Livelihood			
	Disturbance to economic activities			
Stakeholder engagement	Information dissemination	Notable	Unlikely	Low
Involuntary resettlement	Disturbance to Local Communities	Not Applicable		
Vulnerable people	Disturbance to Local Communities	Not Applicable		
Cultural heritage	Potential damage to archaeological sites	Not Applicable		
Environmental - Visual	Nuisance to public	Not Applicable		
Environmental - Ecosystem services	Potential ecological impacts	Not applicable during operation		
Environmental - Air emissions	Nuisance to public (odor from VDS)	Notable	Unlikely	Low
Environmental - Noise and vibration	Nuisance to public (from VDS and during maintenance)	Notable	Unlikely	Low
Environmental - Waste and effluent	Nuisance to public/ pressure on infrastructure	Notable	Unlikely	Low
Environmental - terrestrial ecology	Disturbance to terrestrial flora and fauna	No additional concern during operation		

6.3 Human Rights and Labor Protection

Human rights are generally defined as the people's right to be treated with dignity. Human rights are inherent to every person, irrespective of their race or ethnic origin, nationality, residence, sex, color, religion, language, or any other status. The United Nations (UN) and some international organizations and lenders have developed specific requirements and procedures in human rights impacts assessment.

For instance, the UN has developed the Guiding Principles on Business and Human Rights (UNGP), which are grounded in recognition of[7]:

- States' existing obligations to respect, protect and fulfil human rights and fundamental freedoms.
- The role of business enterprises as specialized organs of society performing specialized functions, required to comply with all applicable laws and to respect human rights.
- The need for rights and obligations to be matched to appropriate and effective remedies when breached.

[7] United Nations, 2011: Guiding Principles on Business and Human Rights (UNGP). Data retrieved from www.ohchr.org.

The UNGP highlights the responsibility of companies or business entities, regardless of their size, structure, or sector, to respect human rights. In line with these and in accordance with the relevant requirements IFC PS and local regulations, the potential human rights impacts associated with the Project implementation have been identified and assessed.

The assessment was specifically undertaken to:

- Identify the potential human rights impacts associated with the implementation of the Project, covering both construction and operation phases.
- Assess the potential human rights impacts in line with international frameworks and good practice standards.
- Identify management and mitigation measures to address the identified potential human rights risks.
- As required, develop measures ensure an effective engagement with affected communities and workers.

6.3.1 Human Rights Assessment Process

The Human Rights Impact Assessment is a process of analysing a project and its implementation strategies to identify and assess the potential impacts on human rights. Figure 6.1 shows the key components of the assessment process, as follows:

- Scoping – defining the scope of the assessment process, identification of the potential stakeholders, defining data collection requirements and scoping potential impacts.
- Data Collection – involves gathering to facilitate the risk identification and assessment process. This could involve site data gathering, review of relevant published information, workshops, interviews, etc.
- Risk Identification – defining potential human right risks considering the actual project components and implementation strategies and the actual site conditions as informed by the data collection process.
- Risk Prioritization and Mitigation – involves risk assessment using internationally accepted guidelines to define the inherent risks and residual risks (considering the project integral management measures). Salient issues identified should be prioritized, particularly in defining additional mitigation measures.
- Reporting and Tracking Performance – consolidation of the assessment results in a register. Tracking will involve performance monitoring and review to ensure the effectiveness of the management measures.

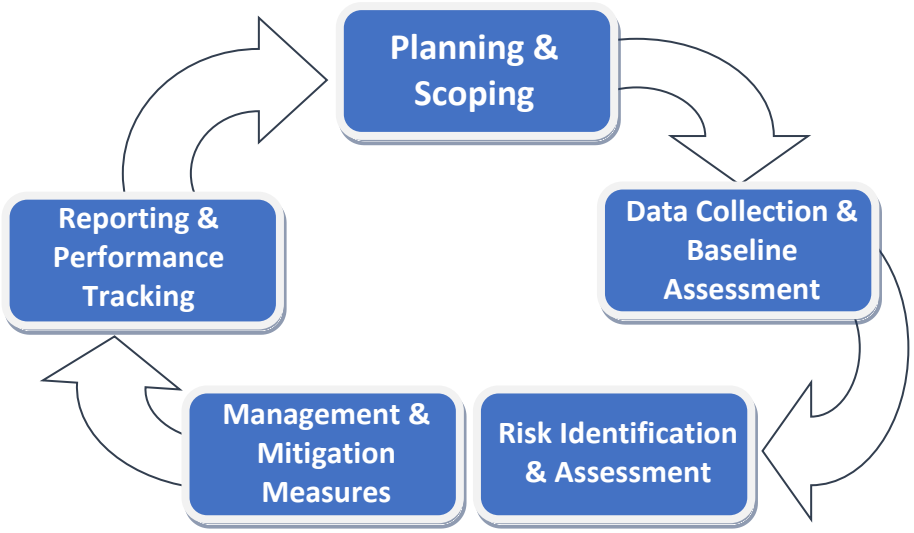


Figure 6.1 – Typical Human Rights Risk Assessment Process

Figure 6.2 shows the human rights risk assessment matrix adopted for the Project. In terms of severity, the UNGP specifies that severity of impacts shall be assessed based on their scale, scope, and irremediable character, as follows:

- Scale – define the seriousness of the potential impact, such as right to life or if potential impacts affect could directly affect health and safety of the workers or the public.
- Scope – define the extent of the potential human right risks, such as the number of potential receptors or stakeholders (i.e., impact on livelihood could consequently affect an entire community).
- Remediably – define the residual effect and assess whether impacts are reversible or not (i.e., is there any potential relocation or loss of important heritage sites, which could potentially be permanent).

In terms of likelihood, it shall be assessed by qualitatively defining the probability of potential impact occurring considering the site-specific baseline conditions. For instance, likelihood of occurrence of a human rights risk is higher in areas with existing conflicts, relatively weak governance, differences with local practices or norms and international standards, etc.

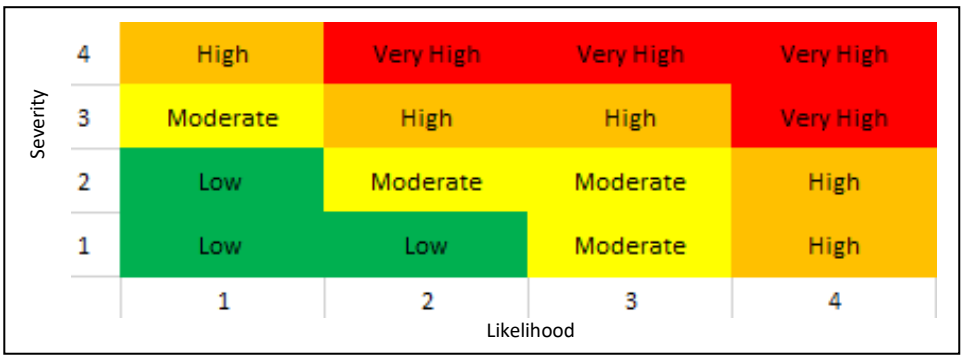


Figure 6.2 – Human Right Risk Assessment Matrix

Table 6.22 – Summary of Identified Human Rights Risks / Issues

Human Rights Aspect	Indicator	Threshold
Discrimination	% of workers with valid contracts	100% of workers must be employed under formal legal contracts (per UAE labor law)
	Incidents of child or forced labor	Zero tolerance – 0 incidents
	Compliance with minimum wage and legal benefits	100% compliance with UAE labor regulations
	Worker grievance mechanism	Functional and accessible to 100% of workers; resolution within 30 days
	Average working hours	Not to exceed 48 hours per week + max 12 hours overtime (as per UAE Labor Law)
Occupational Health & Safety	Workplace injury rate	Maintain injury rate below 1 per 200,000 work hours
	HSE training coverage	100% of workers trained in HSE procedures prior to deployment
	Use of proper PPE (Personal Protective Equipment)	100% compliance across construction and operations

Human Rights Aspect	Indicator	Threshold
Worker Welfare & Accommodation	Compliance with UAE worker welfare regulations	Full compliance with UAE Ministerial resolutions
	Access to potable water, clean sanitation, and safe housing	100% access provided to all site-based workers
Security & Human Rights	% of security personnel trained on human rights	100% trained annually (aligned with Voluntary Principles on Security and Human Rights)
	Incidents of abuse or misconduct by security staff	Zero tolerance – 0 reported or substantiated incidents
Community Engagement	Number of stakeholder consultations held	Minimum of 2 formal consultations during pre-construction phase
	Logging and resolution of complaints from nearby communities	100% of complaints logged and addressed within 60 days

6.3.2 Impact Identification and Assessment

6.3.2.1 Impact Identification

The results of the social impacts assessment undertaken (see Section 6.2) showed that the proposed Project will not directly impact any communities or any livelihood and ecosystems services.

This is mainly due to the fact that the proposed Project will mainly involve underground tunnel construction and all the above-ground components will be located within roadside utility corridors. Thus, the implementation of the proposed Project will not result in direct impacts to any civilian land-uses or civilian activities.

Based on the above and due to the absence of communities and other sensitive stakeholders within and in the immediate vicinity of the Project site , human rights issues in relation to the general public are not expected to be a concern. There are no components of the Project or activties that will encroach any public areas that could result in any human rights concerns.

The potential human rights issues in relation to environmental-based impacts (i.e., air pollution, noise pollution, community health and safety, etc.) have been appropriately assessed as part of the environmental and social assessment and accordingly, management measures to ensure that impacts are controlled within acceptable levels have been defined (see details in Section 6.1 and Section 6.2 of this Report). In addition, as previously discussed, the local environmental permitting process for the Project has already been initiated and is ongoing at the time of the development of this Report.

Considering the above Project-specific factors, the potential human issues during the implementation of the Project are primarily related to labor protection related issues. These impacts could potentially occur in all phases of Project implementation but is more likely to be a concern during construction due to the large quantity of workforce expected and nature of manpower provision in UAE (i.e., workers will be mainly expatriates).

Table 6.23 provides a summary of the identified potential human right issues that could arise during the implementation of the Project, both during construction and operation phases. The potential human rights issues during decommissioning would generally be similar to construction. Nonetheless, the potential human rights issues during this phase should be addressed in a separate and dedicated study since it would occur in a much later stage and potentially in a different social and regulatory context (i.e., not further assessed).

Table 6.23 – Summary of Identified Human Rights Risks / Issues

Potential Human Rights Issue	Description	Relevant Human Rights (not limited to)
Construction Phase		
Discrimination	Discrimination could occur due to the nature and origin of the workforce during construction phase, which will be mainly expatriates' workers. Discrimination could also arise due to the generally low educational degree of workers (majority will be construction laborers and helpers, most from south Asian countries).	Prohibition of discrimination. Right to just and favorable conditions of work. Right to an adequate standard of living.
Labor Standards / Collective Bargaining	A key aspect in large-scale construction wherein several contractors and large number of workers are involved. The following violations could arise: - Lack of employment contracts or standardized contracts. - Potential violations in relation to renumeration, working hours (including unpaid or forced overtime), the right to family and social life. - Potential discrepancy between contractual obligations and actual working conditions, including forced labor.	Right not to be submitted to slavery, servitude, forced labor
Occupational Health and Safety and general Welfare	Potential poor occupational health and safety procedures, including unavailability of appropriate personal protective equipment (PPE), work rest cycles, etc. Absence of basic welfare facilities, including rest areas, proper workers accommodation, decent food provisions, etc. Absence of basic medical services, including site clinic and medical insurance coverage.	Right to an adequate standard of living. Right to the highest attainable standard of physical and mental health Right to just and favorable conditions of work
Freedom of Association	Potential restriction to form or join groups, such as religious groups, considering the generally diverse religious background of workforce in UAE.	Right to freedom of association.
Human Trafficking	Human trafficking related issues is a potential issue considering that most workers during construction phase will be expatriates. This could include the employment of potentially under-aged workers (due to fake documentations), slavery, etc.	Right to freedom of movement. Right to social security. Right not to be submitted to slavery, servitude, forced labor.
Grievance Mechanism	This is a potential challenge particularly for laborers or unskilled workers. Affected workers may feel uncomfortable or intimated to speak out and raise concerns.	Rights to accessing remedy
Operation Phase		
Discrimination	Discrimination could occur due to the nature and origin of the workforce, which will be mainly expatriates' workers during operation.	Prohibition of discrimination. Right to just and favorable conditions of work. Right to an adequate standard of living.

Potential Human Rights Issue	Description	Relevant Human Rights (not limited to)
Labor Standards / Collective Bargaining	Potential violations in relation to renumeration, working hours (including unpaid or forced overtime), and the right to family and social life. Potential discrepancy between contractual obligations and actual working conditions, including forced labor.	Right not to be submitted to slavery, servitude, forced labor
Occupational Health and Safety and general Welfare	Potential poor occupational health and safety procedures, including unavailability of appropriate personal protective equipment (PPE), work rest cycles, etc. Absence of basic welfare facilities, including rest areas, proper workers accommodation, decent food provisions, etc. Absence of basic medical services, including site clinic and medical insurance coverage.	Right to an adequate standard of living. Right to the highest attainable standard of physical and mental health Right to just and favorable conditions of work
Freedom of Association	Potential restriction to form or join groups, such as religious groups, considering the generally diverse religious background of workforce in UAE.	Right to freedom of association.
Human Trafficking	Human trafficking related issues is a potential issue considering that most workers during operation phase will be expatriates. This could include employment of potentially underaged workers (due to fake documentations), slavery, etc.	Right to freedom of movement. Right to social security. Right not to be submitted to slavery, servitude, forced labor.
Grievance Mechanism	This is a potential challenge particularly for laborers or unskilled workers. Affected workers may feel uncomfortable or intimated to speak out and raise concerns.	Rights to accessing remedy

6.3.2.2 Risk Assessment

The main social challenges that could aggravate human rights issues in the UAE, particularly in the context of labor protection, are the fact that the majority of workforce are expatriates (i.e., more than 80% of country's population are foreign workers). This local condition is susceptible to issues related to discrimination and human trafficking. Labor trafficking is a particular concern since the majority of the workers are from countries where human trafficking is rampant (mostly from south and southeast Asian countries).

It should be noted that the US Department of State classifies the country as Tier 2 in TVPA index, which means that the country currently does not fully comply with minimum standards but is making significant efforts. For instance, UAE has enacted a number of federal regulations against human trafficking, including the Federal Law No. 51 of 2006 as amended by Federal law No.1 of 2015. This law covers all forms of human trafficking, including sexual exploitation, engaging others in prostitution, servitude, forced labour, organ-trafficking, coerced service, enslavement, begging and quasi-slavery practices.

In addition, the law ensures that a person aware of a human trafficking crime and does not report it can be punished. The country has also established a number of government agencies that specifically focuses in efforts to combat human trafficking, including the National Committee for Combatting Human Trafficking (NCCHT) and the National Human Rights Institution. In addition The UAE Ministry of Interior implements a number of strategies to address human trafficking, including (u.ae/en/about-the-uae/human-rights-in-the-uae):

- Promoting anti-human trafficking culture and awareness
- Cooperating with Interpol through exchange of information on human trafficking crimes
- Monitoring individuals involved or suspected of being involved in such crimes
- Enforcing tighter control at entry points
- Using unified criminal justice and Interpol systems to verify individuals at entry points.

In terms of labor protection, it should be noted that the Emirate of Dubai and UAE as a whole implements several labor laws and has ratified international conventions to ensure safety and protection of labor. Labor protection is an important part of the country's social system, being a significant recipient of foreign workers (i.e., expatriates constitute more than 80% of the country's population). The UAE is a member of International Labor Organization (ILO), the Arab Labor Organization, and other labor-focused multilateral organizations. The country has ratified international labor related conventions (i.e., The Ministry of Human Resources and Emiratization (MoHRE) is the government agency that is responsible for overseeing employer-employee relations and maintaining labor rights in the private sector.

The Federal Decree Law No. 33 of 2021 on the Regulation of Labor Relations in the Private Sector is the primary labor law of the country (famously known as the 'UAE Labor law'). This law covers wage protection, harassment, bullying, prohibits forced labor and discrimination, outlines employers' obligations towards employees, etc. The following are some of the key labor protection initiatives of UAE (not an exhaustive list, see also Table 4.5):

- UAE Wage Protection System (WPS) by the Ministry of Human Resources and 4.5Emiratization (MoHRE) [Ministerial Resolution Bo. 788 for 2009], a system that ensures on time salary for the private sector employees and provides fines and penalties to employees in case of any delay.
- Mandatory provision of medical insurance for all workers and their dependents Health Insurance Law.
- MoHRE decree of mid-day break during summer season. This law prohibits outdoor work from 12:30 to 3:00 PM during summer season (generally from June to September).
- Standard employment contracts (Ministerial Decree No. 46 of 2022).
- Online labor related complaints (www.mohre.gov.ae/en/our-services/register-labor-complaints-private-sector-employees-2022.aspx)
- The UAE Unemployment Insurance Scheme requires six specific commitments for adoption within the Global Compact for Migration under the Federal Decree Law No. (13) of 2022.
- The UAE Tawjeeh Centers, which provide guidance/assistance for employers and workers regarding the provisions of the UAE Labour Law. It also provides training for employers and employees to raise awareness about the UAE Labour Law, which is mandatory to be taken as part of visa processing for unskilled workers.
- Enforcement of labor safety and health provisions of UAE labor law, which requires a safe and appropriate work environment for his employees, as follows:
  - provide the necessary means of protecting workers from the hazards of occupational injuries and diseases that may occur during work
  - place instructional boards with awareness materials
  - provide appropriate training to workers to avoid such risks
  - conduct periodic evaluations to ensure that all parties to the employment contract comply with and meet the requirements of occupational health and safety.

- National programs and initiatives, including promotion of gender equality at workplace, rights of people with determination and combatting human trafficking (as discussed above).

In regard to local labor (i.e., UAE citizens), the government of UAE has adopted the Emiratization Programs across the country, which mandates the inclusion and hiring of nationals in the job sector (particularly the private). The latest program launched in the country is the NAFIS, which is a federal program to increase the competitiveness of Emirati human resources and empower them to occupy jobs in the private sector.

In terms of freedom of association, the UAE Constitution that was permanently adopted in July 1996 (see Section 4.1.3), outlines the freedoms and rights of all citizens including the freedom to practice religious beliefs. In general, freedom of assembly and establishing associations shall be guaranteed within the limits of law. For instance, it should be noted that religious practices are fully allowed within the country, including the construction and operation of churches, temples, and other similar establishments. Public assemblies and gatherings are also allowed in the country in line with relevant permitting requirements.

Based on the above, there are sufficient regulatory safeguards in place in Dubai and UAE in general to address potential human rights issues that could arise during the implementation of the Project. It should also be noted that the UAE Labor Law provides stiff penalties to employers that violate the labor protection provision in the country.

For instance, a violation in the WPS procedures and requirements (i.e., delayed salaries, salary deductions of more than 10% of monthly wage, etc.) will result is an automatic blockage in the system that will inhibit the capability of employer to carry out any transactions with the labor department (i.e., any hiring could be stopped, renewal of existing visas may be stopped, etc.). Nonetheless, additional measures are provided in Section 6.3.3 to ensure that the identified potential human rights impacts during implementation are managed and would not result in any workplace conflicts, abuses, and other issues.

Table 6.24 provides the summary of risk assessment for the identified potential human rights issues. The risk ranking considers the appropriate and strict implementation of the relevant regulatory requirements and the measures presented in Section 6.3.3 (i.e., it presents anticipated residual risks).

Table 6.24 – Summary of Identified Human Rights Risks / Issues

Potential Human Rights Issue	Description	Severity	Likelihood	Residual Risk
Construction Phase				
Discrimination	Discrimination could occur due to the nature and origin of the workforce during construction phase, which will be mainly expatriates' workers. Discrimination could also arise due to the generally low educational degree of workers (majority will be construction laborers and helpers, most from south Asian countries).	3	1	Moderate
Labor Standards / Collective Bargaining	Potential violations in relation to renumeration, working hours (including unpaid or forced overtime), right to family and social life. Potential discrepancy between contractual obligations and actual working conditions, including forced labor.	3	1	Moderate
Occupational	Potential poor occupational health and safety procedures,	3	1	Moderate

Potential Human Rights Issue	Description	Severity	Likelihood	Residual Risk
Health and Safety and general Welfare	including unavailability of appropriate personal protective equipment (PPE), work rest cycles, etc. Absence of basic welfare facilities, including rest areas, proper workers accommodation, decent food provisions, etc. Absence of basic medical services, including site clinic and medical insurance coverage.			
Freedom of Association	Potential restriction to form or join groups, such as religious groups, considering the generally diverse religious background of workforce in UAE.	2	1	Low
Human Trafficking	Human trafficking related issues is a potential issue considering that most workers during construction phase will be expatriates. This could include employment of potentially underaged workers (due to fake documents), slavery, etc.	3	1	Moderate
Grievance Mechanism	This is a potential challenge particularly for laborers or unskilled workers. Affected workers may feel uncomfortable or intimated to speak out and raise concerns.	3	1	Moderate
Operation Phase				
Discrimination	Discrimination could occur due to the nature and origin of the workforce, which will be mainly expatriates' workers during operation.	2	1	Low
Labor Standards / Collective Bargaining	Potential violations in relation to renumeration, working hours (including unpaid or forced overtime), the right to family and social life. Potential discrepancy between contractual obligations and actual working conditions, including forced labor.	2	1	Low
Occupational Health and Safety and general Welfare	Potential poor occupational health and safety procedures, including unavailability of appropriate personal protective equipment (PPE), work rest cycles, etc. Absence of basic welfare facilities, including rest areas, proper workers accommodation, decent food provisions, etc. Absence of basic medical services, including site clinic and medical insurance coverage.	3	1	Moderate
Freedom of Association	Potential restriction to form or join groups, such as religious groups, considering the generally diverse religious background of workforce in UAE.	2	1	Low
Human Trafficking	Human trafficking related issues is a potential issue considering that most workers during operation phase will be expatriates. This could include employment of potentially underaged worker (due to fake documentations), slavery, etc.	2	1	Low
Grievance Mechanism	This is a potential challenge particularly for laborers or unskilled workers. Affected workers may feel uncomfortable or intimated to speak out and raise concerns.	3	1	Moderate

6.3.3 Management and Mitigation Measures

As discussed in the preceding Section, there are sufficient safeguards in the current labor laws and regulations in the UAE to protect the rights or workers and employees, both locals (UAE nationals) and expatriates' workers.

Thus, the primary management measure is to ensure that the regulatory requirements are strictly implemented during the implementation of the Project. It is the overall responsibility of DM to ensure that all contractors and subcontractors to be involved in the Project are in full compliance, as a minimum requirement, to all regulatory requirements. It is essential that compliance with human rights and labor protection requirements are covered in assessed as part of the environmental and social performance monitoring to be undertaken for the Project on annual basis, both during construction and operation.

In regard to emerging human rights issues, the key management tool is an appropriate and effective grievance mechanism. The availability of this system will allow workers and other key players during Project implementation to have an appropriate channel to raise any concerns in regard to human rights and labor related issues they are facing. This will also serve as a tool for the Project to assess the effectiveness of the management and mitigation measures in place. DM shall ensure that any employee (whether direct or through contractor/subcontractor) can raise grievances without fear of reprisal such as termination, suspension, demotion, etc. DM should also maintain privacy, confidentiality, and anonymity of any grievance and of the personal details of the grievant.

Figure 6.3 presents the proposed human rights and labor redress mechanism to be adopted for the Project, which include the following:

- Stage 0 – the mechanism shall allow informal resolution of grievances through the relevant line managers. Nonetheless, informal grievance shall also be recorded and registered.
- Stage 1 – this will address grievances that cannot be resolved informally. The formal meeting shall be held with the relevant HR Manager and Site Manager. The setting, schedule, and other aspects in relation to the meeting shall be mutually agreed on and the grievant shall have companion.

  A companion, who may be a colleague, or a family member when appropriate, can accompany the grievant during a labor grievance hearing
- Stage 2 – this stage is essential in case the grievant is not satisfied with the results of Stage 1 (formal meeting with the company). This appeal shall be handled by a Project committee, which shall comprise of the HR Manager, Site Manager, and relevant corporate personnel. It shall be attended by the grievant (with a companion) and any other parties involved in the particular issue.
- Stage 3 – this stage is essential in case the grievant is not satisfied with the internal process. It is the company's responsibility to refer the matter to the UAE Ministry of Labor. In case, all employees will be informed of their right to directly lodge any complaints to the Ministry of Labor in line with UAE laws.

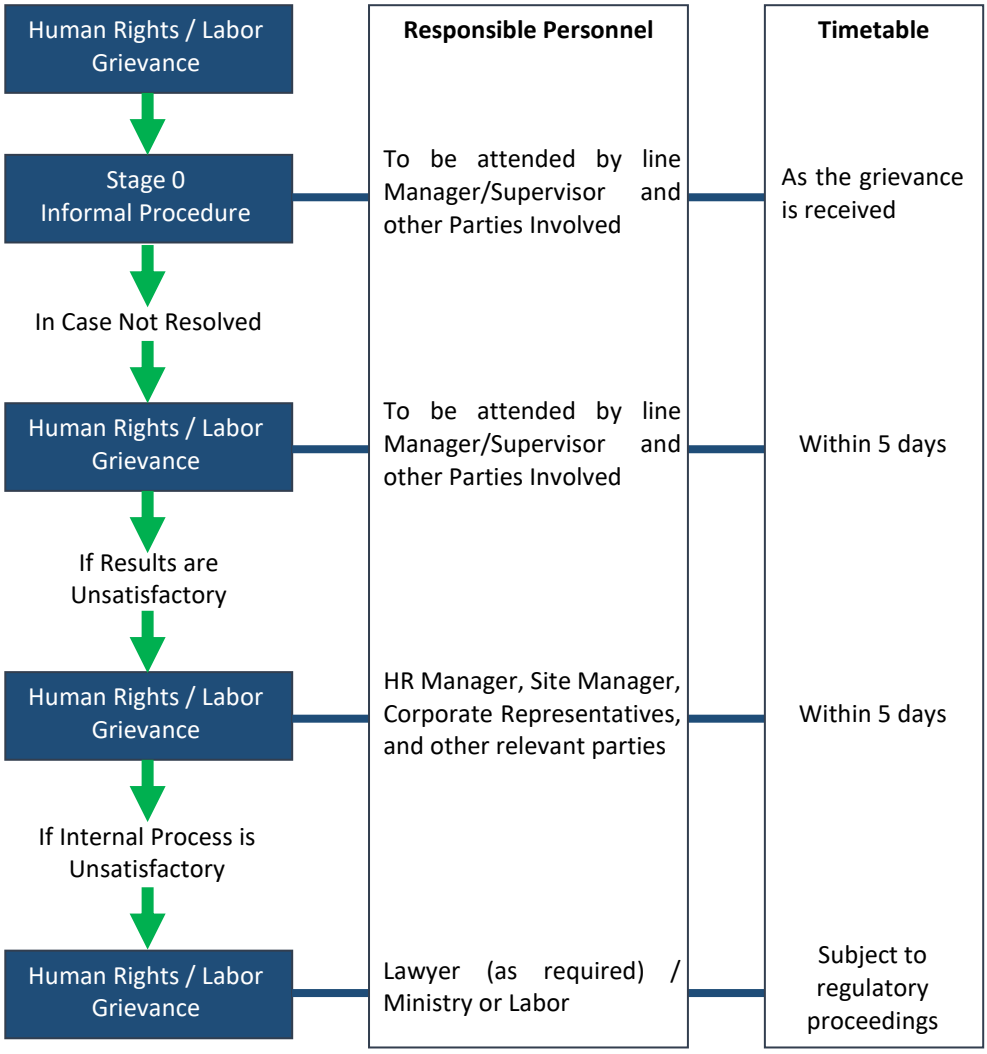


Figure 6.3 – Human Rights and Labor Grievance Redress Mechanism

Table 6.25 provides a summary of proposed and existing management and mitigation measures. The Project's performance in managing the human rights and labor issues identified in this Report shall be evaluated against the defined management and mitigation measures. The ability to identify new and emerging human rights and measures to address will also be evaluated, including the review of all grievances raised for the Project. DM shall ensure that appropriate manpower and resources are allocated for the implementation of human rights and labor related issues. As previously noted, human rights performance shall be disclosed annually as part of the environmental and social performance reporting for the Project.

Table 6.25 – Summary of Existing and Proposed Mitigation Measures

Potential Human Rights Issue	Existing Management Measures	Proposed Mitigation Measures
Construction Phase		
Discrimination	▪ Compliance/ implementation of the relevant provisions of UAE laws against discrimination, including Federal Decree Law No. 2 of 2015, UAE Labor Law, Law on Equal Wages, Federal Law No. 29 of 2006 and relevant international treaties (i.e., Convention concerning Discrimination in	▪ Implement discrimination awareness induction and training for all employees as part of Project employment induction and refresher training. ▪ Conduct rigorous internal monitoring of anti-discrimination

Potential Human Rights Issue	Existing Management Measures	Proposed Mitigation Measures
	Respect of Employment and Occupation, for which UAE is signatory).	policies, including periodic audit (to be reported as part of annual Project performance Report).
Labor Standards / Collective Bargaining	▪ Compliance with the relevant provisions of the UAE Labor Law, including provision of standardized contracts, WPS procedures, Tawjeeh requirements, mandatory health insurance, etc.	▪ Relevant UAE Labor Standards, including employee rights, shall be included in the pre-employment induction and regular refresher courses. ▪ Conduct rigorous internal monitoring of the implementation of labor standards and contractual obligations to employees as part of ESIA assessment and audits (to be reported as part of annual Project performance Report). ▪ Keep accurate and detailed relevant records of an employee's name, address, gender, workweek, hourly rate, daily and weekly hours worked, daily or hourly earnings, overtime pay, and extraordinary additions or deductions from pay, etc. ▪ Conduct periodic audits for contractors and relevant suppliers, depending on the levels of risks associated with their activties.
Occupational Health and Safety and general Welfare	▪ Compliance with the relevant provisions of the UAE Labor Law and other relevant laws on occupational health, safety, and welfare, including - provide the necessary means of protecting workers from the hazards of occupational injuries and diseases that may occur during work - place instructional boards with awareness materials - provide appropriate training to workers to avoid such risks - conduct periodic evaluations to ensure that all parties to the employment contract comply with and meet the requirements of occupational health and safety. ▪ Implementation of the labor accommodation requirements outlined in UAE Ministerial Resolution of 2022 (i.e., provision of appropriate accommodation facilities for companies with >50 workers and salary of <1500 AED, as per the site construction standards). ▪ Compliance with the requirements of DM Technical Guidelines for Labor Accommodation Compliance.	▪ Pre-employment induction and refresher courses shall cover workers' occupational health, safety, and welfare rights. ▪ Develop and implement a comprehensive Project specific HSE Plan, with details of occupational health and safety measures to be implemented to protect workers. ▪ Conduct rigorous internal monitoring of the implementation of occupational H&S and welfare as part of ESIA assessment and audits (to be reported as part of annual Project performance Report). ▪ Conduct periodic audits for contractors and relevant suppliers (including caterers), depending on the levels of risks associated with their activties.

Potential Human Rights Issue	Existing Management Measures	Proposed Mitigation Measures
Freedom of Association	▪ Compliance with the relevant provisions of the UAE Constitution, including freedom to practice religion.	▪ Review and ensure that existing policies respect, protect and facilitate the exercise of the right to freedom of association as per local regulations.
Human Trafficking	▪ Compliance with the relevant provisions of the UAE Constitution and relevant federal regulation in relation to human trafficking.	▪ Review and ensure that existing employment policies and procedures are aligned with current regulatory requirements. This is an important aspect to ensure that child labor is avoided (i.e., employment under aged workers).
Grievance Mechanism	▪ Compliance with the relevant provisions of the UAE Labor Law, including Tawjeeh requirements	▪ Relevant UAE Labor Law requirements on grievance management shall be included in the pre-employment induction and regular refresher courses. It should include the process of: - List of government agencies that handle labor complaints. - Process of registration of labor complaints. ▪ Provision of appropriate training to workers on the internal labor grievance mechanism process, including regular refresher courses.
Operation Phase		
Discrimination	▪ Compliance/ implementation of the relevant provisions of UAE laws against discrimination, including Federal Decree Law No. 2 of 2015, UAE Labor Law, Law on Equal Wages, Federal Law No. 29 of 2006 and relevant international treaties (i.e., Convention concerning Discrimination in Respect of Employment and Occupation, for which UAE is signatory).	▪ Develop facility specific policy and procedures in regard to relevant human rights issues, including discrimination. ▪ Implement discrimination awareness induction and training for all employees as part of Project employment induction and refresher training. ▪ Conduct rigorous internal monitoring of anti-discrimination policies, including periodic audit (to be reported as part of annual Project performance Report).
Labor Standards / Collective Bargaining	▪ Compliance with the relevant provisions of the UAE Labor Law, including provision of standardized contracts, WPS procedures, Tawjeeh requirements, mandatory health insurance, etc.	▪ Develop facility specific policy and procedures in regard to relevant human rights issues, including labor standards. ▪ Relevant UAE Labor Standards, including employee rights, shall be included in the pre-employment induction and regular refresher courses. ▪ Conduct rigorous internal monitoring of the implementation

Potential Human Rights Issue	Existing Management Measures	Proposed Mitigation Measures
		of labor standards and contractual obligations to employees as part of ESIA assessment and audits (to be reported as part of annual Project performance Report). ▪ Keep accurate and detailed relevant records of employee's name, address, gender, workweek, hourly rate, daily and weekly hours worked, daily or hourly earnings, overtime pay, and extraordinary additions or deductions from pay. ▪ Conduct periodic audits for contractors and relevant suppliers, depending on the levels of risks associated with their activties.
Occupational Health and Safety and general Welfare	▪ Compliance with the relevant provisions of the UAE Labor Law and other relevant laws on occupational health, safety, and welfare, including - provide the necessary means of protecting workers from the hazards of occupational injuries and diseases that may occur during work - place instructional boards with awareness materials - provide appropriate training to workers to avoid such risks - conduct periodic evaluations to ensure that all parties to the employment contract comply with and meet the requirements of occupational health and safety. ▪ Implementation of the labor accommodation requirements outlined in UAE Ministerial Resolution of 2022 (i.e., provision of appropriate accommodation facilities for companies with >50 workers and salary of <1500 AED, as per the site construction standards). ▪ Compliance with the requirements of DM Technical Guidelines for Labor Accommodation Compliance.	▪ Pre-employment induction and refresher courses shall cover workers occupational health, safety, and welfare rights. ▪ Develop and implement a comprehensive Project specific HSE Plan for operation, with details of occupational health and safety measures to be implemented to protect workers. ▪ Conduct rigorous internal monitoring of the implementation of occupational H&S and welfare as part of ESIA assessment and audits (to be reported as part of annual Project performance Report). ▪ Conduct periodic audits for contractors and relevant suppliers (including caterers), depending on the levels of risks associated with their activties.
Freedom of Association	▪ Compliance with the relevant provisions of the UAE Constitution, including freedom to practice religion.	▪ Develop facility specific policy and procedures in regard relevant human rights issues to respect, protect and facilitate the exercise of the right to freedom of association as per local regulations.
Human Trafficking	▪ Compliance with the relevant provisions of the UAE Constitution and relevant federal regulation in relation to human trafficking.	▪ Develop facility specific policy and procedures in regard to relevant human rights issues, including measures to combat human trafficking.

Potential Human Rights Issue	Existing Management Measures	Proposed Mitigation Measures
Grievance Mechanism	▪ Compliance with the relevant provisions of the UAE Labor Law, including Tawjeeh requirements.	▪ Develop facility specific policy and procedures in regard to relevant human rights issues, including grievance mechanism in line with regulatory requirements.

6.4 Project Alternatives

An important element of the impact assessment is a comparison of project alternatives and the presentation of the rationale for the chosen solution. In general, the proposed Project will have positive environmental and social impacts as it is a sustainable development project and will enhance sewage handling and treatment process, in general. The following subsections provides an overview of the alternatives considered for the Project.

6.4.1 Tunnel Horizontal Alignment

During the feasibility study, the horizontal alignments for Bur Dubai catchments were agreed upon and further developed during the preliminary design phase. The DSST-BD project presented multiple alignment alternatives, with six (6) different options being thoroughly reviewed and analyzed. In general, tunnel alignments are designed to stay within existing right-of-way (RoW) corridors, ensuring minimal disruption to surrounding areas. Shaft locations have been carefully chosen to stay within these corridors and avoid interference with existing carriageways, while also ensuring ease of maintenance access. The selected shaft locations were chosen based on accessibility from existing highways and the availability of adequate space for tunnel construction operations.

Alternative 1- basically follows the alignment starting from Al Khail Road (E44) – Al Fay road – Emirates Road (E611) to Jebel Ali STP. There are also additional tunnels along Emirates Road (E611) and Mohammed Bin Zayed road (E311) - Jebel Ali Lehbab/Expo road (E77) that collects flows from Dubai land and Jebel Ali areas. Both the branch tunnels connect to the main tunnel at junction with Jebel Ali Lehbab/Expo road (E77).

Alternative 2 moves south-east from the starting point adjacent to PS Sn along the Al Ain Road (E66) to the junction with the Emirates Road (E611). From here the main tunnel moves long the E611 to Jebel Ali STP, collecting flows from tunnels originating at PS X1 and Jebel Ali catchment along the way.

Alternative 3 is identical to Alternative 1 which follows the route along Al Khail Road (E44) but diverts along Jebel Ali Lehbab/Expo Road (E77) to Jebel Ali STP. There is an additional tunnel length along the Emirates Road (E611) that collects flows from Dubai land and connects to the main tunnel at the junction with the Jebel Ali Lehbab/Expo Road (E77).

Alternative 4 is similar Alternative 2 in that the tunnel moves south-east along Al Ain Road (E66) from the starting point at PS Sn. The tunnel turns to move in a south-west direction at the junction with Sheikh Zayed Bin Hamdan Al Nahyan Street (D54) and runs along the D54 until the intersection with the Jebel Ali – Lehbab/Expo Road (E77). At this location, flows from the Jebel Ali catchment are received and the tunnel continues along the E77 to the junction with the Emirates Road (E611). At this point, flows from Dubai land are received, and the tunnel runs along the E611 before turning into Jebel Ali STP.

Alternative 5 moves south-east along Al Ain Road (E66) from the starting point at PS Sn until the junction with MBZR (E311). The tunnel then runs along the E311 to the junction with Al Khail Road (E44). Downstream of this point, the tunnel follows the same alignment as Alternative 3.

Alternative 6 is a hybrid between Alternatives 2 and 5. The tunnel moves south-east along Al Ain Road (E66) from the starting point at PS Sn until the junction with MBZR (E311), then heads along MBZR to the Global Village junction. From here, the tunnel heads towards the Emirates Road (E611) and runs along the E611 before turning into Jebel Ali STP, with flows collected from PS X1 and the Jebel Ali catchment along the way.

Out of the above six alternatives, Alternative 1 was selected as the preferred alignment. This alignment primarily follows the route from Al Khail Road (E44) to Al Faya Road, then along Emirates Road (E611) to the Jebel Ali STP. Additional tunnels along Emirates Road (E611) and Mohammed Bin Zayed Road (E311), extending towards Jebel Ali Lehbab/Expo Road (E77), collect flows from Dubai Land and Jebel Ali areas. These branch tunnels connect to the main tunnel at the junction with Jebel Ali Lehbab/Expo Road (E77).

The final alignment selection (Alternative 1) was based on several factors, including cost (considering the link sewer length), constructability (ease of access to shaft locations), resiliency, and serviceability (ensuring the ability to serve both current and future unserved communities). Additionally, the evaluation considered traffic impacts, potential conflicts with existing utilities (such as water, power, irrigation, sewage, and stormwater networks), and the avoidance of metro crossings where possible.

6.4.2 Terminal Pump Station (TPS)

As part of the feasibility and preliminary design process, several alternatives and configurations for the TPS (Terminal Pumping Station) were reviewed. These included various design options such as binocular and rectangular designs, as well as different pump types, piping configurations, and instrumentation setups. The details of the proposed designs and alternatives are outlined in Table 6.26. Additionally, it should be noted that the Design & Build (D&B) contractors may propose an alternative design during D&B process, providing flexibility to explore other potential solutions that could optimize performance and efficiency.

Table 6.26 – Terminal Pump Station Alternatives

Design Component	Proposed Design	Alternative Solutions
Pump Station Shaft	Circular design with wet well/dry well arrangement	• Binocular Design • Rectangular Design The wet well / dry well arrangement provides ease of maintenance for all the key equipment like pumps, motors, valves, etc. Also, by having a wet well / dry well arrangement all the key equipment is not in direct contact with hazardous gas like H_2S and thereby provides more durability of the equipment. This wet well/dry well arrangement lays out well in the single large shaft.
Pump Station Structure	Diaphragm Wall + Waterproofing Membrane + Shaft Lining + HDPE Lining	--
Pumps	Single stage vertical mixed flow volute pumps	Submersible Pumps
Drives	Variable Frequency Drives (VFDs)	Combination of VFDs vs Fixed Speed Drives
Screens (coarse screens)	Fixed bar screen with automatic integrated grab cleaner; 90 deg. inclination	• Mechanical Trash Rack • Rotating bar interceptor (RBI) • Inclined mechanical multi-rack trash screen
Piping	Separate riser pipes for each pump	Piping with common suction header and/ or

Design Component	Proposed Design	Alternative Solutions
		common discharge header
Instrumentation	Wet well level monitoring using nonintrusive triple redundant hydrostatic level systems	• Guided Radar, • Ultrasonic, • Immersion Hydrostatic • Mechanical float switches • Sight Classes with level switches
	Flow Monitoring System using Electromagnetic Flow Meter	There were many flow types considers with many types ruled out as unsuitable for the wastewater, large pipeline, pressure application The following including types remained after the initial consideration. • ADFM Hot Tap pulse doppler flow meter • Ultrasonic in-line time of flight flow meter • Electromagnetic Flow Meter
	1. Wet Well: H_2S atmosphere being pumped sampled and analysed by Nano Enhanced Metal Oxide Semiconductor (NE-MOS) complete with Smart Transmitter 2. Screening Rooms: H2S atmosphere being directly monitored by Nano Enhanced Metal Oxide Semiconductor (NE-MOS) complete with Smart Transmitter **3.** Dry well Pump and Electrical Room: H2S atmosphere being directly monitored by Nano Enhanced Metal Oxide Semiconductor (NE-MOS) complete with Smart Transmitter	There were many types of fixed H_2S analysers and monitors on the market with a final five sensor type chosen for consideration. The H_2S system transmitter and on-board features were also reviewed for analogue, digital, fieldbus and SMART capabilities. Sensor Types • Electrochemical Cell Analysers • Absorbance Spectroscopy Analysers • Optical hydrocarbon detectors • Metal Oxide Semiconductor (MOS) • Nano Enhanced Metal Oxide Semiconductor (NE-MOS) <u>Justification for Selecting NE-MOS</u> The selection of NE-MOS sensors was based on a comprehensive evaluation of various factors, including cost, availability, installation type, sensor life, calibration frequency, proven performance, and the adoption of the latest technology. These aspects were carefully considered to ensure that the chosen technology meets both operational and budgetary requirements. key benefits: **Standardization**: Having a uniform sensor across all systems allows for simplified management and maintenance, as well as compatibility across different monitoring setups. **Reduced Stock Holdings**: By standardizing on one sensor type, it reduces the need to hold multiple spare parts or systems, optimizing inventory and reducing overall costs. **Familiarity and Ease of Use**: Standardizing on a single technology ensures that operators are familiar with the instruments, which can improve efficiency and reduce the learning curve for staff.

Design Component	Proposed Design	Alternative Solutions
		Smart Technology Integration: The use of smart technology facilitates real-time monitoring, accurate measurements, and enhanced control over odor management and ventilation systems. It also supports automated alarming and system adjustments to maintain optimal environmental conditions. Note: However, selection of NE-MOS sensors will be re-evaluated to ensure the most suitable technology is chosen for the specific environmental conditions in Dubai. The alternative options mentioned will be thoroughly evaluated, taking into account factors such as sensor stability, long-term operational efficiency, and overall cost-effectiveness in local conditions.
	Suction and Discharge Pressure Monitoring Systems Suction: Compound Pressure Transmitters: Analogue and Fieldbus outputs. Compound Pressure Switches: Digital Output: Compound Pressure Gauges: complete with two adjustable indication pointers. Discharge: Pressure Transmitters: Analogue and Fieldbus outputs. Pressure Switches: Digital Output: Pressure Gauges: complete with two adjustable indication pointers.	There were many types of compound and normal pressure transmitters, gauges and switches available in the marketplace all of which are of comparable in standard, costs, analogue, digital and fieldbus output features, and in ease of setting up, calibrating and maintaining. There are also newer models having SMART and wireless features.

6.4.3 Odor Control

Several odor control treatment technologies were thoroughly reviewed and compared, including chemical scrubbers, biological scrubbers, and bio trickling filters. Comparing chemical & biological scrubbers to bio-trickling filters, bio-trickling filters were found to be more effective in treating a wide range of odorous compounds, such as H_2S, NH_3, volatile fatty acids, and organic odors. In addition, bio-trickling filters are more cost-effective, have lower operational costs, and require less maintenance, as they do not include pumps and piping necessary for water recirculation. Given their operational efficiency, longer lifespan, and ability to handle the scale and nature of the project, bio-trickling filters are preferred for this project as the optimal odor control solution.

6.4.4 Tunnelling Methods

The tunnel alignments will encounter a variety of geological conditions, including areas beneath existing structures and utilities that are sensitive to ground movements. The selection of feasible tunneling methods for these conditions is based on an evaluation of several critical factors, including:

- Rock quality
- Strength and abrasiveness of the ground
- Permeability of the ground
- Maximum groundwater pressures

- Uniformity of ground conditions
- Expected ground condition and behaviour (such as stand-up time and heading stability)

The evaluation process considers these factors to determine the most suitable tunneling methods, ensuring safety and stability throughout the construction. Acceptable tunnel construction methods will be outlined in the contract bid documents during construction, allowing contractors to select from a range of methods based on their preferred approach, available equipment, and project costs.

The determination of the appropriate construction method is closely linked to the tunnel lining design, as certain liner types are better suited to specific tunneling techniques. This ensures that the chosen tunneling method and liner design work together to address the unique ground conditions and requirements of the project. The tunnelling methods are discussed in Chapter 4 of this Report.

6.4.5 The Do-Nothing Option

With the “do-nothing” option, the goal of the proposed DSST Project would not be realized and the potential socio-economic benefits of the development will not materialize. As previously noted, the Project will align with the Dubai Municipality Plan objectives of city growth, excellence, and environmental sustainability. The project goals include upgrading aging infrastructure, reducing operational costs and preparing the system for future urban expansion. Considering the above, the “Do-nothing Option” is not the preferred option.

7 STAKEHOLDER ENGAGEMENT AND GRIEVANCE MECHANISM

7.1 Stakeholder Engagement

7.1.1 Overview

Stakeholder engagement is essential in building and maintaining proactive long-term positive relationships with the identified Project stakeholders. An appropriately designed engagement plan is a useful tool to maintain channels of communication with Project stakeholders and provide opportunity for stakeholders to voice opinions and concerns. Engagement will promote trust and strengthen relationships between DM, its contractors, and the stakeholders. The following are the key objectives of stakeholder engagement:

- to assist in the identification of key social, health and economic impacts.
- to get feedback on the effectiveness of existing impact management measures and CSR programs.
- to develop understanding between the operation and its stakeholders.
- to identify creative and mutually beneficial solutions to problems.
- to understand local community rights, needs, priorities, expectations, and perceptions.

Stakeholder engagement in the Emirate of Dubai and the UAE as a whole is generally undertaken through coordination and permitting process with relevant government entities. A Project proponent is required to apply for a permit commonly known as “No Objection Certificate” (NOC) from relevant government authorities and other stakeholders (such as utility companies) through dedicated permitting system of each relevant government agencies. It should be noted that the listed NOC transactions and individual NOCs issued by municipalities and entities are continuously maintained throughout the Project.

For Projects that will encroach any commercial or industrial properties, they are required to acquire individual access permits or NOC from owners or respective management entities. In residential areas, NOC is generally acquired from respective local municipalities. It should be noted as there are no local stakeholders or communities within the defined AOI and no additional permits or NOCs for this Project.

The overall objective aim of this SEP is to provide a systematic approach to identify the actions the Project needs to undertake to ensure that a timely, consistent, comprehensive, coordinated and culturally appropriate approach is taken for consultation and Project disclosure. The key principles of effective engagement that the Company will adhere to include:

- Providing meaningful information in a format and language that is readily understandable and tailored to the needs of the target stakeholder group(s)
- Providing information in advance of consultation activities and decision-making
- Providing information in ways and locations that make it easy for stakeholders to access it and that are culturally appropriate
- Respect for local traditions, languages, timeframes, and decision-making processes
- Two-way dialogue that gives both sides the opportunity to exchange views and information, to listen, and to have their issues heard and addressed
- Inclusiveness in representation of views, including ages, women, and men, vulnerable and/or minority groups
- Processes free of intimidation or coercion or incentivization
- Clear mechanisms for responding to people’s concerns, suggestions, and grievances while protecting personal data and information

- Incorporating, where appropriate and feasible, feedback into project or sub-project design, and reporting back to stakeholders
- Considerations regarding literacy and language barriers.

In general, DM shall specifically requires the conduct of a broad, inclusive, and continuous stakeholder engagement process with all potentially impacted stakeholders through its appointed contractors. In case of potentially significant adverse social impact, consultations by Informed Consultation and Participation (ICP), which involves a more in-depth and iterative consultation that allows appropriate inclusion of community views in the project decision making process shall be undertaken.

7.1.2 Stakeholder Mapping

As previously noted, the implementation of the proposed Project does not pose direct impact to any communities or vulnerable groups within the defined area of influence (AoI). Thus, an in-depth stakeholder engagement is not necessary, and consultations will only be undertaken for the purposes of permit acquisition (in the case of government entities) and information dissemination (in the case of any nearby social receptor). Each stakeholder within the defined AoI (see Section 5.9.1) was mapped based on their influence-interest levels to determine allocation and focus of engagement activities. In addition, this allows tracking of stakeholder's influence-interest levels over time. The combination of a stakeholder's influence and interest level results in the degree of engagement activity required, as shown in Table 7.1.

Table 7.1 – Stakeholder Influence, Interest, and Related Engagement

Influence-interest levels	Engagement activity
High influence – high interest	Negotiate / Partner: Focus engagement with these stakeholders to achieve mutually beneficial solutions either through an agreement or activity that will manage their influences and interests
High influence – low interest	Consult: Keep these stakeholders informed and encourage them to give feedback to monitor their influence and interest levels by providing communication channels
Low influence – high interest	
Low influence – low interest	Inform: Regularly communicate with these stakeholders for information disclosure purposes.

Table 7.2 lists the identified Project's external stakeholders and the defined classification, influence/interest levels and appropriate engagement activities. The assessment shows that required consultations shall mainly involve consultation and information dissemination, with the exception to relevant departments of DM wherein detailed engagement is required as part of planning. As discussed previously, the local environmental permitting process with DM Environment Department is ongoing at the time of preparation of this Report.

Table 7.2 – Classification and Influence-Interest Levels of External Stakeholders within the AoI

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Influence - interest Levels	Engagement Activity	Implementation Phase
Residential Areas						
ESC.1	Residential areas in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners ▪ Land / real estate developers ▪ Dubai Municipality	Non-municipal (Private) / Municipal	High influence – low interest	Consult	Construction and Operation
Industrial and Commercial						
ESC.2	Commercial	▪ Private/individual	Non-	Low	Inform	Construction

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Influence - interest Levels	Engagement Activity	Implementation Phase
	establishments in the vicinity of above-ground structures (see Table 5.12)	owners ▪ Land / real estate developers	municipal (Private)	influence – low interest		and Operation
ESC.3	Industrial establishments in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners	Non-municipal (Private)	Low influence – low interest	Inform	Construction and Operation
Archaeology						
ESC.4	Archaeological sites	▪ Dubai Culture	Municipal (Government)	Low influence – low interest	Inform	Pre-construction
Government / Services Providers Companies						
ESC.5	Police and Military (Security)	▪ Dubai Police ▪ UAE Armed Forces GHQ	Municipal (Government)	Low influence – low interest	Inform	Pre-construction / Construction
ESC.6	Dubai International Airport	▪ Dubai International Airport	Non-municipal (Private)	Low influence – high interest	Consult	Construction
ESC.7	Utility infrastructure and services providers	▪ DEWA ▪ DM Public Facilities Department ▪ DM Planning & Governance Sector ▪ DM Environment, Health & Safety Agency ▪ DM Buildings Regulation & Permits Agency ▪ Emirates Telecommunication Group Company PJSC (Etisalat) ▪ Emirates Integrated Telecommunications Company PJSC (“du”)	Non-municipal (Private) / Municipal (Government)	High influence – low interest	Consult	Design / Pre-construction (ongoing)

7.1.3 Engagement Program

Consultations with relevant department/section of DM and utility providers is undertaken as part of the design stage to ensure that any potential concerns are considered in the design process. This is an essential part of the design process since the Project has the potential to impact existing and future infrastructure and developments.

During construction phase, all stakeholders will be kept informed of project activities and what they might expect in terms of impacts by means of engagement tools. Specific activities will involve informing, consulting, and negotiating with stakeholders particularly with DM (and its relevant departments), and other stakeholders where necessary.

During operations, the engagement requirement is limited to continuous coordination with DM and as required, with the residential areas nearby the proposed location of the VDS (particularly if there are odor concerns that would arise). Both during construction and operation phases, a community feedback or grievance mechanism will be available to receive all stakeholder feedback and complaints (see Section 7.2).

7.1.3.1 Engagement process

Stakeholder Identification and Analysis

All municipal (government) stakeholders were already identified and analyzed and engagement with these stakeholders is primarily through their respective permitting or NOC processes. Non-municipal (private) stakeholders have also been identified and analyzed, with the engagement process to be mainly limited to consultation and information dissemination.

Communication Strategy and Information Disclosure

The main aim of the Project's communication strategy is to be transparent and receptive to stakeholders about social risks and the ways in which these risks will be mitigated and monitored. This will be achieved through a variety of tools, such as brochures, web-based publications and announcements, and social media communications, among others as needed. The methods and applications above-mentioned under information disclosure and stakeholder consultation will be used where applicable in communicating with relevant stakeholders. In order to maintain construction activities free of interruptions, the Project will use displays, signs and fences around the Project sites.

The second step of the stakeholder engagement process is the disclosure of the Project information to the identified stakeholders. The following information will be disclosed:

- Purpose, nature, and the scale of the Project.
- Duration, activities, and progress/ milestone of the Project.
- Potential risk /impact to the affected stakeholder's communities and the mitigation measures.
- The stakeholder engagement program; and
- Dissemination of grievance mechanism to the Project stakeholders.

Table 7.3 lists the different methods and describes the application of these methods. DM or its contractors will use any of these methods to disclose the Project information as relevant for each type of external stakeholder identified.

Table 7.3 – Information Disclosure Methods

No.	Information Disclosure Method	Application	Target Stakeholder
1.	Correspondence by email, text, and instant message	▪ Distribute project information to identified stakeholders; and ▪ Inform stakeholders about consultation meetings (if applicable).	▪ All stakeholders under government authorities ▪ Utility/services providers ▪ Residential areas
2.	Correspondence by formal letters	▪ Distribute project information to identified stakeholders; and ▪ Inform stakeholders about consultation meetings (if applicable).	▪ All stakeholders under government authorities ▪ Utility/services providers
3.	Print media (brochure, in appropriate language)	▪ Disseminate project information/schedule of activities to the identified nearby residential houses/villas, etc.	▪ Residential areas ▪ Nearby industrial and commercial areas
4.	Website	▪ To disseminate project information, schedule and progress to large audiences, and stakeholders.	▪ All identified stakeholders and general public (as appropriate)

No.	Information Disclosure Method	Application	Target Stakeholder
5.	Formal meetings (as required)	▪ Present the Project information using PowerPoint presentations. ▪ Distribute technical documents. ▪ Build impersonal relations with high-level stakeholders. ▪ Record discussion, comments/ questions raised, and responses.	▪ Government Authorities ▪ Utility/services providers ▪ Residential areas

Stakeholder Consultation

The main aim of the stakeholder consultation program for the Project is to listen, respond and collaborate the stakeholders' views and opinions on the Project (including impacts and mitigations where they might be affected) to ensure and build a strong relationship with the stakeholders and to maintain its social license to operate and implement the Project. The following stakeholder consultation program is developed for the following stages of the Project:

- Baseline Assessments
- Pre-project implementation
- Project Implementation
- Project monitoring

It should be noted that as part of the initial design stage and during the local EIA process, a number of consultations and coordination with stakeholders has already been initiated. The remaining consultation process will be implemented by Social Risk Management Team (SRMT) to be organized by DM as per the timeline mentioned in the program.

Table 7.4 – Stakeholder Consultation Program for the Project

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Influence -interest Levels	Implementation Phase	Status
Residential Areas						
ESC.1	Residential areas in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners ▪ Land / real estate developers ▪ Dubai Municipality	Non-municipal (Private) / Municipal	High influence – low interest	Construction and Operation	Not started, to commence during EPC phase.
Industrial and Commercial						
ESC.2	Commercial establishments in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners ▪ Land / real estate developers	Non-municipal (Private)	Low influence – low interest	Construction and Operation	Not started, to commence during EPC phase.
ESC.3	Industrial establishments in the vicinity of above-ground structures (see Table 5.12)	▪ Private/individual owners	Non-municipal (Private)	Low influence – low interest	Construction and Operation	Not started, to commence during EPC phase.
Archaeology						
ESC.4	Archaeological sites	▪ Dubai Culture	Municipal (Government)	Low influence – low interest	Pre-construction	Not started, to commence during EPC phase.

S. No.	Stakeholder Groups / Location	Entities /Parties	Classification	Influence -interest Levels	Implementation Phase	Status
Government / Services Providers Companies						
ESC.5	Police and Military (Security)	▪ Dubai Police ▪ UAE Armed Forces GHQ	Municipal (Government)	Low influence – low interest	Pre-construction / Construction	Not started, to commence during EPC phase.
ESC.6	Dubai International Airport	▪ Dubai International Airport	Non-municipal (Private)	Low influence – high interest	Construction	Not started, to commence during EPC phase.
ESC.7	Utility infrastructure and services providers	▪ DEWA ▪ DM Public Facilities Department ▪ DM Planning & Governance Sector ▪ DM Environment, Health & Safety Agency ▪ DM Buildings Regulation & Permits Agency ▪ Emirates Telecommunication Group Company PJSC (Etisalat) ▪ Emirates Integrated Telecommunications Company PJSC (“du”)	Non-municipal (Private) / Municipal (Government)	High influence – low interest	Design / Pre-construction (ongoing)	Initial consultation completed as part of the design process. Coordination to continue during EPC and Operation phases.

7.1.4 Resources and Responsibilities

7.1.4.1 Budget and Resources

The budget for implementation of stakeholder engagement process and activities is included in the financial plan of the Project. The budget is to be allocated annually based on actual planned activities to be conducted in each specific Project phase. The budget allocation will be reviewed as part of the annual Project review based on the progress and results of the actual engagement process. The stakeholder engagement budgeting will consider the following:

- Resources/personnel requirements.
- Communication material development and production (i.e., printing of posters).
- Regular updates to the Project’s website
- Meeting/consultation costs, including transportation, data gathering, events, etc.

DM through its appointed contractor will create a Project-specific Social Risk Management Team (SRMT) to handle both construction and operation social management activities. The following are the key responsibilities of the SRMT:

- Delivers on requirements of Social Risk Management include timely completion of social risk assessment studies and stakeholder engagement processes.
- Plans, executes, monitors, and reports on social risk mitigation and opportunity enhancement activities.
- Coordinates with the SRMTs of other projects, operations and/or businesses that impact and engage the same communities and other stakeholders.

- Designs and executes social risk related to community engagement and communication activities, including CSR.
- Implements and manages the community feedback mechanism.
- Investigates and reports community incidents.
- Monitors social performance and reports on social KPIs.

DM will ensure that SRMT is comprised of well-trained and experienced personnel in their roles, including in terms of local context, and able to organize and manage engagement activities. The staff shall have the confidence and empowerment to address critical issues and communicate them to the management team.

DM through its contractor will also employ a Community Liaison Officer (CLO) who shall be responsible for coordinating the response to a complaint and serving as the main point of contact with the complainant. This includes receiving and reporting complaints, maintaining the complaints log, supporting the resolution of complaints, and liaison with the complainant.

7.1.4.2 Roles and Responsibilities

DM will hold the overall responsibility for ongoing and frequent engagement with various stakeholders throughout the Project lifetime. The SRMT will have permanent stakeholder engagement and grievance personnel under the supervision of the Stakeholder Engagement Manager. Table 7.5 provides a summary of the responsibilities for each member under the stakeholder engagement/community relations.

Table 7.5 – Stakeholder Engagement Team Roles and Responsibilities

Roles	Responsibilities
DM E&S Manager	▪ Review and approve stakeholder engagement register submitted by CLO
Community Liaison Officer (CLO)	▪ Monitor and maintain a positive profile of the project with the community and required stakeholders. ▪ Overall management of the stakeholder engagement activities to ensure engagement activities under EPC responsibility are undertaken in a timely manner. ▪ Undertake the stakeholder engagement activities ▪ Develop and maintain the stakeholder engagement register. ▪ Monthly reporting in the following: - Status of the implementation of the actions established in this document. - KPI monitoring (including data from previous months to assess trends) QHSE Statistics – Stakeholder Engagement Log. - Non-conformances, corrective and preventive actions (if required) QHSE Statistics – Non-Conformity Log; and - Improvements and MP updates (if required).
EPC E&S Manager	▪ The EPC E&S Manager will participate in the investigation of all grievances that are related to activities under the EPC scope, including activities related to the EPC's subcontractors and suppliers. ▪ Undertake and/or assign other responsible personnel to undertake stakeholder consultation and engagement activities as per Table 3 ▪ Provide on a monthly basis the CLO with all stakeholder consultation and engagement activities undertaken under EPC Contractor scope as per.

7.1.5 Engagement Performance Monitoring

The external stakeholder engagement and consultation are an ongoing process, and it is essential that the Project stakeholders know which of their suggestions will be used, how their concerns will be addressed, the status of the Project, etc.

In order to provide updated information to the stakeholders, the monitoring of the process is essential. During the implementation of the Project, the following activities are required to be monitored and evaluated regularly:

- Update of the Project stakeholder database and issues
- Stakeholder engagement activities documentation (meetings, interviews, etc.)
- Maintain the communication channels with the Project stakeholder [i.e., through Community Liaison Officers (CLO)]
- Identification of additional stakeholders during the Project implementation and initiated the consultation with them (as identified during the consultation process)
- Implementation of the Project grievance mechanism which includes dissemination of the grievance mechanism with the Project stakeholders, grievance logging and tracking; effectiveness of the grievance management and number of grievances solved; and
- Evaluation of the engagement implementation annually to provide feedback and enhance the Project-stakeholder relationship.

In addition, the stakeholder engagement activities, update in the Project information, stakeholder's concerns, and issues, etc. will be continuously reported and published in a transparent way through public domain documents, website, Company's sustainability report, annual report, newsletters, articles, local media, and any other outreach tools. Table 7.6 presents the method and frequency of reporting to the Project stakeholders. All the monitoring and reporting records related to project stakeholder engagement activities will be kept up to date. The following minimum records will be maintained for the engagement process:

- Database or library (electronic or hard copy) of all communication material
- Database or library record of all engagement activities including meetings, open-house events and focus group discussions on written format, including video as necessary.
- Records of media coverage, if applicable.
- Community feedback mechanism statistics.

Table 7.6 – Stakeholder Reporting Methods, Frequency, and Monitoring

No.	Engagement Method	Stakeholder	Reporting Information	Frequency	Monitoring Measure
1.	Correspondence by phone, text and instant message	▪ All Identified stakeholders, as required	▪ Project status ▪ Issues and any changes implemented. ▪ Progress of the communication campaign	Regularly during work (monthly) and when changes occur	Number of correspondences (i.e., phone calls, texts, and instant messages) to stakeholders and their responses
2.	Formal meetings	▪ All stakeholders under government authorities ▪ Government/utility Services Providers Companies	▪ Project status ▪ Issues and any changes implemented. ▪ Progress of the communication campaign	As required	Number of formal meetings conducted and their responses
3.	Correspondence by letter/email				Number of correspondences (i.e., letters/email) to stakeholders and their responses
4.	Print media (brochure)	▪ Residential villas ▪ Commercial and Industrial establishments	▪ Project status ▪ Overview of social engagement	Regularly during work (monthly) and when	Number of print media developed and distributed to stakeholders and their

No.	Engagement Method	Stakeholder	Reporting Information	Frequency	Monitoring Measure
			initiatives	changes occur	responses
5.	Website and social media	▪ All stakeholders	▪ Project status ▪ Overview of social engagement initiatives	Regularly during work (monthly) and when changes occur	Number of website and social media updates/ communications and their responses

KPIs are established to measure and monitor the effectiveness of implementation of this stakeholder engagement process (see Table 7.7).

Table 7.7 – Stakeholder Engagement Process KPIs

No.	KPI	Measurement Action	Frequency	Goal
1	Number of stakeholder engagement activities undertaken	Stakeholder Engagement Register	Monthly	N/A
2	Type of communications undertaken	Stakeholder Engagement Register	Monthly	N/A
3	Number of stakeholders involved	Stakeholder Engagement Register	Monthly	N/A
4	Number of vulnerable groups engaged (including women groups)	Stakeholder Engagement Register	Monthly	At least once every 2 months
5	Number of requests for information via websites, CLOs and local information centers	Stakeholder Engagement Register	Monthly	N/A
6	Number of incidents and/or non-compliances in relation to this plan	Submission of incident report and/or Non-Compliance Report (NCR)	Weekly	ZERO

7.2 Grievance Mechanism

A grievance, as defined by IFC/WB, is “an issue, concern, problem, or claim (perceived or actual) that an individual or community group wants a company or contractor to address and resolve”. IFC PS1 highlights the importance on an appropriate and effective grievance mechanism that is designed to facilitate an early indication of potentially harmful Project-related action/s that could directly or indirectly harm an individual, group or community.

DM, through its appointed contractor, shall implement an appropriate Stakeholder Grievance Mechanism. This mechanism shall establish a process to receive stakeholder concerns and grievances and to facilitate their resolution through a set procedure. Depending on the scale of potential risks and adverse impacts of a project, the grievance mechanism may be adjusted. This Section provides a framework of a stakeholder grievance mechanism that should be implemented throughout the implementation of the Project, with the following aims:

- To identify and manage stakeholder concerns and thus support effective risk management.
- To prevent adverse consequences of failure to adequately address grievances.
- To build and maintain trust with all stakeholders.

In line with IFC requirements and as a general company policy, the DM and its appointed contractor shall apply a proactive approach in preventing grievances through strict implementation of environmental and social mitigation measures (in line with the results of the Project's environmental and social studies) and through an appropriate stakeholder's engagement process throughout the Project implementation. Nonetheless, DM will ensure that an appropriate mechanism is in place to receive and address grievances, claims, comments, concerns, requests, and/or suggestions from any individual, group, or community.

7.2.1 Scope and Objectives

This Section describes the framework of a Project-specific Grievance Mechanism to be implemented by DM, through its appointed contractor and shall be applicable for the pre-construction, construction, and operation phases of the proposed Project. It describes the process for the grievance handling process and outlines the roles and responsibilities of the participants that will be involved in the grievance acceptance and redressal process. It ensures that:

- A prompt, consistent and respectful mechanism for receiving, investigating, and responding to complaints from the community or any other stakeholders is in place.
- An appropriate documentation of complaints and any corrective actions taken is in place.
- Grievances received, redressal process and lessons learnt are analyzed and contribute to the continuous improvement in environmental and social performance of the Project.

This mechanism will be considered as a "live document", which shall be revised and updated periodically based on actual grievance received or any changes or update in regulatory processes. The statutory rights of the complainant to undertake legal proceedings remain unaffected by participation in the grievance mechanism process.

7.2.2 Grievance Procedure

7.2.2.1 Grievance Management Principles

The Grievance Mechanism outlined in the Section is in line with the following guiding principles:

- Accessibility – the mechanism is accessible to diverse members of the local community, including vulnerable groups such as women, disabled people, the poor, the elderly, the youth and the affected Indigenous Peoples, if any.
- Adequate Protection – investigations will be undertaken in a manner which respects a complainant's confidentiality and privacy. Anonymous complaints will be received, accepted and shall be processed as usual. If requested, complainants will be guaranteed privacy in the investigation process and in the documentation and reporting.
- Accountability and transparency – an appropriate timeline for key process milestones is defined and communication with the complainant is maintained throughout the process. A well-defined record-keeping and reporting process is in place that allows disclosure of proper information to the public and lenders, as deemed necessary.
- Culture Sensitive – the grievance mechanism considers the local norms and cultures in handling grievances, ensuring respectful way of receiving and investigating concerns.

In general, a Grievance Mechanism must be a simple process that provides access to all stakeholders through different channels. A grievance disclosure leaflet shall be developed and be disclosed at the locations of all identified stakeholders. The grievance disclosure leaflet will inform the stakeholders on how and where to lodge a grievance.

7.2.2.2 Receipt and Log of Grievance

Multiple channels shall be made available for stakeholders to report a grievance in relation to any component or activities associated with the proposed Project, including:

- In person (i.e., face to face during formal or informal meetings) by contacting any Project personnel, who will in turn inform the Project Manager and CLO.
- By email or telephone.
- By post or other means of formal communication in writing.
- Through DM, its appointed contractors or any government authority.

The details of all grievance submission channels shall be finalized by DM and its appointed contractors prior to construction once the SRMT has been developed and CLO is employed, including names and contact details (i.e., mobile/phone numbers, emails, office address). Public disclosure of the grievance procedure will be conducted during the pre-construction phase of the Project so that stakeholders are fully aware of the grievance procedure. This disclosure will include handing out printed copies of the procedure, including contact details.

All grievances will be accepted and recorded irrespective of significance and consolidated in the grievance log. The Receipt of grievances will be acknowledged formally in writing in a maximum of five (5) working days. In general, the individual or group submitting the grievance will be asked for the following information:

- Grievant/complainant name and address. If requested, grievance will be received and recorded anonymously.
- Nature of grievance, including details of actual or perceived effect to the grievant, community, groups, or livelihood/socio-economic activities.

As a minimum, the following will be recorded upon receipt of the grievance:

- Case number
- Complainant's name and contact details, unless received as anonymous.
- Date of complaint.
- Details of complaint.
- History of other complaints / queries / questions (if known).
- Any preliminary resolution requested or discussed/agreed with the grievant.

7.2.2.3 Screening of Grievance

The next step in the mechanism is to screen the complaint for admissibility to the grievance mechanism. This will ensure resources are appropriately managed through elimination of grievances that are not relevant. This screening process will comprise the following simple criteria:

- Is the grievance related to any Project component or activities?
- Is the grievance within the scope or authority of the grievance mechanism?
- Are there reasonable grounds to file the grievance?

In general, all grievances will be given the benefit of doubt and rejection will only be taken once all aspects have been considered. If necessary, relevant local authorities will be consulted as early as the screening stage. If any grievance is rejected, the grievant will be formally informed and will be provided with details of the decision.

The grievant will also be provided with an option to appeal and provide additional information or data. For anonymously submitted grievances, an effort will be made to ensure that the results of the screening will reach the individual or at least the group or community to whom the grievance pertains.

In general, this mechanism addresses grievances related to the following:

- Any grievance related to project activities to include but not limited to: (i) damage to public / private assets; (ii) degradation / deterioration of local infrastructure (e.g. roads); (iii) disturbance from noise, dust, traffic accidents, pollution, excessive speed of project's vehicles; (iv) degradation of the environment and disturbance of wildlife; (v) disturbance to land uses, (vi) other similar issues.
- Any grievance against involved person/entity involved in the project to include but not limited to DM, EPC Contractor, subcontractors, and suppliers. This could include but is not limited to: (i) negative behavior of construction workforce towards local communities; (ii) conduct of security providers; (iii) inappropriate behavior of workers in terms of managing employment and procurement opportunities, (iv) other similar issues.
- However, the following grievances will not be addressed in the case they are submitted. In this case, the applicant will be informed that the grievance will not be addressed along with a justification. This includes the following in particular:
- Grievances that are not related to the project or its activities
- Grievances against an entity / person / worker that is/was not involved in the project in any way directly or indirectly
- A complaint that is currently being reviewed by the judiciary system and/or for which a final and definitive court ruling has been issued
- Worker grievances.

7.2.2.4 Assessment of Grievance

Table 7.8 provides the grievance significance criteria to be adopted throughout the Project implementation. The assessment of grievance will be undertaken by the SRMT team, including the CLO, relevant Project personnel and management representative. As required, relevant local authorities will also be consulted as part of the grievance assessment process.

During EPC phase, the EPC contractors (through dedicated CLO and in consultation with the Project SRMT) will take proactive roles in resolving Level 1 and Level 2 grievances involving the community and contractors, subcontractors, and suppliers. In high-risk grievance cases (Level 3 and Level 4), the SRMT will identify the main responsible parties that should be involved in the process (i.e., EPC contractor and specific sub-contractors are responsible for EPC-related grievances).

In cases where more detailed investigations are essential, the SMRT will collaborate with the Project management, EPC contractors (if arises during EPC stage), and relevant local authorities to define an appropriate investigation team with the relevant skills necessary. An extensive investigation is generally required for complex or widespread grievances and cannot be resolved quickly. The objective of the investigation is to identify whether the incident leading to the grievance is a singular occurrence or likely to reoccur and may involve face-to-face meetings and site visits if needed.

Table 7.8 – Grievance Significance Rating Criteria

Significance Level	Type of Grievance
Level 1	A grievance that is isolated or 'unique' and essentially local in nature and restricted to one complainant. Note: some unique grievances may be significant enough to be assessed as a Level 4 grievance, particularly for issues that violates any laws or regulations.
Level 2	A grievance that extends to the local community or region and has occurred more than once, which is judged to have the potential to cause disruption to Project implementation or to generate negative view from local media or other local stakeholders.
Level 3	A grievance which is widespread and repeated or has resulted in long term damage and/or has led to negative view or comment from local media, or is judged to have the potential to generate negative media and local stakeholder comments, such as damage to cultural sites, flooding, etc.
Level 4	A one-off complaint, or one which is widespread or repeated and, in addition, has resulted in a serious breach of policies and regulations, Dubai and UAE laws or International Law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (i.e., failure to implement appropriate resettlement action)

7.2.2.5 Investigation of Grievance

The investigation on eligible grievance will aim to define the root cause of the complaint, understand the impact to the aggrieved individual, group or community and develop actions to prevent similar incidents occurring in the future. As necessary, the investigation should also assess the need to implement any compensatory measures, particularly for cases where a grievance is due to actual damage to properties, direct impact on livelihood, etc. The investigation shall take into considerations the following best practices, in line with IFC guidelines (IFC, 2009):

- Senior management involvement is essential, particularly for complex grievances, to ensure that the management is fully aware of the process, which will facilitate the decision-making process at the end of the investigation.
- Competent investigation and impartial investigation team to ensure a fair investigation process. The team members shall act independently of the Project and shall not have any connections with the grievant or witnesses.
- Development of an investigation plan that is specific for grievance. This is important to ensure a guided process and a reliable conclusion.
- Data gathering through meetings and site visits. This task is very important to ensure that the investigation team has an actual picture of the nature of grievance.

For other more complex grievances, third parties could be involved in the investigation as applicable. Specific examples on this includes the following:

- Grievances that entail safety concerns such as personal threats. Such grievances might require the involvement of local Police
- Grievance against which a permit / clearance has already been obtained from a governmental entity. For example, a grievance could be submitted claiming that the project has destroyed an archaeological or cultural site within the project area although a site assessment has been already conducted and clearance has been obtained from the relevant governmental entity. In this case, this governmental entity should be involved in the investigation and management of grievance.

- Grievances that entail damage to property which have been verified might require an assessment of the damaged asset with the support of an external specialist in agreement with the complainant.

Based on the results of the investigation, a range of grievance resolution approaches to accommodate cultural and personal preferences shall be proposed. The proposal for resolution shall be holistic, addressing any impact that has already taken place and ensuring that recurrence will be avoided. The resolution shall be presented to the grievant, as follows:

- Propose a solution to the grievant, which is generally applicable for minor and straightforward cases where the complainant considers the solution satisfactory.
- In cases where the complainant does not immediately consider the proposed solution acceptable, a two-way discussion with the grievant to jointly define a solution shall be held. As required, for complex cases, third-party mediation should be considered.

The grievance investigation process shall be completed within 15 working days. Once investigation is completed and resolution is proposed, the CLO will formally inform the grievant in writing or any mode of communication preferred as indicated in the Grievance Form. The feedback shall include details of the grievance review and investigation process, results of investigations and proposed measures to address any actual impact and any changes in Project implementation or operation that will be implemented to avoid recurrence of the incident. In cases where more time is required to resolve, the CLO will also inform the grievant on the progress, estimated completion time and channels for any follow-up.

For anonymously submitted grievances, the results of investigations and actions taken will be included in the periodic environmental and social reporting for submission to relevant authorities. As appropriate, results may also be displayed on site information boards or printed as part of posters or Project information leaflets that are periodically distributed to affected communities and other stakeholders.

7.2.2.6 Grievance Resolution

Once the proposed resolution is agreed with the grievant and other relevant parties (if required), the actions defined in the resolution shall be implemented based on the agreed timeline. The CLO along with the SRMT, shall lead the implementation, in coordination with other relevant departments of the company and if required, in partnership with local authorities. As necessary, particularly for complex resolutions, periodic progress reports shall be developed and submitted to relevant parties (including the grievant). In some circumstances, the CLO shall conduct follow up to ensure that acquire feedback on the resolutions that have been implemented.

In the case the grievance resolution form identifies proposed actions to be implemented, the CLO will monitor and follow up to ensure that such actions have been implemented in accordance with the timeline proposed within the grievance resolution form. The actions in specific should be registered. The CLO will contact the complainant once such actions are completed in accordance with the preferred method of communication specified. The grievance will be closed out in the grievance log, as follows:

- **Resolved –** resolution has been communicated, agreed, and/or implemented.
- **Unresolved – c**omplainant did not accept the proposed resolution and has appealed to other entities for resolution.
- **Abandoned –** complainant is no longer contactable and efforts to trace whereabouts have been unsuccessful.

The CLO will seek sign-off from the grievant that the grievance has been resolved. In cases where the grievant is not satisfied with actions taken, the grievance will either:

- Be escalated to senior management and a decision will be taken either to implement supplementary actions or to consider initiating an appeal process; or
- The SRMT will approach a neutral or third party to assist in mediating and resolving the grievance; or
- The SRMT will approach the host country's judiciary to further address the grievance.

Once the above process is completed, the CLO will again approach the grievant to obtain sign-off on actions implemented. Once sign-off has occurred, this will be recorded in the Grievance Log and will be closed accordingly.

7.2.2.7 Progress Tracking and Monitoring

Grievances will be tracked and monitored throughout the grievance investigation and resolution process. The CLO will summarize grievances monthly during EPC phase and quarterly during operation phase and included in the annual performance reporting (maintaining confidentiality, as required). These grievance reports will include:

- The number of grievances logged in the proceeding period by level and type.
- The number of stakeholders that have come back after 30 days stating they are not satisfied with the resolution.
- The number of grievances unresolved after 60 days by level and type.
- The number of grievances resolved between DM or its contractors and complainant, without accessing legal or third-party mediators, by level and type.
- The number of grievances of the same or similar issue.
- Responses of DM or its contractors to the concerns raised by the various stakeholders.
- The measures taken to incorporate these responses into project design and implementation.

The reports and other records will be made available for external review, if required. The annual reports, which will include the summary of grievances, will be made available to the public through the website or by request. A hard copy will be located at the site offices during construction and operation phases, and an electronic copy will be made available online.

KPIs are established to measure and monitor the effectiveness of implementation of this mechanism, see Table 7.9.

Table 7.9 – Grievance Process KPIs

No.	KPI	Measurement Action	Frequency	Goal
1	Number of valid grievances submitted	Grievance Register	Weekly	ZERO
2	Number of resolved grievances	Grievance Register	Weekly	All grievances
3	Outstanding grievances	Grievance Register	Weekly	ZERO
4	Number of grievances not processed on time	Grievance Register	Weekly	ZERO
5	Number of grievances related to GBVH	Grievance Register	Weekly	ZERO
6	Average time for resolution of complaints by severity	Grievance Register	Weekly	Within 14 days from receipt
7	Category of grievances submitted. Ex. Waste, air quality	Grievance Register	Monthly	N/A

No.	KPI	Measurement Action	Frequency	Goal
8	Number of incidents and/or non-compliances in relation to this plan	Submission of incident report and/or Non-Compliance Report (NCR)	Weekly	ZERO

7.2.2.8 Grievance Process Roles and Responsibilities

Table 7.10 lists the roles and responsibilities in relation to the implementation of the Grievance Mechanism. DM and its contractors shall ensure that required resources are available in all stages of Project implementation to fulfil the defined roles and responsibilities.

Table 7.10 – Grievance Process Roles and Responsibilities

Roles	Responsibilities
E&S Manager	▪ Review and approve stakeholder grievance register submitted by CLO ▪ Participate in implementation of the requirements of the stakeholder grievance mechanism as applicable to include approving and singing grievance resolution forms
Community Liaison Officer (CLO)	▪ Overall responsibility for implementing the requirements of the stakeholder grievance mechanism to include distribution of grievance disclosure sheets, collection of grievance forms, updating grievance log sheet, filling grievance resolution forms and grievance close-out forms. ▪ Develop and maintain the stakeholder grievance register.
EPC E&S Manager	▪ Provide support to the CLO as applicable within the roles and responsibilities identified above. ▪ The EPC E&S Manager will participate in the investigation of all grievances that are related to activities under the EPC scope, including activities related to the EPC's subcontractors and suppliers
Construction Workers	▪ Should any worker (whether from Company, EPC Contractor or subcontractor) receive any complaint from any stakeholder directly or indirectly will be required to redirect the complaint to the Company CLO

7.2.2.9 Confidentiality and Protection of Grievant

DM and its contractors shall ensure the confidentiality of the grievances received and if requested, shall protect the identity of the grievant, witnesses and other individuals or groups that take part in the process. This is the responsibility for all employees and personnel for both the DM and its contractors that are part of the grievance receipt and resolution process. All personal data gathered during the process shall be kept accessible to the relevant parties during the investigation and resolution process only. The data shall be either deleted or modified and transferred to an archive for a reasonable period in line with relevant regulations on data privacy.

In terms of conflict of interest, as previously discussed, DM shall ensure that the individuals involved in the investigation and resolution process will act independent of the Project and shall not be related to either the complainant or any of the witnesses that would be involved in the process. The segregated roles and responsibilities in the process as outlined in table 7.10 shall ensure a fair and trustworthy process of grievance investigation and resolution.

During the process of investigation and resolution, the grievant shall be given an appropriate channel to raise any concerns in relation to retaliation from any affected Project party or employee. Any complaints about retaliation shall be investigated in line with the relevant employee's code of conduct and, as necessary, shall be referred to the relevant government authority.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

To ensure that all environmental and social impacts associated with the implementation proposed Project are minimized, it is important that a suitable management framework is developed to control activities at all stages of implementation. This section outlines the Environmental and Social Management Plan (ESMP), which provides such a framework for minimizing environmental and social impacts associated with the construction and operation of the Project as identified in this ESIA Report.

The plan presented in this Section is based on the typical environmental and social management system and includes the following elements:

- Management Program Objective
- Management System
- Environmental and Social Control Measures
- Monitoring and Auditing

8.1 ESMP Objective

The overall objective of the ESMP is to minimize the short-term and long-term impacts associated with the implementation of the Project to the receiving environmental and social receptors. In particular, this requires procedures to be put in place which:

- Minimize areas disturbed during implementation, particularly the identified ecologically sensitive habitat or areas where social receptors are present.
- Minimize environmental releases, including air emissions, noise and vibrations during the construction and operations.
- Prevent all forms of soil/groundwater pollution, including appropriate management schemes for construction and operational waste.
- Ensuring the health, safety and security of impacted communities and other stakeholders.
- Minimizing and, where possible, avoiding negative impacts of Project activities on impacted communities or their livelihood.
- Satisfactorily comply with all regulatory requirements in regard to project construction and operations.

To achieve the above objectives, it will be the overall responsibility of the proposed Project Management to ensure distribution to all relevant contractors and strict implementation of all the mitigations measures outlined in this ESIA Report. Project management should also ensure that any additional requirements to be issued by relevant government authorities (i.e., DM, DEWA, etc.) are appropriately implemented in relevant Project phases.

8.2 Construction Phase ESMP

8.2.1 Environmental and Social Management System

8.2.1.1 Roles and Responsibilities

A well-defined environmental and social management structure with assigned responsibilities is essential to ensure that a suitable organization to manage, implement and maintain Project ESMP and operate safely is in place. The environmental and social roles and responsibilities of DM and its appointed contractors/subcontractors are summarized in Table 8.1 and Table 8.2, respectively. DM and its appointed contractor shall also ensure that competent personnel will be employed to ensure effective management of environmental and social impacts associated with the implementation of the Project.

Table 8.1 – Construction Phase Environmental Roles and Responsibilities

Designation	Summary of Roles and Responsibilities
Project Proponent	
General - HSE Department	▪ Review and update the ESMP annually or as necessary. ▪ Provide guidance and advice regarding management of environmental aspects that have not been identified in this plan. ▪ Conduct inquiries with DM and other relevant government entities to facilitate required approvals/renewal for environmental permits. ▪ Lead and schedule environmental inspections and audits. ▪ Ensure required environmental monitoring reports completed internally or by appropriate contractors. ▪ Ensure dissemination and implementation of the ESMP to contractors and subcontractors working for the Project.
HSE Director	▪ The HSE Director is responsible for the development and maintenance of this ESMP and coordinating with the Project management and site construction team to maintain employee awareness of compliance with this Plan.
Site HSE Supervisor	▪ The Site HSE Supervisor has the primary responsibility to ensure that the requirements described in this document are adhered to by all DM personnel, Contractors, and subcontractors. ▪ Ensure all required reports are completed and communicated to the HSE department. ▪ Assist in carrying out environmental audits and ensure actions from audits are implemented on location. ▪ Assist in assurance of compliance to all relevant Project-related Management Plans (Company and Regulatory Authorities) at Project sites.
Contractors and Subcontractors	
General	▪ Contractors and subcontractors must ensure: – Compliance with Environmental Management Plan. – Applicable UAE regulations; and – DM HSE Standards and regulations.
Construction Manager CM)	▪ Implementation of applicable HSE laws and regulations along with applicable DM requirement. ▪ Review and implement all project specific HSE plans, environmental plans, and emergency response procedures. ▪ Review and update (if required) Project specific ESMP. ▪ Evaluate that adequate HSE hazard evaluations are carried out. ▪ Shall monitor and review the overall Project HSE performance and implement timely mitigation and corrective action(s). ▪ Reviewing and ensuring compliance with HSE orientation and training program. ▪ Assisting supervisor and field personnel in obtaining HSE training. ▪ Carrying out and monitoring levels of risk assessment activity ensures compliance with contract requirements and occupational safety and health. ▪ Ensure construction HSE team inspecting the site and equipment by visual observation and report on potential violations of HSE standards. ▪ Documenting violations through notes, sketches, measurements, photographs, and video, as appropriate. ▪ Provide resources and ensure that actions to address HSE issues are implemented. ▪ Supervise and participate, where required, in investigations of accidents and injuries to determine the root cause and to determine violations; and ▪ Evaluating working conditions and recommending improvements in HSE methods, practices, and procedures.

Designation	Summary of Roles and Responsibilities
HSE Staff	▪ Ensure contractors and sub-contractor staff are provided awareness of the main provisions of this ESMP. ▪ Support the Company staff in the implementation of this ESMP. ▪ Support record keeping and management of all data
Environmental Engineer	▪ The Environmental Engineer shall be responsible for ensuring all employees and contractor personnel are aware and trained on provisions of the ESMP to always allow implementation by all site personnel. ▪ Coordinating with the external auditor party for scheduling and execution of external audits, in accordance with DM requirements. ▪ Coordinate with the contractor and ensure that environmental monitoring is being implemented by the contractor through qualified personnel. ▪ Responsible for the assessment and management of all acquired data and incorporation into monitoring reports. ▪ Coordination with external Regulatory Authorities, if / as necessary. This also includes the provisional reporting of any environmental incidents or emergencies. ▪ Ensure that waste service providers regularly collect the construction waste, from the site including solid and effluent, and records are kept at site. ▪ Development of Annual Environmental Monitoring Report to be submitted to Regulatory Authorities, as per requirements. ▪ Development of a comprehensive environmental awareness training program and corresponding schedule for all site personnel. ▪ Conduct site inspections to check compliance with the construction ESMP requirement. ▪ Conduct environmental monitoring through qualified personnel as required by this ESMP. ▪ Record keeping and management of all acquired data and incorporation into weekly/monthly monitoring reports. ▪ Responsible for coordination with waste service providers, including scheduling of delivery of freshwater batches and waste skips. This also includes the removal of all waste materials (solid or effluent) from Project sites and recordkeeping management. ▪ Take immediate actions to close any identified issue during inspection or site monitoring. ▪ Ensure compliance is met with all related Project environmental documentation and permits, including the policies, regulations, and conditions included therein.

Table 8.2 – Construction Phase Social Roles and Responsibilities

Designation	Summary of Roles and Responsibilities
Project Proponent	
General Manager	▪ Set expectations for social conformance with the management systems requirements and compliance with the governmental regulations on health, environment, safety, security, risk management and social responsibility
HSE Manager	▪ Develop the corporate social management system, monitor its effectiveness, update its requirements, and ensure its application throughout the Project.
Employees	▪ Work in compliance with company social policies and management systems and to inform their supervisor if any requirement is not understood and notify their supervisor immediately of any observed noncompliance.

Designation	Summary of Roles and Responsibilities
CLO	▪ Closely aligns with Project leadership team. ▪ Delivers the requirements of the social risk management standard and policies. ▪ Plans, executes, monitors, and reports on social risk mitigation and opportunity enhancement activities. ▪ Coordinates with contractors SRMT and CLO. ▪ Designs and executes social risk related to community engagement and communication activities, including CSR. ▪ Implements and manages the community feedback mechanism. ▪ Investigates and reports community incidents. ▪ Monitors social performance and reports social Key Performance Indicators (KPI)s.
Contractors and Subcontractors	
General	▪ Contractors and subcontractors must ensure: – Compliance with Environmental and Social Management Plan. – Applicable UAE regulations
Contractor CLO	▪ Coordinates with the Project management on the implementation of social management measures outlined in this ESMP. ▪ Holds the two-way communication channel between the Project and community. ▪ Facilitates the review and approval of all communications and community engagement materials. ▪ Prepares communities for social risk management activities.
HSE Staff	▪ Ensure contractors and sub-contractor staff are provided awareness of the main provisions of this ESMP. ▪ Support the Company staff in the implementation of this ESMP. ▪ Support record keeping and management of all data

8.2.1.2 Training and Competence

Environmental and social awareness and training is an integral part of the ESMP. Training is required to be carried out to ensure that employees and contractors can carry out their work safely and competently, ensuring environmental and social protection. DM shall ensure that a Project-specific training program is developed for construction phase and tailored to the associated Scope of Works (SOW) to be conducted by the construction contractor, considering the environmental and social sensitivities within the Project areas.

Table 8.3 provides a summary of the environmental training program that shall be provided by the EPC contractor to all personnel to be involved in the construction phase of the Project, including subcontractors. The HSE Site Manager/Engineer will record all environmental training conducted and received (other than EMP induction). An Environmental Training Record Form will be maintained for this purpose). The Record Form will detail the type of training received, the date of the training, the names of people being trained and the trainer's name and company details.

Table 8.3 – List of Environmental Awareness Trainings

Training Title	Frequency
HSE Management System	Annually
Project HSE Induction	Start of Project and for new employees and visitors
Incident Reporting and Classification	Bi-annually
Incident Investigation	Bi-annually
Environmental Risk Management	Bi-annually

Training Title	Frequency
Emergency Response Plan	Bi-annually
Waste Management	Annually
Environmental Awareness	Bi-annually
Hazardous Material Handling	Annually
Journey Management	Bi-annually
Blood Borne Pathogens	Annually
Basic First Aid	Annually
Personal Health & Hygiene	Annually
Personal Protective Equipment (its proper use)	Annually
Personal Security	Annually

Table 8.4 provides a summary of the social training to be provided by EPC contractor to all personnel involved during construction phase. Recordkeeping of all environmental and social awareness training sessions and attendance shall be consistently maintained.

Table 8.4 – List of Social Awareness Trainings

Training	Description
Induction (as part of overall HSE induction)	To be provided to all personnel at all levels, upon arrival at site and will include the following (but not limited to): • HSE and Social Responsibility Policy, objectives, including relevant international standards. • Identification of all stakeholders and applicable conditions, regulations, and applicable mitigation measures in place • Environmental / ecological preservation, waste management procedures, key preventative and mitigation control plans, and ecological community identification • Awareness of cultural heritage or archaeological receptors (identified or undiscovered)

8.2.1.3 Document Review and Update

This Construction ESMP shall be maintained as a "live" document and subject to review and updates throughout the Project duration. It will be reviewed and updated to address any changes in environmental and social conditions and regulatory requirements. The frequency of the review and update of this ESMP will be determined based on either the basis of non-effectiveness of mitigation measures, or any changes in the associated scope of works, or addition of new site activities (non-approved), or as required by the Regulatory Authorities (i.e., relevant sections/departments of DM) based on their review and evaluation of environmental performance reports submitted. In any case, as a minimum and in line with the general requirements of DM, the Construction ESMP shall be updated annually.

DM is responsible for ensuring that the EPC contractor will update the Construction ESMP as and when required (as mentioned above). It shall also ensure that any significant technical modifications in the Project made by the EPC contractor will be verified and assessed, and that DM will be informed prior to incorporation into the ESMP update.

8.2.1.4 Coordination with External Entities and Addressing Complaints

Coordination with external entities and addressing complaints shall follow the Project Grievance Mechanism process as presented in Chapter 7 of this Report.

8.2.2 Environmental and Social Control Measures

DM and its contractors are committed to all outcomes and obligations of this ESMP, to minimize the short-term and long-term impacts of the construction activities on environmental and social receivers.

It will ensure that that all EPC personnel that will be deployed for the actual implementation of the planned developments are properly informed of the requirements outlined in this Plan and relevant requirements of DM and other relevant authorities. DM will further ensure that an appropriate and dedicated team will be available during the entire EPC phase to oversee and implement all ESMP requirements.

DM will ensure the proper transfer of information to the responsible implementing department within the company (i.e., HSE) for further distribution among relevant personnel, contractors, stakeholders, and any other entities that will be involved the EPC phase. As previously noted, this ESMP will be an integral part of the Project HSE Plan once approved. The transfer of documents and information will follow proper protocols and will ensure that key information required for proper and effective implementation is highlighted. In particular, it will ensure that all relevant parties, particularly the EPC contractor, are informed of the following requirements (but not limited to):

- Ensure that environmental and social induction content includes requirements specified in this ESMP.
- Environmental and social mitigation measures and monitoring programs that need to be implemented during construction.
- Periodic (i.e., annual) environmental compliance audits to assess the effectiveness of all construction phase mitigation and monitoring measures.
- As necessary, contractors need to update the ESMP and the overall environmental management framework in order to adapt to the changing environmental conditions or new regulatory requirements during the EPC phase.
- In case of any modifications, the EPC contractor will advise DM and will formally inform other relevant authorities.
- EPC contractors will ensure adherence to all relevant permitting regulations and procedures.

8.2.3 Environmental and Social Monitoring and Auditing

The monitoring program provides the framework for early identification of environmental and social risks and for triggering the appropriate corrective actions and should have the following specific aims:

- To provide an early indication of the failure of any environmental and social control measure or practice to achieve acceptable performance standards;
- To monitor the performance of the Project and the effectiveness of the mitigation measures;
- To determine the Project's compliance with local and any relevant international regulatory requirements;
- Take remedial action if unexpected problems or unacceptable impacts arise.

Monitoring of all significant environmental and social parameters will be undertaken on a regular basis to check adherence to the recommended mitigation measures and to ensure compliance with UAE/DM environmental and social requirements, including relevant IFC and World Bank standards.

8.2.3.1 Reporting Requirements

Incidents and Non-compliance Reporting

Incident reporting and investigation is an important process that is utilized to determine the root cause of an accident/incident and applying suitable mitigation or modification measure in order to prevent further escalation and to avoid similar incident happening in the future.

Work related environmental hazards, near miss and incidents (including those that could potentially or actually resulted in impact to any community) will be reported in accordance with the following reporting requirements:

- Recordable incidents (non-serious) – shall be reported to the site Supervisor in charge of the area to his manager (applicable to contractor staff). Site HSE Supervisor to be notified by the Supervisor in charge within 2 days of the occurrence.
- Reportable incidents (serious) – shall be reported to the Supervisor in charge of the area to his manager (applicable to contractor). Site HSE Supervisor to be notified by the Supervisor in charge immediately (within an hour of the occurrence) about any HSE incident.
- Site HSE Supervisor / Management to notify relevant government agencies and any other relevant external bodies (i.e., Civil Defense, Police, Ambulance, DM, etc.), as necessary.

The incident scene will be secured immediately (either by Site Supervisor in charge or Site HSE team). Physical evidence, such as location of equipment and materials involved, shall not be disturbed until they have been identified and photographed / sketched by the Site HSE investigating team. Witnesses to the incident shall be allowed by their immediate supervisor to be interviewed by the person and/or team investigating the accident to determine the root causes of the incident. Witnesses shall be interviewed immediately after the incident. Written statements of witnesses' account of the accident shall be prepared by the supervisor.

In case of any potential social risks related to the incident, the SRMT and CLO shall be notified. Investigation of environmental incidents will be properly documented. Construction and Operation contractor(s) will be required to develop Incident Investigation and Reporting Format. In case of any community or stakeholder grievances related to any work-related incidents, it shall be investigated in line with the Grievance Mechanism presented in Section 7 of this Report.

Performance Reporting

The environmental and social performance of the project will be measured and monitored using both qualitative and quantitative measures. During the site preparation and construction phases, there will be regular site inspections and audits to monitor contractor's conformance with environmental mitigation/controls, compliance with guidelines and standards. On a semi-annual basis, the project will develop an environmental performance report detailing the results of the inspections and audit conducted and providing an overall assessment of environmental performance of Project-related activities.

Reporting

The Contractor environmental and social in-charge will manage and provide reports as daily, weekly, or monthly (as part of HSE reports). The daily report shall be integrated into day-to-day operation reports in pre-defined format. The environmental and social statistics are listed below but not limited to:

- Person-hours
- Number of per-talks or toolbox meetings

- Unsafe situations
- Incidents and accidents
- Community/stakeholders grievances
- Inductions and Meeting
- Training sessions
- Visit, audits and inspections
- Safety Drills
- Update of any Remedial Work Plan

At the minimum, a monthly environmental and social Statistics Report (as part of HSE statistics), as part of any contract, should be prepared. The Report shall be sent to the Contract Proponent and designated representative. The monthly cutoff date for each Report shall be the close of business up to and including the final day of each month.

Records

Environment and social related operating records serve as a collection of experience for crew to prepare and execute the next project. In addition to the required data to be recorded, additional requests by the DM / or local government will be included in this record. Different records and documents will be maintained and kept and shall contain of but not limited to below:

- Risk management
- Project specific plans, procedures
- Incident reports, investigations and follow up
- Audits & Inspections reports
- Training records / competency certificates
- Meeting minutes
- Medical records/certificates
- Fuel & water consumption
- Management of change (MOC)
- Equipment certificates
- Maintenance records
- Inventory or hazardous substances
- Grievance log and resolution (as per the Grievance Mechanism)

Contractor Interface Meetings

In order to enhance Contractor environmental and social performance, manage expectations and communicate Project initiatives, lessons learned and feedback on Contractor performance, the Proponent along with the environmental and social representative will hold routine (weekly) interface meetings when applicable. The Interface meetings shall address:

- Monthly environmental and social performance
- Annual improvement Plan/Objectives
- Issues or concerns
- Incidents & lessons learned
- Audit/corrective & preventative action requests

Ad-hoc meetings may also be called at the request of the Proponent to discuss other specific issues.

8.2.3.2 Audit and Inspection

Contractor Environmental and Social Performance Evaluation

The environmental and social performance of all Contractors is a critical consideration in the selection, use and retention of Contractors during construction phase. Routine Contractor interaction over the contract period is essential to maintain alignment with performance expectations and goals of the Project in line with local and IFC/EP requirements.

Regular inspections shall provide day-to-day means of checking compliance with contract requirements. Whereas audits shall provide a more formal and comprehensive assessment of adherence to the written framework of the contract (including this ESMP).

The Contractor performance evaluation shall include the following:

- Ongoing site evaluation throughout the contract by:
  - On site inspections
  - Periodic site Audit
- Routine tracking and trending of Contractor supplied monthly performance data
- Routine administrative review of "High Risk" Contractor base office and facilities
- Open communication between Proponent and Contractor leadership to ensure expectations are clear and receive routine feedback on behaviour and performance
- Scheduled performance reviews, between Contractor and Proponent, to review environmental and social performance and take appropriate action to enhance future performance
- Conduct Contractor performance review and prepare a Contract Close-Out Report, within one month of contract completion.

Inspections and Follow-up

Routine and non-routine inspections of Contractor personnel, work scope and related activities shall be initiated. As applicable, inspections and audits may include an assessment of the following:

- Implementation of day-to-day environmental and social control measures at site
- Employee / workers environmental and social awareness
- Emergency and contingency plan readiness and drills
- Availability and correct use of protective equipment
- Implementation of workers welfare measures
- Any other required areas

The effectiveness of inspections and audits shall be enhanced by the use of unannounced spot checks. The contractor shall be informed promptly of any nonconformity - and implement immediate corrective / preventive action as required. Tangible evidence shall be provided to verify close-out and take any additional action to be documented in the Contractor Action tracker database.

Internal Audits

Internal audits will be conducted monthly by competent auditors of Contractor team, to verify the conformance with environmental and social requirements and to check if it is effectively implemented and maintained. The audit program will be planned, established, implemented, and maintained. The Contractor shall follow the established procedure for auditing that addresses the responsibilities and requirements for planning and conducting audits, reporting results, and retaining associated records. The selection of auditors and conduct of audits will be so as to ensure objectivity and impartiality of the audit process. The auditors will not audit their own work / tasks / area / department.

The Project Company shall be able to provide documented evidence of internal audits, including audit reports, corrective actions taken, and any follow-up verification.

External Inspection/Audits

Regular site inspection/site audit will be undertaken by Dm or its appointed contractor to cover construction activities. The inspection will be specifically undertaken to:

- Ensure that contractor(s) comply with the ESMP requirements in terms of environmental and social control measures, monitoring and reporting;
- Ensure that contractor(s) comply with the DM's NOC requirements in terms of environmental control measures, safety and emergency response, training, monitoring, record keeping and reporting;
- Identify any non-compliances and environmental/social concerns associated with the project activities; and
- Provide recommendations and corrective actions to address any identified non-compliance.

8.3 Operation Phase ESMP

8.3.1 Environmental and Social Management System

DM, through its appointed operator, shall ensure it is in full compliance with all pertinent regulations from relevant Dubai Authorities, as well as with national and international environmental and social rules and regulations. It is understood that prior to operation, a facility-specific Environmental and Social Governance System, which shall be in conformance to relevant international standards, i.e., ISO 45001:2018, ISO 14001:2015 and ISO 23001:2012 international standards.

This management system shall be developed to ensure that all operations and activities that may have environmental or social impact, have been systematically identified, prioritized, and controlled in a proactive manner. The goal is to create a manageable system, within a cohesive framework, that can be audited by the regulatory authorities, third parties, and DM (as required).

8.3.1.1 Roles and Responsibilities

As part of the management system, the appointed operator shall define its company environmental and social management structure and assign responsibilities to ensure that the Company maintains a suitable organization to manage, implement and maintain the relevant environmental and social plans and procedures during operation. DM, through its appointed operator shall:

- Issue, revise, and enforce the necessary policies, standards, procedures, codes of practice, instructions, and guidelines to safeguard the health and safety of personnel, while also preserving the environment and protecting assets.
- Ensure compliance with environmental and social requirements by:
  - Auditing and inspecting plant areas and associated facilities.
  - Auditing and inspecting are of influence (particularly any communities or stakeholder that could be affected by the operation)
  - Collecting evidence and issuing corrective/preventive actions, warnings, prohibition notices, vessel detentions, and/or penalties, as necessary
- Evaluate and recommend environmental and social related training programs.
- Liaise with and advise federal and local regulatory authorities on compliance status.

The top management shall ensure that the responsibilities and authorities for relevant roles within the HSE management system are assigned and communicated at all levels within the

company and maintained as documented information. Workers at each level shall assume responsibility for those aspects of the environmental and social management system over which they have control.

While responsibility and authority are assigned, ultimately top management is still accountable for the functioning of the environmental and social management system. The environmental and social roles and responsibilities during operation are provided in Table 8.5.

While responsibility and authority are assigned, ultimately top management is still accountable for the functioning of the environmental and social management system. The environmental and social roles and responsibilities during operation are provided in Table 8.5. These defined roles and responsibilities shall be reflected and carried through to the RFP documents to ensure alignment with the ESIA commitments and continuity in environmental and social management across project phases.

Table 8.5 – Operation Phase Environmental and Social Roles and Responsibilities

Designation	Summary of Roles and Responsibilities
CEO	▪ Ultimate accountability and Responsibility for the environmental and social management and commitment to demonstrate effective and efficient implementation. ▪ Ensure the availability of resources is essential to establish, implement, maintain, and continually improve the management system. Resources include human resources and specialized skills, organizational, infrastructure, technology, and financial resources. ▪ Define the Environmental and Social Policy and make sure the policy requirements are complied with at all functions and levels of the organization. ▪ Ensure the management system and policies comply with relevant regulations, standards, rules, and best practices. ▪ Ensure that the environmental and social policy is appropriate to the nature and scale of plant risks and impacts. ▪ Chairs the management review meetings.
Environmental and Social Head (or HSE Director / Manager)	▪ Ensure the development and implementation of the environmental and social management system in compliance. ▪ Ensure that adequate resources, including manpower and training are made available to establish, implement, maintain, and improve the management system. ▪ Ensure that environmental and social management system requirements are complied with at all levels and functions within the organization. ▪ Reports on plant's performance for the management review.
Operations / Facility Manger	▪ The effectiveness of environmental and social controls is to be reviewed regularly. ▪ Environmental and social programs, objectives, targets and if appropriate Key Performance Indicators (KPI)'s are properly planned and set to continually improve environmental and social management performance. ▪ Adequate arrangements are made for the provision of advice and information on environmental and social matters to all employees. ▪ Arrangements are being made to make the environmental and social policies and requirements known to all employees. ▪ Encourage periodic environmental and social inspections to be carried out and review implementation of relevant mitigations to minimize the impact of identified hazards. ▪ Encourage incident reporting & arrange for investigations of incidents to be carried out. ▪ Adequate monitoring systems are in place to measure compliance with environmental and social requirements for the operation of the facility.

Designation	Summary of Roles and Responsibilities
Departmental Managers	▪ Ensure that arrangements are in place to identify environmental and social hazards and aspects. ▪ Be accountable to ensure that the requirements for environmental and social protection are established across his areas of responsibility to support the achievement and maintenance of an effective system. ▪ Effectively communicate the environmental and social requirements of the in accordance with the relevant procedure. ▪ Ensure that resources are properly allocated to allow proactive elements of operation. ▪ Review incident and accident reports and ensure that root causes are identified, and adequate controls are imposed. ▪ Ensure that plant, machinery, and equipment is provided to the required standard, maintained in an environmentally sound manner. ▪ Review the adequacy of emergency response planning. ▪ Collate and prepare all data required for the management review process. ▪ Close out and action all recommendations required by the management review.
Social Risk Management Team (SRMT)	▪ Closely aligns with Project leadership team. ▪ Delivers the requirements of the social risk management standard and policies. ▪ Plans, executes, monitors, and reports social risk mitigation and opportunity enhancement activities. ▪ Coordinates with contractors SRMT and CLO. ▪ Designs and executes social risk related to community engagement and communication activities, including CSR. ▪ Implements and manages the community feedback mechanism. ▪ Investigates and reports community incidents. ▪ Monitors social performance and reports social Key Performance Indicators (KPI)s.
Company CLO	▪ Coordinates with the Project management on the implementation of social management measures outlined in this ESMP. ▪ Holds the two-way communication channel between the Project and community. ▪ Facilitates the review and approval of all communications and community engagement materials. ▪ Prepares communities for social risk management activities.
Employees	▪ Actively participate with line management in the implementation of environmental and social management systems and procedures. ▪ Work within the framework of his/ her organization structure ▪ Get familiarized with his/her Job Description and to act through. ▪ Become familiar with environmental management procedures and requirements. ▪ Participate in identifying Hazards & conform to safe operation. ▪ Enhance his/her competency through training and awareness. ▪ Report Unsafe Act, Unsafe Condition, Near Miss Incidents, external complaints, and grievances. ▪ Participate in identifying Hazards & conform to safe operation. ▪ Enhance his/her competency through training and awareness. ▪ Participate in carrying out environmental and social risk assessments and HSE inspections. ▪ Provide reliable information to Management and participate in counseling and HSE communication.
Visitors	▪ Comply with the established environmental and social procedures and instructions of which they have been informed and instructed. ▪ Report all HSE port related incidents to the relevant manager/ supervisor.

8.3.1.2 Training and Competence

Environmental awareness, training and competency are key elements of environmental and social management policy. Accordingly, a facility-specific environmental awareness training program for all relevant personnel involved in operation. This is to ensure that all personnel under its control are competent based on appropriate training or experience. Table 8.6 and Table 8.7 provide a summary of the training program for employees during operation. The designated Environmental and Social personnel will record all environmental training conducted and received. A Training Record Form shall be maintained for this purpose.

Table 8.6 – List of Environmental Trainings during Operation

Training Title	Frequency
Environmental Management System	Annually
Site Induction	Upon Arrival at Site
Incident Reporting and Classification	Bi-annually
Incident Investigation	Bi-annually
Risk Management	Bi-annually
Auditing Techniques	Bi-annually
Emergency Response Plan	Bi-annually
Waste Management	Annually
Environmental Awareness	Bi-annually
Hazardous Material Handling	Annually
Road Transportation	Annually
Personal Health & Hygiene	Annually
Personal Protective Equipment (its proper use)	Annually
Personal Security	Annually

Table 8.7 – List of Social Awareness Trainings during Operations

Training	Description
Induction (as part of overall HSE induction)	To be provided to all personnel at all levels and will include the following (but not limited to): • Company Environmental and Social Responsibility Policy, objectives, etc. • Identification of all stakeholders and applicable conditions, regulations, and applicable mitigation measures in place • Environmental / ecological preservation, waste management procedures, key preventative and mitigation control plans, and ecological community identification • Awareness of social and cultural heritage or archaeological receptors.

8.3.1.3 Document Review and Update

This Operation ESMP is intended to be a living document for continual improvement on all relevant aspects. It will be reviewed and updated to address changing environmental and social conditions and regulatory requirements. An annual review and update of the Operation ESMP will be implemented by the SRMT or through designated personnel/consultant. Review and update of the plan will be based on the effectiveness of all mitigation measures, because of periodic monitoring and auditing. It shall also be ensured that any significant upgrade or operations changes will be verified and assessed, and that relevant local authorities (such as DM) will be informed prior to incorporation into the ESMP.

8.3.1.4 Coordination with External Entities and Addressing Complaints

Coordination with external entities and addressing complaints shall follow the Project Grievance Mechanism process as presented in Chapter 7 of this Report.

8.3.2 Environmental and Social Control Measures

DM is committed to all outcomes and obligations of this ESMP, to minimize the short term and long-term impacts of the operational activities on environmental and social receptors. It will ensure that all personnel that are involved in operations are properly informed of the requirements outlined in this ESMP, relevant policies and management plans, and all relevant local and international regulatory requirements.

DM will further ensure that a competent and dedicated team will be available at all times during the operation to oversee and implement all ESMP requirements. It will ensure the proper transfer of information to the responsible implementing department within the company for further distribution among relevant personnel, stakeholders, and any other entities involved in operations.

The transfer of documents and information will follow standard protocols and will ensure that key information required for proper and effective implementation is highlighted. In particular, it will ensure that all relevant personnel and parties are informed of the following requirements (but not limited to):

- Environmental and social mitigation measures and monitoring program that needs to be implemented during operations.
- Carry out periodic (i.e. annual) environmental and social compliance audit in order to assess the effectiveness of all mitigation and monitoring measures.
- As necessary, update the ESMP and the overall environmental and social management framework in order to adapt with the changing environmental and social conditions or new regulatory requirements.
- In case of any modifications, upgrade or operational changes, formally apply for a technical modification NOC.
- Ensure adherence to all relevant permitting regulations and procedures.

8.3.3 Environmental and Social Monitoring and Auditing

The monitoring program provides the framework for early identification of environmental and social risks and for triggering the appropriate corrective actions and should have the following specific aims:

- To provide an early indication of the failure of any environmental and social control measure or practice to achieve acceptable performance standards;
- To monitor the performance of the Project and the effectiveness of the mitigation measures;
- To determine the Project's compliance with local and any relevant international regulatory requirements;
- Take remedial action if unexpected problems or unacceptable impacts arise.

Monitoring of all significant parameters will be undertaken on a regular basis to check adherence to the recommended mitigation measures and to ensure compliance with UAE/DM environmental requirements. Monitoring of all significant environmental and social parameters will be undertaken on a regular basis to check adherence to the recommended mitigation measures and to ensure compliance with UAE/DM environmental and social requirements, including relevant IFC/WB standards.

8.3.3.1 Reporting Requirements

Incidents and Non-compliance Reporting

DM shall establish, implement, and maintain processes for investigating and taking actions, to determine and manage incidents and nonconformities. When an incident or a nonconformity occurs, it shall deal with these cases by:

- Reacting in a timely manner to the incident or nonconformity and, as applicable, taking actions to control and correct it, and to deal with the consequences
- Evaluating, with the participation of workers and the involvement of other relevant interested parties, the need for corrective action to eliminate the root causes of the incident or nonconformity, in order that it does not recur or occur elsewhere, by:
  - Investigating the incident or reviewing the nonconformity.
  - Determining the causes of the incident or nonconformity.
  - Determining if similar incidents have occurred, if nonconformities exist, or if they could potentially occur.
- Reviewing existing assessments of environmental and social risks and other risks, as appropriate.
- Determining and implementing any action needed, including corrective action, in accordance with the hierarchy of controls and the management of change.
- Assessing environmental and social risks that relate to new or changed hazards/impacts, prior to taking action.
- Reviewing the effectiveness of any action taken, including corrective action.
- Making changes to the environmental and social management system, if necessary

Corrective actions are ensured to be appropriate to the effects or potential effects of the incidents or nonconformities encountered. DM or its appointed shall communicate relevant documented information to relevant workers and their representatives, and to other relevant interested parties.

Relevant retained documented information is that providing evidence of:

- The nature of the incidents or nonconformities and any subsequent actions taken
- The results of any action and corrective action, including their effectiveness

DM through its appointed contractor shall ensure that corrective and preventive actions have been implemented and that there is a systematic follow-up to ensure effectiveness. They shall also ensure that any necessary changes are implemented to the management system documentation.

In case of any potential social risks related to the incident, the SRMT and CLO shall be notified. Investigation of environmental incidents will be properly documented. In case of any community or stakeholder grievances related to any work-related incidents, it shall be investigated in line with the Grievance Mechanism presented in Section 7 of this Report.

Performance Reporting

The environmental and social performance of will be measured and monitored using both qualitative and quantitative measures. In addition to the results of the monitoring program, DM through its appointed contractor shall develop monitoring and reporting system of the following:

- Energy usage (electricity and fuel)
- Water usage (potable and non-potable)
- Waste generation, including waste statistics related to the percentage of recycled waste, disposed to landfill, re-used, etc.
- GHG emissions, including both direct and indirect emissions.

- Social statistics, including no. of received grievances, investigated, and resolved, rejected, etc.

Environmental and Social Performance reporting requirements will be embedded in the Request for Proposal (RFP) documentation for all relevant contractors and sub-contractors. The requirements will include:

- Regular submission of Environmental and Social Monitoring Reports (see Table 8.8)
- Incident and non-compliance reporting mechanisms
- Key Environmental and Social performance indicators (ESKPIs)
- Compliance with applicable national regulations, international standards (e.g., IFC Performance Standards, Equator Principles), and project-specific ESMPs
- Community engagement and grievance redress reporting
- Auditing and third-party verification, where applicable

The RFP documents will clearly define these obligations to ensure that all bidders are aware of, and capable of complying with, the project's E&S performance expectations.

Table 8.8 – Environmental and Social Performance Reporting

Concerns	Frequency
Key Performance Indicators (KPIs) for the number of written warning notices issued by the Regulatory Authority regarding non-compliance with relevant laws	Monthly
Key Performance Indicators (KPIs) for the number of fines imposed against violations of relevant laws	Monthly
Minor Incidents and Near Misses, Community Grievances	Monthly
KPIs for air emissions to include reduction and prevention of air pollution and carbon emissions reports	Monthly
KPIs on energy usage, initiatives, efficiencies, and conservation	Monthly
Serious Incident	Within 24 Hours
Pollution Incidents	Within 48 Hours
Noise KPIs to include monitoring & reduction of noise, and reduction of vibration	Annual
KPIs for water to include water consumption monitoring, reduce, reuse, and recycle initiatives, and conservation initiatives	Annual
KPIs for waste to include implementation efforts based on replace, reduce, reuse, recycle and measures of waste reduction to the landfill	Annual
KPIs for hazardous substances to include management and control of hazardous substances and programs to eliminate, reduce, or replace hazardous substances	Annual
KPIs for biodiversity & conservation to include protecting and maintaining wildlife habitat and reduction of impacts of development on natural life	Annual
KPIs for land to include reduction of land contamination and an increase of remediation/ vegetation	Annual
KPIs for social responsibility to include management and control of potential social risks and impacts, including resolution of grievances (if any)	Annual

In addition to the above, environmental, and social in-charge during operation shall manage and provide reports as daily, weekly, or monthly. The report shall contain the following statistics (but not limited to):

- Person-hours
- Number of per-talks or toolbox meetings
- Unsafe situations

- Incidents and accidents
- Community/stakeholders grievances
- Inductions and Meeting
- Training sessions
- Visit, audits and inspections
- Safety Drills
- Update of any Remedial Work Plan

Records

Operating records serve as a collection of experience for personnel to assess environmental and social performance. In addition to the required data to be recorded, additional requests by the DM / or local government will be included in this record. Different records and documents will be maintained and kept by the crew in different sections. These records contain of but not limited to below:

- Plans, procedures.
- Unsafe Act / Unsafe condition auditing;
- Incident reports, investigations and follow up;
- Audits & Inspections reports;
- Training records / competency certificates;
- Meeting minutes;
- Management of change (MOC);
- Equipment certificates;
- Maintenance records; and
- Inventory or hazardous substances

8.3.3.2 Audit and Inspection

HSE Performance Evaluation

Regular inspections shall provide day-to-day means of checking compliance with environmental requirements for the plant operation. Whereas audits shall provide a more formal and comprehensive assessment of adherence to the written environmental management framework. The performance evaluation shall include the following:

- Ongoing site evaluation by:
  - On site inspections
  - Periodic site Audit
- Routine tracking and trending of supplied monthly environmental and social performance data
- Open communication between management and operators to ensure expectations are clear and receive routine feedback on environmental and social behavior and performance
- Scheduled performance reviews, between management and port operators, to review HSE performance and take appropriate action to enhance future environmental and social performance

Inspections and Follow-up

A routine and non-routine inspection of different operating areas shall be initiated periodically. As applicable, Inspections and Audits may include an assessment of the following:

- Implementation of day-to-day environmental and social control measures at site
- Employee / workers environmental and social awareness

- Emergency and contingency plan readiness and drills
- Availability and correct use of protective equipment
- Implementation of workers welfare measures
- Any other required areas

The effectiveness of inspections and audits shall be enhanced by the use of unannounced spot checks. Site management shall be informed promptly of any nonconformity - and implement immediate corrective / preventive action as required. Tangible evidence shall be provided to verify close-out, and take any additional action required.

Internal Audits

Internal audits will be conducted quarterly by competent auditors to verify conformance with environmental requirements and to check whether the system is effectively implemented and maintained. The audit program will be planned, established, implemented, and maintained in line with recognized auditing standards.

DM, through its appointed contractor, shall follow the established procedure for auditing, which addresses the responsibilities and requirements for planning and conducting audits, reporting results, and retaining associated records. The selection of auditors and the conduct of audits will ensure objectivity and impartiality; auditors will not audit their own work, tasks, area, or department.

The audit results will be reported to top management and concerned managers, and relevant findings will be communicated to workers, their representatives, and other relevant interested parties.

DM shall ensure that appropriate actions are taken to address any identified nonconformities and that continual improvement of environmental performance is pursued.

The Project Company shall be able to provide documented evidence of internal audits, including audit reports, corrective actions taken, and any follow-up verification. DM shall ensure that documented information is retained as evidence of the implementation of the audit program and the results obtained.

External Audits

DM shall commission annual third-party external compliance audits. The environmental compliance audit will cover all operating areas or a selected area. The audit will be specifically undertaken to ensure compliance with the ESMP requirements in terms of environmental and social control measures, monitoring, and reporting. It will also assess compliance with the DM's NOC requirements. Non-compliance and environmental and social concerns associated with the operations will be identified and recommendations and corrective actions to address any identified non-compliance will be provided. DM shall be able to carry this out under the terms of the CA.

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Annex 1

SHAFT NAMES IN SITEPLAN (VOLUME 6)	CORRESPONDING SHAFT NAMES IN NOC DRAWINGS (SCHEDULE 1, PART 2)
MS-10(RS)	CS-10
MS-19	MS-19
MS-18	MS-18
MS-9(CS/RS)	CS-9
MS-17A	MS-17A
MS-17	MS-17
MS-16B	MS-16B
MS-16A	MS-16A
MS-16	MS-16
MS-RT-04	MS-RT-04
MS-1(RS)	CS-1
MS-1B	MS-1
MS-1A	MS-1A
MS-2	MS-2
MS-2B	MS-3
MS-31(CS/RS)	MS-31
MS-33	MS-32
MS-34(CS/RS)	MS-34
MS-3(CS/RS)	CS-3/RS
MS-20	MS-20
MS-42	MS-42
MS-41(CS/RS)	MS-41
MS-40	MS-40
MS-39	MS-39
MS-3A(RS)	CS-3A/RS
MS-38	MS-38
MS-2A(CS/RS)	CS-2A/RS
MS-36	MS-36
MS-12	MS-12
MS-12A	MS-12A
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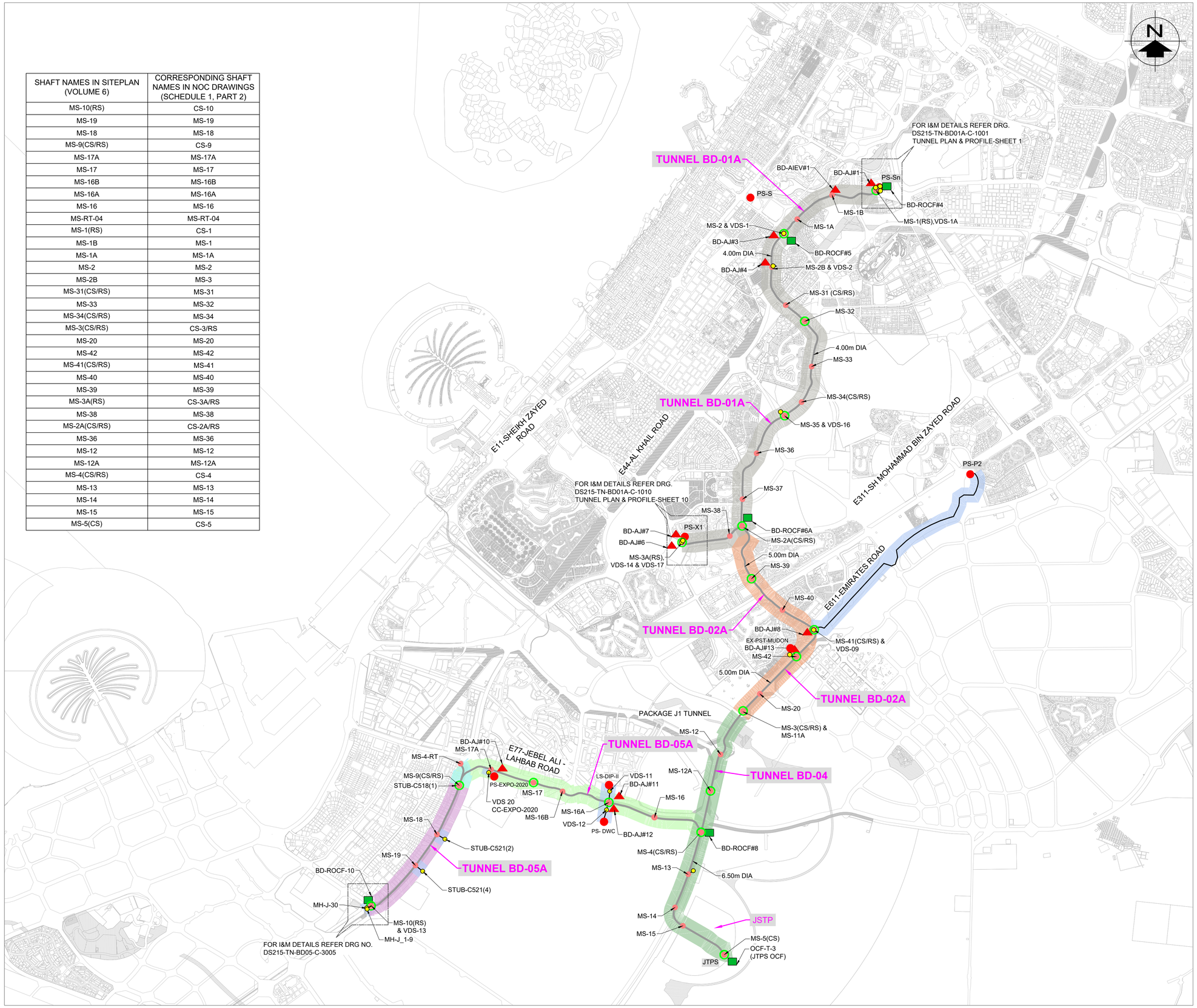
MS-13	MS-13
MS-14	MS-14
MS-15	MS-15
MS-5(CS)	CS-5



NOTES

1. FOR GENERAL NOTES REFER DRAWING NO. DS215-TN-BD01-G-1003.
2. LEGENDS ARE INDICATIVE AND DO NOT REFER PRECISE LOCATIONS, FOR PRECISE LOCATIONS OF OCF, AJ REFER INDIVIDUAL SHAFT SITE PLAN.

LEGEND:

- PROPOSED TUNNEL
- PROPOSED LINK SEWERS
- MS - MAINTENANCE SHAFT
- CS - CONSTRUCTION SHAFT
- RS - RECEIVING SHAFT
- VDS - VORTEX DROP STRUCTURE
- PS - PUMP STATION
- LINK SEWER INSTRUMENTATION MONITORING STATION
- TUNNEL INSTRUMENTATION MONITORING LOCATION
- REGIONAL ODOUR CONTROL FACILITY (ROCF)
- AIR INTAKE / RELIEF VAULT/ AIR JUMPER / BOOSTER FAN
- Ø4m TUNNEL BD-01A
- Ø5m TUNNEL BD-02A
- Ø6.5m TUNNEL BD-04
- Ø3.5m TUNNEL BD-05A
- Ø5m TUNNEL BD-05A
- LINK SEWER
- RESILIENCE TUNNEL

REV.	DATE	DESCRIPTION	APPR'D
P0	AUG '25	ISSUED FOR INFORMATION	GM

Client: Dubai Municipality

Consultant: PARSONS

Project / Contract

DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

DSST PACKAGE-J
TUNNEL LOCATION MAP

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VERT SCALE :		AUG 25	A1

Drawing No. DS215-TN-BD01A-G-1004D Rev. P0

PRINTED ON : 26 August 2025

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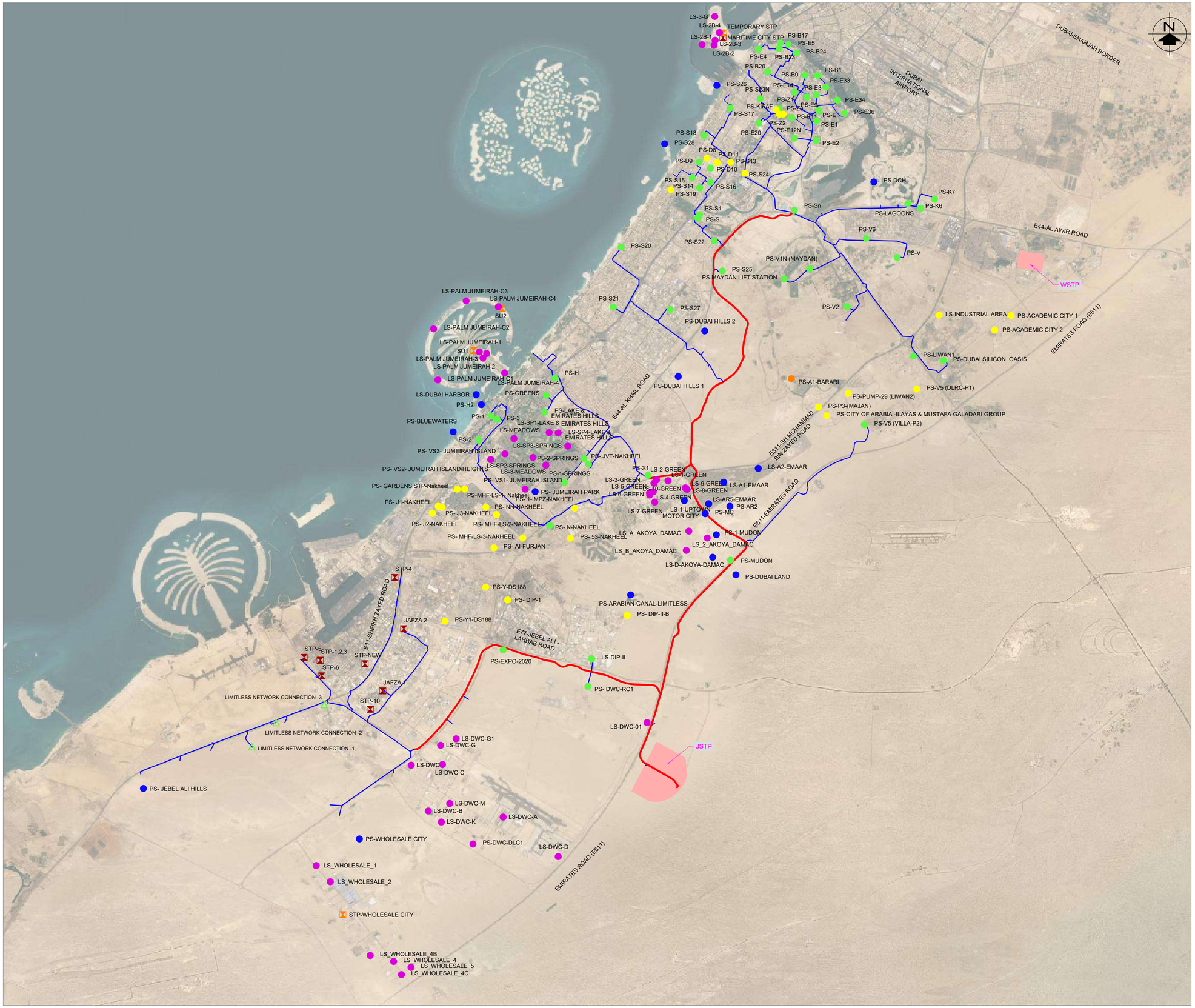
PRINTED ON : 27 August 2025



LEGEND:

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- PROPOSED LINK SEWERS
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- STPs LEFT IN PLACE
- PUMP STATIONS TO BE DE-COMMISSIONED IN DSST
- PUMP STATIONS IN DSST WITH STUBOUT PROVISION
- PUMP STATIONS LEFT IN PLACE
- PUMP STATIONS DE-COMMISSIONED BY OTHER PROJECTS

REV.	DATE	DESCRIPTION	APPR'D
P0	AUG '25	ISSUED FOR INFORMATION	GM

Client

Dubai Municipality

Consultant

PARSONS

Project / Contract

DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PUMPING STATIONS IN BUR DUBAI CATCHMENT

CONTRACT No:		JOB No: 350821	
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VERT SCALE :		AUG 25	A1

Drawing No. SK-SHT-270 A

Rev. P0

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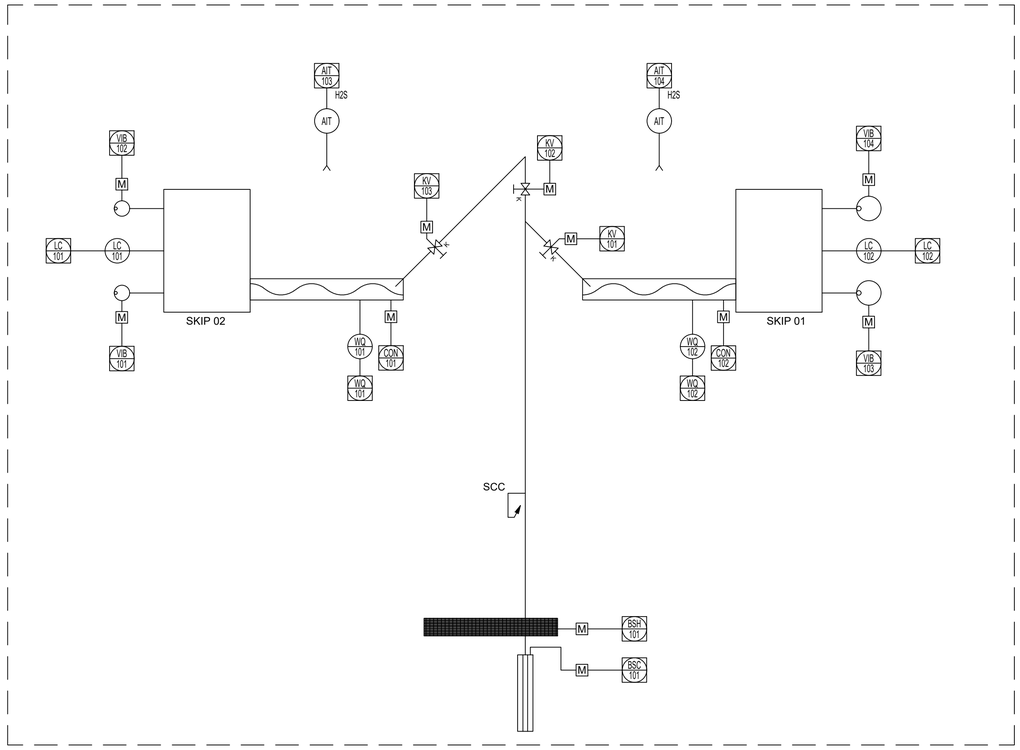
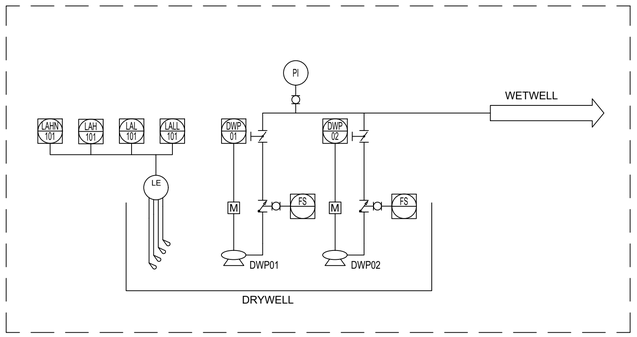
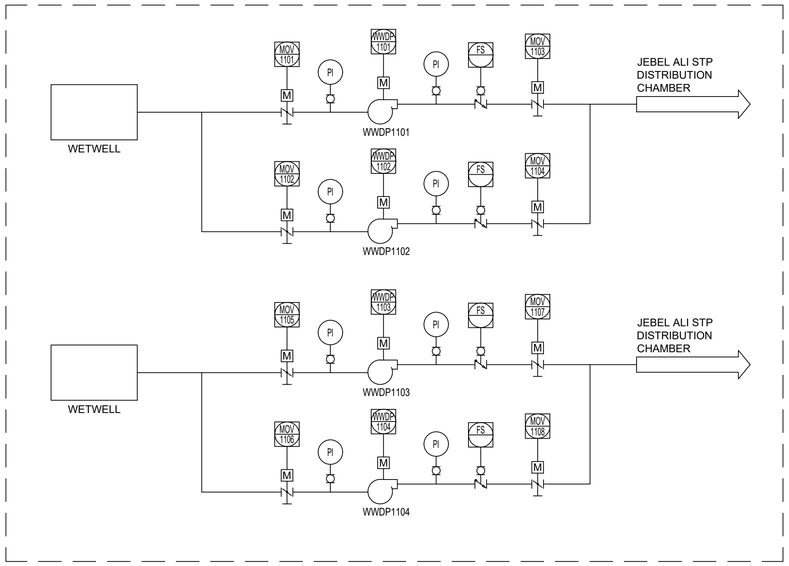


SEE NOTES

SCREENINGS



DRYWELL SUMP PUMPS



WETWELL DRAIN PUMPS

NOTES:

1. THE BSH HATCH WILL BE SEAL AIR TIGHT AND CONTROLLED TO OPEN / CLOSE ACCORDING TO CLEANING CARRIAGE REQUIREMENT.
2. SCREEN CLEANING CARRIAGE WILL BE PROTECTED BY TORQUE, POSITION AND OVER CURRENT SENSORS.
3. CONVEYORS SYSTEM DUTY STAND BY AND ISOLATION VALVES CONTROLLED ACCORDINGLY.

REV.	DATE	DESCRIPTION	APPR'D
P3	FEB '24	ISSUED FOR INFORMATION	GM
P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN '18	ISSUED FOR REVISED PDR	SB
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Client

Dubai Municipality

Consultant

PARSONS

Project / Contract

DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION AT JSTP
P & ID DIAGRAM
(SHEET 2 OF 2)

CONTRACT No:	DS215	JOB No:	350821
DRAWN	DESIGNED	CHECKED	APPROVED
AH	AD	AM	GM
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VERT SCALE :		FEB '24	A1

Drawing No. DS215-JSTP-PS-IN-2002 Rev. P3

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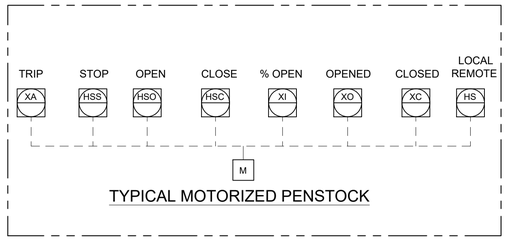
PRINTED ON : 15 March 2024



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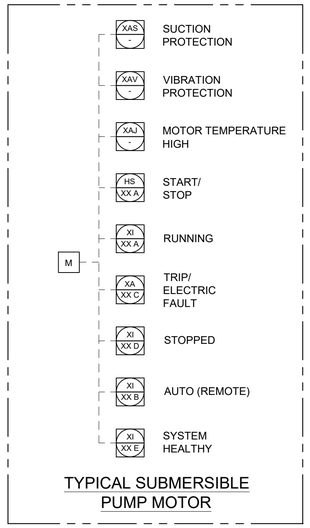

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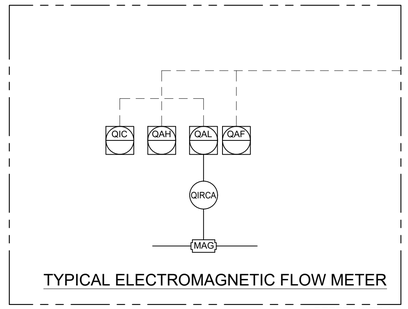

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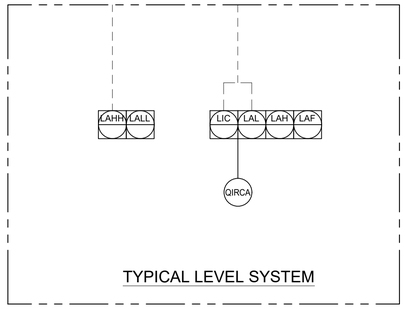

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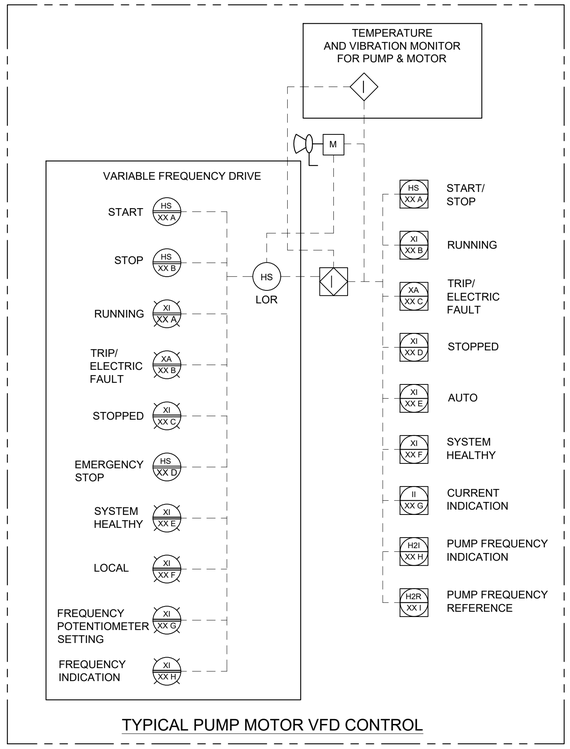

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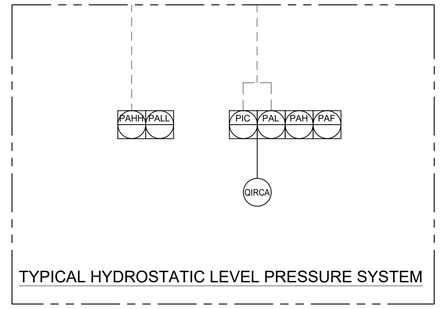

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P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN '18	ISSUED FOR REVISED PDR	SB
P0	JAN '18	ISSUED FOR PDR	SB

Client

Dubai Municipality

Consultant

PARSONS

Project / Contract

DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

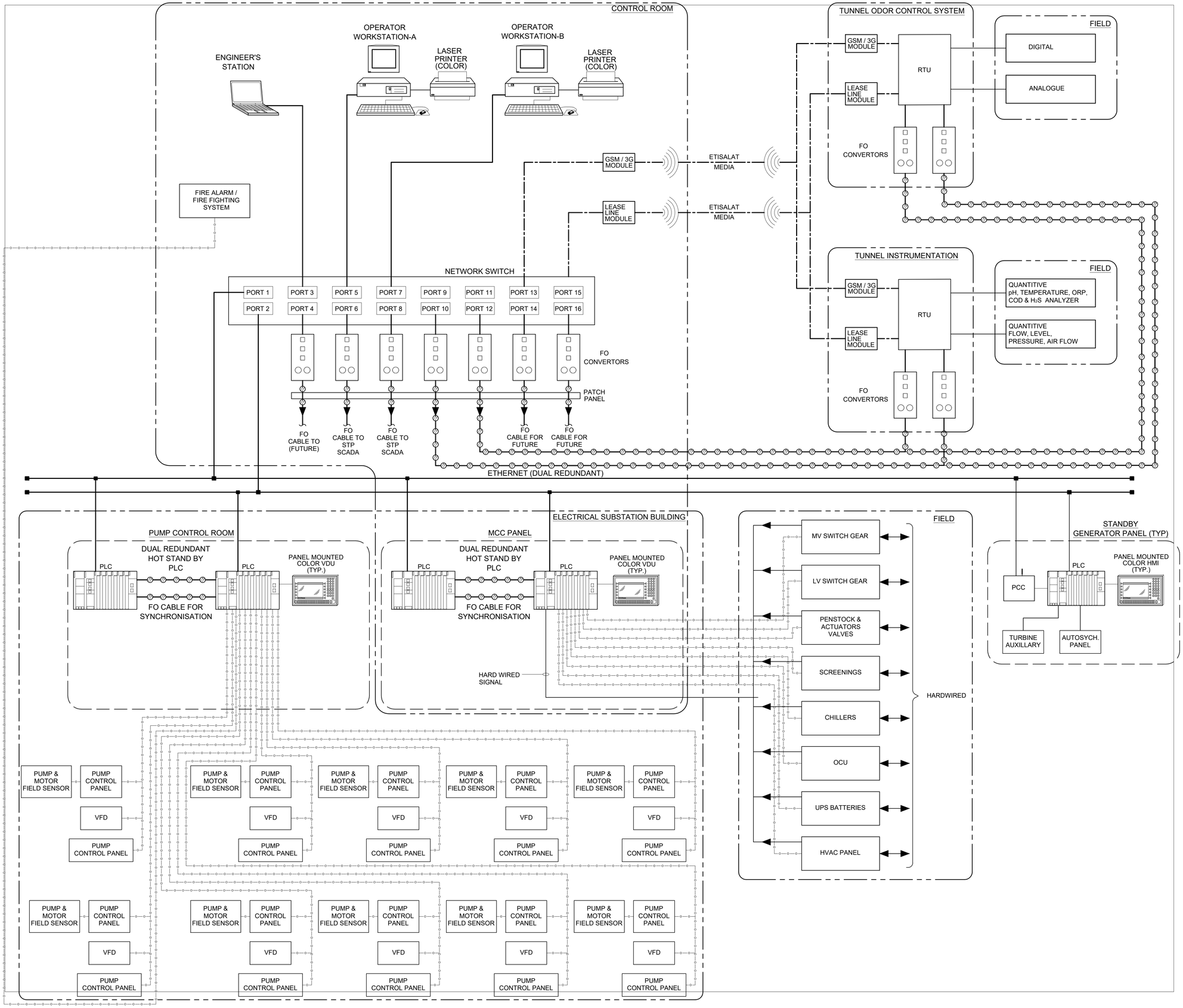
PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION AT JSTP
TYPICAL I/O

CONTRACT No:	DS215	JOB No:	350821
DRAWN	DESIGNED	CHECKED	APPROVED
AH	AD	AM	GM
HORZ SCALE : NTS		DATE	ACTUAL SIZE
VERT SCALE :		JAN '18	A1

Drawing No. DS215-JSTP-PS-IN-2003

Rev. P3

CAD file name : DS215-JSTP-PS-IN-2003.dwg



NOTES:

1. THE CONTROL SYSTEM & INSTRUMENTATION SHALL BE BATTERY BACKED TO PROVIDE EIGHT HOUR OF OPERATION IN THE EVENT OF A POWER FAILURE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPLY, INSTALLATION, CONFIGURATION, PROGRAMING TESTING AND COMMISSIONING OF PLCs AND SCADA CONTROL SYSTEM.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPLY, INSTALLATION, TESTING, PROGRAMING, CONFIGURATION TESTING, COMMISSIONING, END TO END TESTING OF THE TUNNEL OCU INSTRUMENTATION AND CONTROL SYSTEM.
4. PRIMARY AND SECONDARY COMMUNICATION LINKS PRIMARY FOC WITH SECONDARY EITHER GSM/3G OR LEASED LINE.
5. THE SCADA SYSTEM SHALL BE CONFIRMED AND BE CAPABLE OF USING OPC TO INTERFACE WITH AND INTEGRATE INTO THE RECEIVING STP SCADA SYSTEM AND REMOTE CENTRALIZED SCADA SYSTEM.

REV.	DATE	DESCRIPTION	APPR'D
P3	FEB '24	ISSUED FOR INFORMATION	GM
P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN '18	ISSUED FOR REVISED PDR	SB
P0	JAN '18	ISSUED FOR PDR	SB

Client

Dubai Municipality

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Project / Contract

DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION AT JSTP SYSTEM ARCHITECTURAL

CONTRACT No:	DS215	JOB No:	350821
DRAWN	DESIGNED	CHECKED	APPROVED
AH	AD	AM	GM
HORZ SCALE : NTS		DATE	ACTUAL SIZE
VERT SCALE :		FEB '24	A1

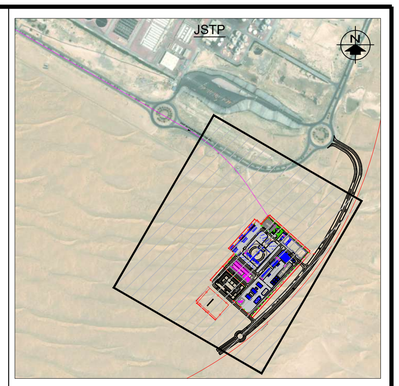
Drawing No. DS215-JSTP-PS-IN-2004 Rev. P3

PRINTED ON : 15 March 2024

CAD file name : DS215-JSTP-PS-IN-2004.dwg

PRINTED ON : 3 February 2025





KEY PLAN

NOTES

1. ALL COORDINATES ARE REFERENCED TO DUBAI LOCAL TRANSVERSE MERCATOR (DLTM) - WGS84 - 40N, GRID AND ELEVATIONS ARE RELATED TO DUBAI MUNICIPALITY DATUM.
2. ALL DIMENSIONS AND LEVELS ARE IN METERS, UNLESS OTHERWISE STATED.
3. FOR GENERAL MECHANICAL NOTES, CONTRACTOR SHALL REFER DWG. No. DS215-JTPS-PS-ME-3001.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS.
5. PROJECT COMPANY SHALL PROVIDE ADEQUATE PROTECTIONS FOR ROAD CROSSING UNDERGROUND PIPES AS PER DESIGN, ENGINEERING AND CONSTRUCTION REQUIREMENTS.
6. THE PROJECT COMPANY SHALL DESIGN, CONSTRUCT, MAINTAIN THE REQUIRED PERMANENT ACCESS ROADS FROM THE NEAREST PUBLIC HIGHWAY.

REV.	DATE	DESCRIPTION	APPR'D
P5	DEC '24	ISSUED FOR INFORMATION	GM
P4	FEB '24	ISSUED FOR INFORMATION	GM
P3	OCT '19	ISSUED FOR REVISED PDR	SB
P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN' 18	ISSUED FOR REVISED PDR	SB
P0	FEB' 18	ISSUED FOR PDR	SB

Client

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Consultant

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DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION LOCATION PLAN

CONTRACT No:		JOB No: 350821	
DRAWN	DESIGNED	CHECKED	APPROVED
MM	AM	AM	GM
HORZ SCALE :		DATE	ACTUAL SIZE
VERT SCALE :	1:2000(m)	DEC '24	A1

Drawing No. DS215-JTPS-PS-GE-1001 Rev. P5

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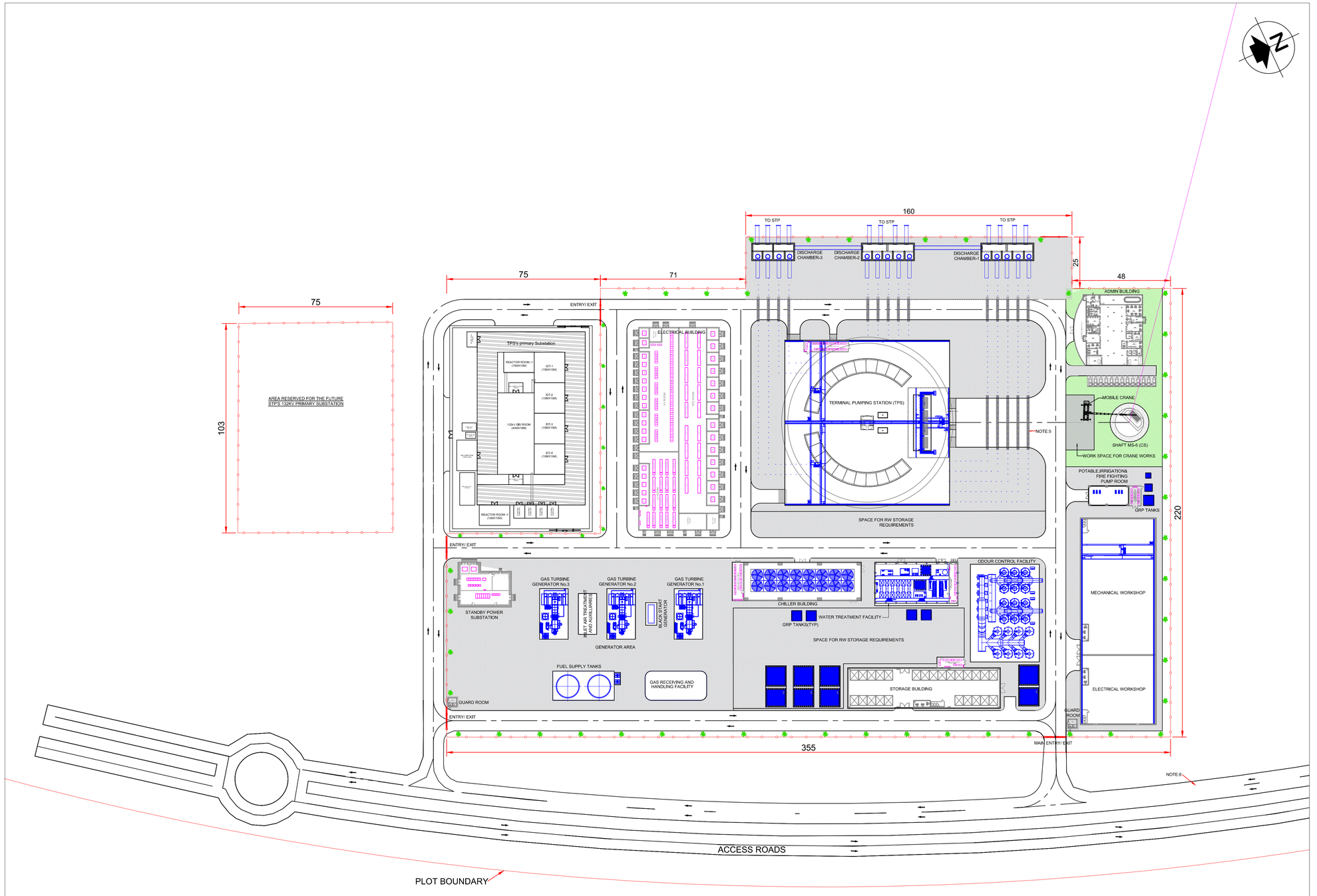
PRINTED ON : 3 February 2025





KEY PLAN

NOTES

1. ALL COORDINATES ARE REFERENCED TO DUBAI LOCAL TRANSVERSE MERCATOR (DLTM) - WGS84 - 40N, GRID AND ELEVATIONS ARE RELATED TO DUBAI MUNICIPALITY DATUM.
2. ALL DIMENSIONS AND LEVELS ARE IN METERS, UNLESS OTHERWISE STATED.
3. FOR GENERAL MECHANICAL NOTES, CONTRACTOR SHALL REFER DWG. No. DS215-JTPS-PS-ME-3001.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS.
5. PROJECT COMPANY SHALL PROVIDE ADEQUATE PROTECTIONS FOR ROAD CROSSING UNDERGROUND PIPES AS PER DESIGN, ENGINEERING AND CONSTRUCTION REQUIREMENTS.
6. THE PROJECT COMPANY SHALL DESIGN, CONSTRUCT, MAINTAIN THE REQUIRED PERMANENT ACCESS ROADS FROM THE NEAREST PUBLIC HIGHWAY.

REV.	DATE	DESCRIPTION	APPR'D
P5	DEC '24	ISSUED FOR INFORMATION	GM
P4	FEB '24	ISSUED FOR INFORMATION	GM
P3	OCT '19	ISSUED FOR REVISED PDR	SB
P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN' 18	ISSUED FOR REVISED PDR	SB
P0	FEB' 18	ISSUED FOR PDR	SB

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DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION OVERALL SITE LAYOUT

CONTRACT No:		JOB No: 350821	
DRAWN	DESIGNED	CHECKED	APPROVED
MM	AM	AM	GM
HORZ SCALE :		DATE	ACTUAL SIZE
VERT SCALE :	1:500(m)	DEC '24	A1

Drawing No. DS215-JTPS-PS-GE-1002 Rev. P5

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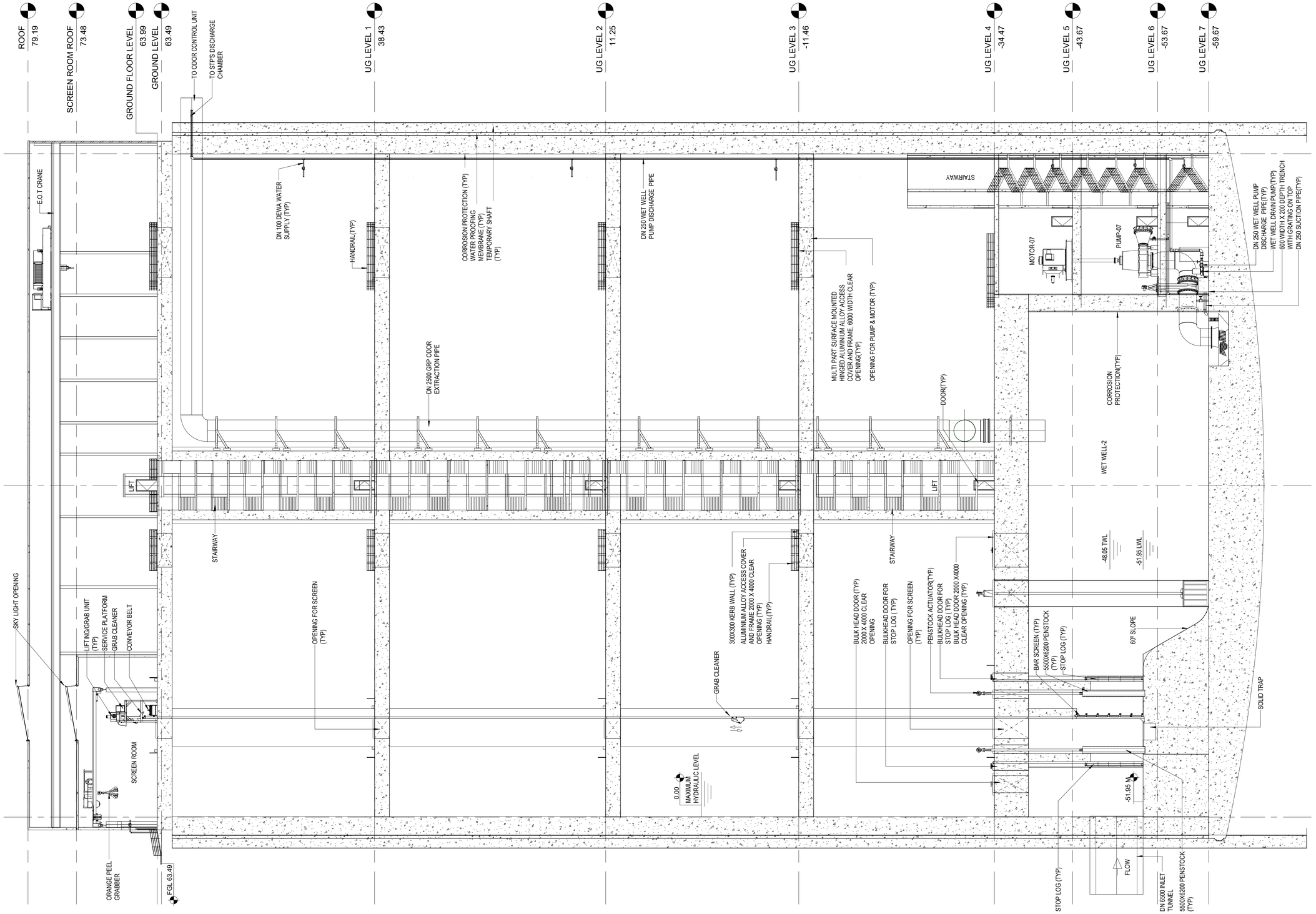

SECTION A

NOTES.

1. FOR GENERAL MECHANICAL NOTES, PLEASE REFER DRAWING NO.DS215-JTPS-PS ME-3001.

REV	DATE	DESCRIPTION	APPR'D
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P3	FEB '24	ISSUED FOR INFORMATION	GM
P2	MAY '19	ISSUED FOR REVISED PDR	SB
P1	JUN '18	ISSUED FOR REVISED PDR	SB
P0	FEB '18	ISSUED FOR REVIEW	SB

Client

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DS 215 DUBAI STRATEGIC SEWERAGE TUNNELS

Drawing Title

PACKAGE J1 JEBEL ALI TERMINAL PUMPING STATION SECTION A

CONTRACT No:		JOB No: 350821	
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MM	AM	AM	GM
		DATE	ACTUAL SIZE
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Drawing No. DS215-JTPS-PS-ME-2001			Rev. P4

Annex 2



Ambient Air Quality Measurement Report

20th Nov. 2024

Authored by:

Scientific Business Solutions

"Accreditation by the Emirates International Accreditation Centre (EIAC) and in accordance with the requirements of ISO/IEC 17025:2017"

Prepared for:

Dome

A	20th November 2024	Dome Oilfield Engineering & Services LLC Ambient Air Quality Measurement Report	Eng. Amr Khalil Eng. Mohamed Salah Eng. Omnia Mahfouz	Eng. Mohamed Taha	Chemist. Mohamed Khater
Rev.	**Date**	**Description**	**Author**	**Verified & Reviewed by**	**Checked & Approved by**

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1 Introduction

This report is prepared for **Dome Oilfield Engineering & Services LLC** to present the findings from ambient air quality and odor measurements for the Parsons Sewerage Tunnel EIA-EBS (JSTP) project. These environmental measurements are issued according to the contract between **Scientific Business Solutions (SBS)** and **Dome Oilfield Engineering & Services LLC**.

Ambient air quality measurements were performed at ten locations, and odor measurements were also conducted at ten locations in Dubai. The detailed schedule and coordinates of these monitoring points are outlined in Table 1-1 Coordinates and schedule of the measured points in Dubai for JSTP project. Site-specific ambient air quality measurements were carried out under the supervision of experienced specialists.

Table 1-1 Coordinates and schedule of the measured points in Dubai for JSTP project.

JSTP					
#	Coordinates	Start Date	Measuring Time	Duration	End Date
AQM					
AAQ-01	24°54'20.5"N 55°14'21.7"E	11/11/2024	16:00	7 Days	18/11/2024
AAQ-02	24°56'55.4"N 55°14'05.5"E	11/11/2024	16:30	7 Days	18/11/2024
AAQ-03	24°59'34.0"N 55°15'03.3"E	11/11/2024	17:00	7 Days	18/11/2024
AAQ-04	24°55'21.5"N 55°06'08.4"E	11/11/2024	18:00	7 Days	18/11/2024
AAQ-05	25°02'27.5"N 55°12'01.3"E	11/11/2024	20:00	7 Days	18/11/2024
AAQ-06	25°03'15.9"N 55°13'34.4"E	20/11/2024	17:00	7 Days	27/11/2024
AAQ-07	25°03'40.2"N 55°15'01.4"E	20/11/2024	17:30	7 Days	27/11/2024
AAQ-08	25°11'03.1"N 55°18'21.3"E	20/11/2024	18:00	7 Days	27/11/2024
AAQ-09	25°06'02.4"N 55°16'02.8"E	20/11/2024	19:30	7 Days	27/11/2024
AAQ-10	25°09'59.4"N 55°16'01.6"E	20/11/2024	20:00	7 Days	27/11/2024
Odor					
OMS-01	24°54'18.8"N 55°14'23.1"E	11/11/2024	16:00	24h	12/11/2024
OMS-02	24°56'56.3"N 55°14'06.3"E	12/11/2024	18:00	24h	13/11/2024
OMS-03	25°01'21.1"N 55°16'45.2"E	13/11/2024	18:30	24h	14/11/2024
OMS-04	25°03'40.5"N 55°15'01.2"E	14/11/2024	19:30	24h	15/11/2024
OMS-05	25°06'02.4"N 55°16'02.7"E	20/11/2024	12:35	24h	21/11/2024
OMS-06	25°09'59.3"N 55°16'01.8"E	25/11/2024	13:00	24h	26/11/2024
OMS-07	25°11'03.4"N 55°18'21.6"E	26/11/2024	13:30	24h	27/11/2024
OMS-08	25°02'27.2"N 55°12'01.4"E	27/11/2024	15:00	24h	28/11/2024
OMS-09	24°55'21.6"N 55°06'08.3"E	28/11/2024	16:30	24h	29/11/2024
OMS-10	25°07'06.3"N 55°16'40.8"E	29/11/2024	17:30	24h	30/11/2024

1.1 Project Location

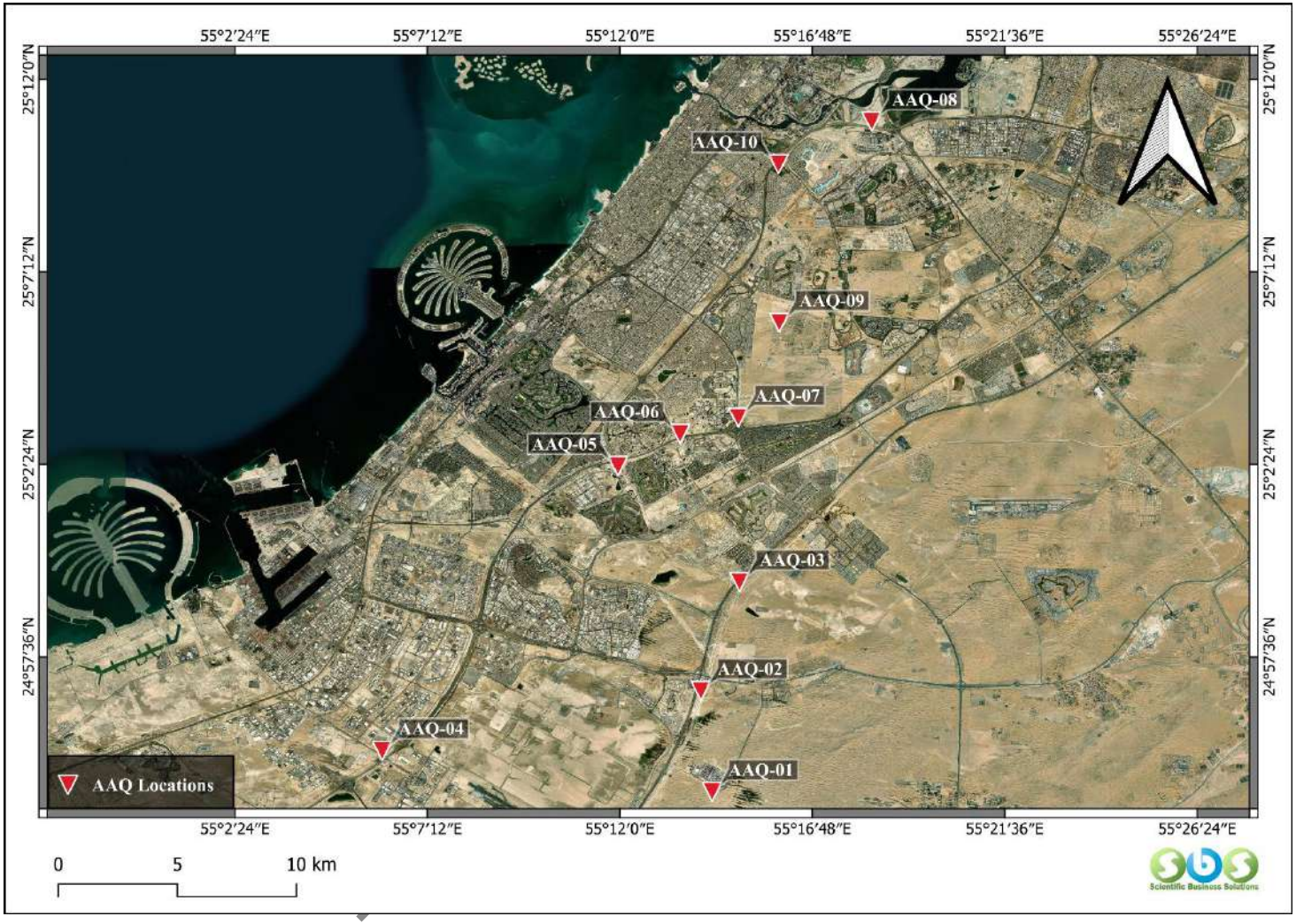

Figure 1-1 Ambient air monitoring locations for JSTP project

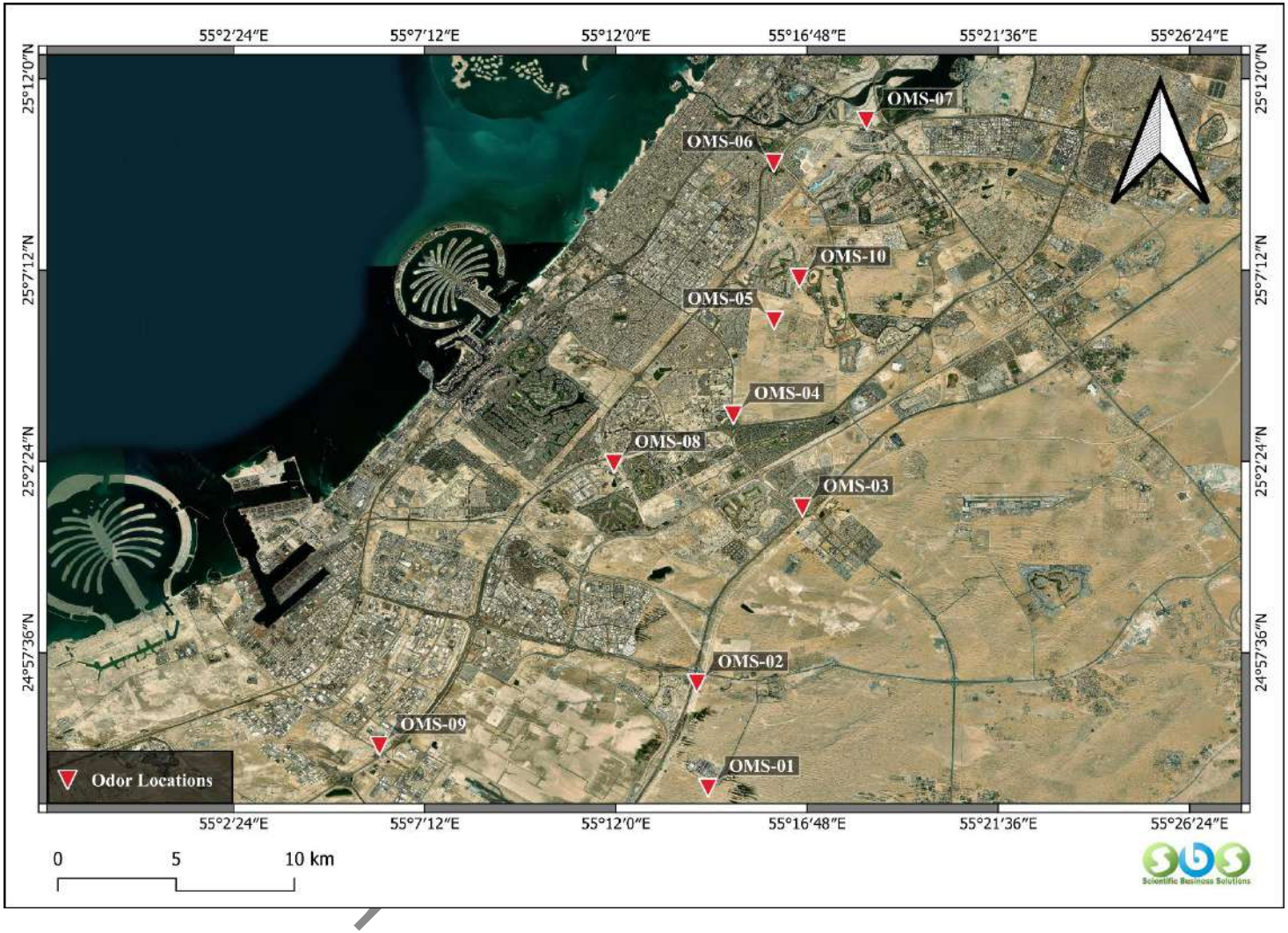

Figure 1-2 Odor measurement locations for JSTP project

1.2 Objective

The overall objectives of this monitoring round are to:

- Ensure compliance with National Regulations.
- Identify and address any non-compliance issues, if present.
- Monitoring air quality to assess pollution levels and identify sources of pollution.
- Assess the ambient concentration of odorous gases.
- Provide general conclusions based on the analysis's results.

1.3 Scope of Work

The scope of work described in the report outlines the environmental measurement program conducted for **Dome Oilfield Engineering & Services LLC** by **SBS**. The program primarily focuses on **ambient air quality monitoring** and **odor assessment**.

Ambient Air Quality Monitoring:

This program involves continuous 24-hour measurements over seven consecutive days to monitor various environmental parameters, including Total Suspended Particulates (TSP) and Particulate Matter (PM_{10}) at ten locations in Dubai. The purpose of the monitoring is to assess the impact of these dust parameters on ambient air quality and ensure compliance with applicable regulations and guidelines.

Odor Measurement:

The program focuses on odor measurements, which were conducted for 24 hours at ten locations, as outlined in Table 1-1. This assessment focuses on determining the concentrations of a group of compounds in the surrounding air that negatively affect the environment and public health. These compounds are Ammonia (NH_3), Hydrogen Sulfide (H_2S), Dimethyl disulphide ($C_2H_6S_2$), Dimethyl sulphide (C_2H_6S), and Methyl mercaptan (CH_4S).

The scope of work encompassed the following key parameters:

Table 1-2 Parameters and corresponding standard methods for air quality monitoring

Parameter	Standard
NH_3	ID-164
H_2S	ASTM D4323-21
TSP	AS 3580.12.1
PM_{10}	AS 3580.12.1

1.4 Measurements Equipment

Table 1-3 Instrument used for measurements

Instrument Description		Parameter Measured	Detection Limit / Range (µg/m³)	Last Calibration Date	Calibration Due Date
Name: Online Odor Monitor **Instr. Model**: ZWIN-EC06 **Serial no.:** 02400923072200048042 **Device ID:** 20240712040001		NH_3	0.04 / 0:7000	13-07-2024	12-07-2025
		H_2S	0.01 / 0:14000		
Name: Online Odor Monitor **Instr. Model**: ZWIN-EC06 **Serial no.:** 00402424060700102482 **Device ID:** 20241026050001		$C_2H_6S_2$	0.01 / 0:40000	20-11-2024	19-11-2025
		C_2H_6S	0.01 / 0:26000		
		CH_4S	0.01 / 0:20000		
Name: Air Quality Monitor **Instr. Model:** Topas - Particulate Monitoring System **Serial no.:** TNT1869		TSP	0.01 / 1:6000	07-10-2024	06-01-2025
Name: Air Quality Monitor **Instr. Model:** Topas - Particulate Monitoring System **Serial no.:** TNT1559				03-10-2024	02-01-2025
Name: Air Quality Monitor **Instr. Model:** Topas - Particulate Monitoring System **Serial no.:** TNT1567		PM_{10}	0.01 / 1:6000	15-10-2024	14-01-2025
Name: Air Quality Monitor **Instr. Model:** Topas - Particulate Monitoring System **Serial no.:** TNO2101				10-10-2024	09-01-2025
Name: Air Quality Monitor **Instr. Model:** Topas - Particulate Monitoring System **Serial no.:** TNT1586				03-10-2024	02-01-2025

2 Legislation and Regulatory Framework

2.1 National and International Legislation

The measurement results of ambient air quality corresponded to the national limits set in **decree no. (12) for the year 2006 of the executive regulations of UAE federal law 24 for 1999 amended by federal law 20 for 2006** for measuring continued 24 hours as limits mentioned in the below table.

Table 2-1 Maximum allowable limits for ambient air pollutant in (decree no. 12 for the year 2006 of the executive regulations of UAE federal law 24 for 1999 amended by federal law 20 for 2006)

Pollutant	Averaging Period	UAE Standards (µg/m^3)
Total Suspended Particulates	24 hours	230
	1 year	90
Particulate Matter <10 micron (PM_{10})	24 hours	150

The results of ambient concentration measurements of odorous gases were compared with the national limits specified in **the Guidance on the Environmental Clearance (EC) Requirements for Development, Infrastructure, and Industrial Projects in the Emirate of Dubai**.

Table 2-2 Ambient Air (Odor) limits in the Guidelines for Environmental Approval Requirements for Development, Infrastructure, and Industrial Projects in the Emirate of Dubai

Parameter	Standard Limit	Source of Standard Limit
Hydrogen Sulfide (H_2S)	7 µg/m^3 (30-min averaging)	WHO
Ammonia (NH_3)	30 µg/m^3 (30-min averaging)	NIH, US
Dimethyl disulphide ($C_2H_6S_2$)	56 µg/m^3 (10-min averaging)	Ontario's Ambient Air Quality Criteria
Dimethyl sulphide (C_2H_6S)	30 µg/m^3 (10-min averaging)	
Methyl mercaptan (CH_4S)	13 µg/m^3 (10-min averaging)	

3 Measurements Methodology

3.1 Ambient Air Quality Measurements

Monitoring and measuring the surrounding area are an integral part of environmental management practices. Monitoring these emissions is essential for assessing their impact on the human and environment, ensuring compliance with regulations, and implementing effective pollution control measurements.

Topas - Particulate Monitoring System:

Topas, a turnkey optical particle analysis system, is a fixed station monitor that continuously measures PM_1, $PM_{2.5}$, PM_{10}, and TSP concentrations. It draws in ambient air, separates particles based on size, and directs them into a chamber where a laser beam scatters off the particles. The intensity of the scattered light, measured by a detector, is directly proportional to the particle mass concentration. This data is processed by the device's microprocessor and stored for later analysis. Topas offers remote access, a user-friendly interface, and a compact design, making it suitable for various monitoring applications, including environmental, industrial, and construction site monitoring.

3.2 The ZWIN-EC06 online odor monitor

The ZWIN-EC06 is a device designed to continuously monitor air quality for specific odors. It works by drawing in ambient air and analyzing it for compounds such as hydrogen sulfide, ammonia, dimethyl disulfide, dimethyl sulfide, and methyl mercaptan. These compounds are associated with unpleasant odors. The device uses sensors to detect and measure the concentration of these odors in the air. This information is then used to track odor emissions, identify where the odors are coming from, and evaluate methods to reduce them. To ensure accurate measurements, the device is regularly calibrated using standard gas mixtures.

4 Result of the Measurements

4.1 Ambient Air Quality

4.1.1 AAQ-01

AAQ-01 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
11/11/2024	16:00	34.88	20.78
	17:00	22.90	14.63
	18:00	22.50	15.43
	19:00	27.70	18.80
	20:00	24.93	17.43
	21:00	13.98	10.20
	22:00	29.50	21.18
	23:00	39.30	28.68
12/11/2024	0:00	67.45	53.20
	1:00	64.65	48.80
	2:00	60.20	47.55
	3:00	73.83	62.43
	4:00	94.03	85.73
	5:00	98.78	89.93
	6:00	111.05	103.23
	7:00	135.15	124.83
	8:00	74.43	65.88
	9:00	24.53	17.83
	10:00	21.45	13.50
	11:00	31.08	17.63
	12:00	27.30	16.00
	13:00	33.90	19.85
	14:00	33.93	20.63
	15:00	33.38	20.50
Average 24 hr		**50.03**	**39.77**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
12/11/2024	16:00	28.18	18.10
	17:00	33.75	19.83
	18:00	28.93	18.45
	19:00	25.68	17.05
	20:00	25.33	17.78
	21:00	33.65	24.60
	22:00	27.13	19.88
	23:00	23.53	17.70
13/11/2024	0:00	24.38	19.95
	1:00	29.72	24.66
	2:00	38.03	31.59

AAQ-01 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	3:00	57.96	51.00
	4:00	85.81	77.45
	5:00	88.88	79.49
	6:00	106.84	95.87
	7:00	152.53	140.50
	8:00	74.80	66.45
	9:00	28.88	21.93
	10:00	15.80	11.18
	11:00	15.03	9.83
	12:00	25.45	15.03
	13:00	23.65	13.50
	14:00	44.00	21.33
	15:00	24.70	15.00
Average 24 hr		**44.27**	**35.34**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
13/11/2024	16:00	22.45	14.18
	17:00	24.45	15.93
	18:00	24.80	17.63
	19:00	27.80	20.65
	20:00	30.53	23.53
	21:00	26.33	21.93
	22:00	31.38	27.05
	23:00	84.08	73.13
14/11/2024	0:00	186.45	164.55
	1:00	172.75	152.75
	2:00	174.38	156.20
	3:00	195.48	175.03
	4:00	273.65	245.43
	5:00	313.05	284.48
	6:00	418.85	378.60
	7:00	607.75	557.65
	8:00	418.08	391.58
	9:00	43.98	35.98
	10:00	38.75	26.23
	11:00	39.03	27.40
	12:00	32.93	22.45
	13:00	32.05	21.58
	14:00	30.50	21.05
	15:00	34.75	23.40
Average 24 hr		**136.84**	**120.76**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
14/11/2024	16:00	34.25	22.60
	17:00	35.43	24.53
	18:00	43.60	30.93
	19:00	41.63	30.55
	20:00	43.25	32.23
	21:00	18.28	15.15
	22:00	27.35	22.20
	23:00	44.43	34.93
15/11/2024	0:00	110.18	89.75
	1:00	107.23	89.00
	2:00	60.23	50.90
	3:00	84.98	71.55
	4:00	136.68	116.63
	5:00	157.08	134.65
	6:00	152.45	131.20
	7:00	190.10	163.75
	8:00	124.88	107.30
	9:00	45.90	34.13
	10:00	29.03	20.68
	11:00	24.28	17.18
	12:00	28.48	18.80
	13:00	26.20	16.50
	14:00	19.58	12.68
	15:00	18.83	11.85
Average 24 hr		**66.84**	**54.15**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
15/11/2024	16:00	24.68	14.78
	17:00	20.80	13.73
	18:00	26.53	17.10
	19:00	21.75	14.53
	20:00	10.65	7.73
	21:00	12.00	9.23
	22:00	10.95	8.68
	23:00	26.35	19.98
16/11/2024	0:00	32.70	24.25
	1:00	48.55	36.68
	2:00	63.95	50.05
	3:00	33.98	27.18
	4:00	61.48	46.38
	5:00	36.38	29.13
	6:00	39.95	32.28
	7:00	68.25	55.88
	8:00	58.05	45.68
	9:00	27.20	18.65

AAQ-01 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	10:00	14.58	10.00
	11:00	15.13	9.53
	12:00	16.35	9.45
	13:00	17.65	10.38
	14:00	26.15	15.13
	15:00	24.48	14.30
Average 24 hr		**30.77**	**22.53**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
16/11/2024	16:00	25.78	15.35
	17:00	14.58	8.95
	18:00	19.05	11.68
	19:00	14.33	9.63
	20:00	10.10	7.13
	21:00	7.58	5.73
	22:00	24.38	16.93
	23:00	21.65	14.70
17/11/2024	0:00	23.80	16.58
	1:00	19.25	13.80
	2:00	30.13	20.13
	3:00	24.05	16.55
	4:00	39.80	27.70
	5:00	45.13	32.30
	6:00	47.18	34.08
	7:00	48.93	35.50
	8:00	44.03	29.40
	9:00	37.03	24.10
	10:00	34.18	21.45
	11:00	21.43	14.18
	12:00	18.95	12.88
	13:00	28.75	17.68
	14:00	20.38	12.68
	15:00	16.43	10.63
Average 24 hr		**26.53**	**17.90**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-01 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
17/11/2024	16:00	13.78	8.70
	17:00	13.58	8.40
	18:00	17.20	10.78
	19:00	10.55	7.08
	20:00	9.83	7.03

AAQ-01 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
	21:00	13.98	9.85
	22:00	18.48	12.28
	23:00	17.80	11.88
18/11/2024	0:00	36.90	24.05
	1:00	24.30	17.38
	2:00	31.65	21.35
	3:00	30.29	20.49
	4:00	24.98	18.53
	5:00	22.08	16.83
	6:00	21.35	16.43
	7:00	23.28	17.70
	8:00	20.63	14.63
	9:00	17.50	11.43
	10:00	19.33	12.33
	11:00	15.83	10.15
	12:00	13.88	9.13
	13:00	12.68	8.33
	14:00	22.38	13.08
	15:00	15.55	9.95
Average 24 hr		**19.49**	**13.24**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

4.1.2 AAQ-02

AAQ-02 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
11/11/2024	16:30	98.90	68.88
	17:30	104.05	70.50
	18:30	68.93	42.13
	19:30	42.55	26.15
	20:30	40.13	24.98
	21:30	46.58	28.45
	22:30	39.10	26.18
	23:30	65.45	41.88
12/11/2024	0:30	67.24	46.16
	1:30	71.88	49.93
	2:30	78.25	55.78
	3:30	85.43	63.40
	4:30	84.00	66.03
	5:30	80.18	64.90
	6:30	78.13	64.33
	7:30	78.25	63.53
	8:30	78.83	49.75
	9:30	70.90	41.33
	10:30	56.78	29.53
	11:30	72.45	37.68
	12:30	68.03	35.45
	13:30	55.05	31.05
	14:30	76.58	50.63
	15:30	50.13	29.73
Average 24 hr		**69.07**	**46.18**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
12/11/2024	16:30	47.45	32.15
	17:30	50.05	31.15
	18:30	44.55	26.68
	19:30	40.68	25.55
	20:30	41.28	24.90
	21:30	82.85	48.30
	22:30	41.45	26.83
	23:30	40.03	27.00
13/11/2024	0:30	46.80	31.75
	1:30	54.50	35.35
	2:30	79.75	54.08
	3:30	68.40	49.80
	4:30	76.55	59.65
	5:30	78.68	61.98
	6:30	99.60	80.03

AAQ-02 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	7:30	96.60	76.75
	8:30	53.08	38.55
	9:30	39.13	27.45
	10:30	43.08	25.60
	11:30	50.15	26.85
	12:30	36.70	20.50
	13:30	43.80	22.95
	14:30	96.40	64.40
	15:30	101.28	72.20
Average 24 hr		**60.53**	**41.27**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
13/11/2024	16:30	114.00	75.83
	17:30	119.25	76.15
	18:30	55.95	34.38
	19:30	60.25	37.95
	20:30	65.50	41.98
	21:30	63.05	43.65
	22:30	133.70	82.18
	23:30	107.43	78.78
14/11/2024	0:30	126.55	92.10
	1:30	112.80	84.90
	2:30	126.38	96.80
	3:30	139.78	109.85
	4:30	163.45	131.80
	5:30	194.70	159.38
	6:30	230.70	183.28
	7:30	201.33	170.65
	8:30	76.03	62.45
	9:30	50.93	34.73
	10:30	55.60	35.58
	11:30	83.45	55.90
	12:30	60.73	38.38
	13:30	80.30	50.80
	14:30	81.48	47.60
	15:30	70.50	41.18
Average 24 hr		**107.24**	**77.76**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
14/11/2024	16:30	89.20	51.05
	17:30	85.25	50.08

AAQ-02 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	18:30	90.58	56.28
	19:30	88.75	53.25
	20:30	96.65	57.68
	21:30	161.25	113.33
	22:30	66.28	43.33
	23:30	75.90	48.90
15/11/2024	0:30	99.60	65.08
	1:30	99.93	69.40
	2:30	104.10	72.70
	3:30	108.80	77.65
	4:30	105.00	77.13
	5:30	109.18	78.45
	6:30	132.90	98.30
	7:30	116.50	85.93
	8:30	72.88	51.93
	9:30	51.83	33.95
	10:30	138.78	105.28
	11:30	57.60	35.48
	12:30	66.20	37.43
	13:30	105.58	73.90
	14:30	76.63	42.08
	15:30	90.13	61.48
Average 24 hr		**95.39**	**64.17**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
15/11/2024	16:30	76.80	51.88
	17:30	66.70	44.38
	18:30	44.05	26.28
	19:30	51.53	29.80
	20:30	61.30	35.78
	21:30	77.25	43.30
	22:30	52.15	31.90
	23:30	54.05	34.13
16/11/2024	0:30	59.17	37.08
	1:30	78.93	49.18
	2:30	63.08	41.95
	3:30	68.13	41.13
	4:30	53.60	34.23
	5:30	56.90	36.73
	6:30	54.45	36.65
	7:30	66.55	44.83
	8:30	43.68	28.60
	9:30	36.45	21.90
	10:30	68.43	45.70

AAQ-02 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	11:30	168.60	140.60
	12:30	53.63	29.63
	13:30	88.65	55.28
	14:30	118.98	81.50
	15:30	85.88	55.68
Average 24 hr		**68.70**	**44.92**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
16/11/2024	16:30	80.15	50.35
	17:30	39.83	21.65
	18:30	41.05	23.33
	19:30	74.50	49.33
	20:30	32.48	19.35
	21:30	48.65	27.00
	22:30	84.20	43.20
	23:30	49.43	27.08
17/11/2024	0:30	39.03	22.68
	1:30	37.10	21.88
	2:30	44.53	26.78
	3:30	46.30	27.98
	4:30	53.23	32.95
	5:30	59.83	37.00
	6:30	63.35	38.50
	7:30	65.40	38.23
	8:30	60.28	35.70
	9:30	57.08	33.75
	10:30	50.13	29.90
	11:30	77.43	48.63
	12:30	64.25	36.75
	13:30	70.45	48.43
	14:30	30.78	18.23
	15:30	44.00	23.28
Average 24 hr		**54.73**	**32.58**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-02 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
17/11/2024	16:30	68.15	28.93
	17:30	51.85	22.80
	18:30	58.85	27.25
	19:30	51.78	25.65
	20:30	37.70	21.73
	21:30	412.43	324.28

AAQ-02 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	22:30	63.25	38.13
	23:30	45.83	27.08
18/11/2024	0:30	52.00	31.54
	1:30	55.55	33.20
	2:30	57.60	34.45
	3:30	48.65	29.85
	4:30	44.33	27.43
	5:30	38.48	24.70
	6:30	34.58	21.70
	7:30	42.10	24.83
	8:30	41.80	23.10
	9:30	82.40	38.70
	10:30	47.28	24.30
	11:30	41.05	21.00
	12:30	33.68	18.70
	13:30	51.65	27.28
	14:30	118.28	83.48
	15:30	55.68	27.08
Average 24 hr		**68.12**	**41.96**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

4.1.3 AAQ-03

AAQ-03 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
11/11/2024	17:00	55.30	35.50
	18:00	46.65	30.90
	19:00	24.50	18.03
	20:00	20.65	15.73
	21:00	20.58	15.45
	22:00	15.88	12.90
	23:00	13.25	11.35
12/11/2024	0:00	23.25	19.30
	1:00	36.28	29.48
	2:00	35.20	30.70
	3:00	26.58	24.35
	4:00	41.55	38.48
	5:00	47.68	45.75
	6:00	55.45	53.73
	7:00	55.35	52.63
	8:00	72.48	61.10
	9:00	77.03	49.98
	10:00	32.05	21.93
	11:00	39.90	26.78
	12:00	31.63	21.75
	13:00	53.40	32.83
	14:00	42.53	29.00
	15:00	46.75	30.78
	16:00	65.85	39.70
Average 24 hr		**40.82**	**31.17**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
12/11/2024	17:00	63.70	39.03
	18:00	45.43	29.05
	19:00	24.18	18.25
	20:00	19.53	15.00
	21:00	20.38	15.60
	22:00	17.73	14.35
	23:00	18.10	15.53
13/11/2024	0:00	15.93	13.70
	1:00	15.48	13.40
	2:00	19.58	16.98
	3:00	18.48	16.55
	4:00	20.63	18.43
	5:00	24.95	22.80
	6:00	29.85	27.70
	7:00	47.95	44.55
	8:00	72.10	58.70

AAQ-03 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	9:00	28.50	22.55
	10:00	18.90	13.95
	11:00	24.18	16.33
	12:00	28.60	18.83
	13:00	29.00	19.50
	14:00	45.80	29.98
	15:00	53.45	34.23
	16:00	38.05	25.05
Average 24 hr		**30.85**	**23.33**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
13/11/2024	17:00	35.68	24.35
	18:00	40.33	29.95
	19:00	42.98	32.68
	20:00	47.35	37.18
	21:00	54.70	44.08
	22:00	36.90	32.28
	23:00	40.55	34.60
14/11/2024	0:00	47.98	43.25
	1:00	48.30	44.48
	2:00	39.83	37.13
	3:00	65.53	59.73
	4:00	79.88	73.80
	5:00	62.18	58.85
	6:00	61.55	59.18
	7:00	91.28	87.65
	8:00	112.30	105.58
	9:00	37.48	31.25
	10:00	30.00	21.65
	11:00	34.25	25.73
	12:00	32.08	24.55
	13:00	34.43	25.25
	14:00	40.88	30.20
	15:00	46.00	32.53
	16:00	48.20	33.83
Average 24 hr		**50.44**	**42.90**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
14/11/2024	17:00	43.43	31.73
	18:00	44.58	33.95
	19:00	38.38	30.20

AAQ-03 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	20:00	32.33	26.00
	21:00	31.53	25.83
	22:00	34.08	27.40
	23:00	32.55	27.28
15/11/2024	0:00	40.60	33.33
	1:00	40.78	34.95
	2:00	31.60	28.78
	3:00	38.63	35.40
	4:00	51.93	47.33
	5:00	38.88	36.33
	6:00	57.18	51.80
	7:00	61.05	54.45
	8:00	63.53	54.98
	9:00	37.23	28.50
	10:00	34.38	24.98
	11:00	35.63	25.58
	12:00	43.55	30.60
	13:00	44.58	27.83
	14:00	25.85	18.20
	15:00	36.03	23.10
	16:00	30.98	20.20
Average 24 hr		**40.38**	**32.44**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
15/11/2024	17:00	33.13	22.63
	18:00	42.25	28.98
	19:00	31.33	22.48
	20:00	30.38	22.43
	21:00	22.75	18.15
	22:00	21.23	17.48
	23:00	21.20	17.93
16/11/2024	0:00	24.70	20.65
	1:00	22.85	19.88
	2:00	36.18	29.33
	3:00	22.30	19.40
	4:00	23.43	20.50
	5:00	20.53	17.85
	6:00	21.15	18.95
	7:00	30.23	25.50
	8:00	36.55	29.03
	9:00	25.58	18.45
	10:00	21.60	15.20
	11:00	30.20	19.83
	12:00	42.65	25.88

AAQ-03 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	13:00	47.25	28.70
	14:00	53.75	32.58
	15:00	51.78	32.28
	16:00	59.80	37.43
Average 24 hr		**32.20**	**23.39**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
16/11/2024	17:00	35.08	21.95
	18:00	30.93	20.15
	19:00	18.85	14.33
	20:00	16.38	12.70
	21:00	19.40	14.28
	22:00	16.40	13.43
	23:00	17.50	14.15
17/11/2024	0:00	21.70	17.70
	1:00	16.65	13.13
	2:00	14.03	11.83
	3:00	12.88	11.13
	4:00	13.83	12.10
	5:00	16.98	14.65
	6:00	32.23	24.95
	7:00	30.38	23.80
	8:00	32.43	23.33
	9:00	26.93	19.83
	10:00	26.48	18.90
	11:00	18.23	13.73
	12:00	24.00	17.35
	13:00	26.55	18.50
	14:00	19.53	13.48
	15:00	25.03	17.73
	16:00	20.18	13.33
Average 24 hr		**22.19**	**16.52**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-03 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
17/11/2024	17:00	19.80	13.53
	18:00	19.70	13.73
	19:00	14.85	10.75
	20:00	21.65	15.98
	21:00	20.38	16.18
	22:00	21.50	17.00
	23:00	22.75	18.25

AAQ-03 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
18/11/2024	0:00	16.62	14.23
	1:00	23.85	19.60
	2:00	22.90	18.93
	3:00	25.50	21.10
	4:00	22.80	18.63
	5:00	14.78	12.95
	6:00	13.05	11.45
	7:00	16.43	14.13
	8:00	86.03	52.63
	9:00	102.40	60.58
	10:00	40.30	23.90
	11:00	28.33	17.65
	12:00	21.70	14.55
	13:00	17.55	12.30
	14:00	23.40	15.78
	15:00	28.48	19.40
	16:00	51.60	33.98
Average 24 hr		29.01	20.30
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

4.1.4 AAQ-04

AAQ-04 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
11/11/2024	18:00	37.25	22.88
	19:00	36.30	23.78
	20:00	29.38	19.70
	21:00	20.23	14.55
	22:00	33.95	22.80
	23:00	59.15	38.13
12/11/2024	0:00	52.48	36.57
	1:00	62.93	43.93
	2:00	76.63	54.93
	3:00	69.93	51.53
	4:00	76.35	58.20
	5:00	79.23	63.08
	6:00	69.05	57.58
	7:00	88.05	75.85
	8:00	58.53	48.70
	9:00	37.38	24.38
	10:00	53.45	32.43
	11:00	81.38	46.55
	12:00	56.70	35.05
	13:00	56.93	34.90
	14:00	56.90	33.55
	15:00	44.25	28.05
	16:00	42.43	26.15
	17:00	49.23	29.13
Average 24 hr		**55.33**	**38.43**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
12/11/2024	18:00	47.53	29.25
	19:00	40.33	25.55
	20:00	45.20	28.73
	21:00	40.75	26.23
	22:00	27.63	18.93
	23:00	24.70	18.15
13/11/2024	0:00	32.73	22.65
	1:00	40.30	26.35
	2:00	46.60	28.08
	3:00	25.08	18.90
	4:00	44.48	32.73
	5:00	57.65	41.90
	6:00	89.48	63.58
	7:00	70.88	53.50
	8:00	57.33	42.63
	9:00	80.00	49.03

AAQ-04 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	10:00	47.13	28.80
	11:00	38.08	22.83
	12:00	43.90	25.08
	13:00	40.88	24.48
	14:00	41.55	24.53
	15:00	43.63	25.88
	16:00	41.20	25.98
	17:00	43.18	28.10
Average 24 hr		**46.26**	**30.49**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
13/11/2024	18:00	45.58	30.50
	19:00	53.15	37.55
	20:00	61.23	41.75
	21:00	63.70	43.15
	22:00	42.85	31.95
	23:00	69.15	49.00
	0:00	66.03	49.68
14/11/2024	1:00	80.33	62.13
	2:00	89.88	71.50
	3:00	86.43	69.48
	4:00	98.73	80.30
	5:00	132.53	110.43
	6:00	167.60	143.58
	7:00	163.95	139.83
	8:00	149.68	127.68
	9:00	75.85	56.50
	10:00	67.90	45.85
	11:00	96.68	66.23
	12:00	59.75	40.23
	13:00	59.85	40.50
	14:00	93.68	52.03
	15:00	77.25	46.45
	16:00	63.38	43.10
	17:00	67.48	46.33
Average 24 hr		**84.69**	**63.57**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
14/11/2024	18:00	76.25	51.80
	19:00	74.13	51.65
	20:00	72.45	46.95

AAQ-04 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	21:00	58.88	41.05
	22:00	63.60	45.15
	23:00	69.85	49.95
15/11/2024	0:00	70.65	47.50
	1:00	38.00	27.30
	2:00	63.20	43.78
	3:00	84.55	59.15
	4:00	81.00	58.25
	5:00	84.55	58.63
	6:00	79.48	56.03
	7:00	80.18	56.53
	8:00	69.33	49.05
	9:00	68.05	45.88
	10:00	52.33	34.38
	11:00	48.88	30.70
	12:00	37.03	24.18
	13:00	63.55	42.25
	14:00	25.65	17.08
	15:00	30.20	19.05
	16:00	40.83	23.90
	17:00	45.28	25.68
Average 24 hr		**61.58**	**41.91**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
15/11/2024	18:00	39.13	23.93
	19:00	40.48	26.85
	20:00	61.68	35.18
	21:00	53.78	33.35
	22:00	50.85	32.50
	23:00	50.08	33.10
16/11/2024	0:00	42.33	27.73
	1:00	61.63	41.00
	2:00	39.83	28.00
	3:00	53.63	37.13
	4:00	51.98	36.68
	5:00	42.63	30.55
	6:00	43.78	31.35
	7:00	62.65	43.88
	8:00	67.15	45.30
	9:00	66.25	41.00
	10:00	83.28	45.53
	11:00	38.48	21.68
	12:00	37.75	20.43
	13:00	38.43	20.38

AAQ-04 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	14:00	47.05	24.40
	15:00	54.73	26.45
	16:00	45.55	23.38
	17:00	31.00	18.43
Average 24 hr		**50.17**	**31.17**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
16/11/2024	18:00	32.23	20.15
	19:00	32.23	20.45
	20:00	34.80	21.80
	21:00	23.45	15.38
	22:00	32.23	21.15
	23:00	44.33	27.60
17/11/2024	0:00	35.45	23.28
	1:00	41.50	26.85
	2:00	62.58	38.60
	3:00	43.75	28.68
	4:00	45.65	29.40
	5:00	44.63	29.85
	6:00	45.30	31.48
	7:00	50.70	35.15
	8:00	55.28	36.10
	9:00	52.65	31.63
	10:00	54.75	32.75
	11:00	56.65	33.03
	12:00	46.08	26.45
	13:00	53.95	28.73
	14:00	69.90	31.83
	15:00	47.25	24.20
	16:00	44.08	22.25
	17:00	24.80	14.60
Average 24 hr		**44.76**	**27.14**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-04 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
17/11/2024	18:00	21.08	13.15
17/11/2024	19:00	30.58	17.85
17/11/2024	20:00	25.83	15.90
17/11/2024	21:00	25.55	16.28
17/11/2024	22:00	35.15	23.15
17/11/2024	23:00	34.80	23.73
18/11/2024	0:00	36.61	22.47

AAQ-04 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
18/11/2024	1:00	28.18	17.90
18/11/2024	2:00	23.58	14.60
18/11/2024	3:00	31.48	20.40
18/11/2024	4:00	19.00	13.28
18/11/2024	5:00	28.35	19.63
18/11/2024	6:00	31.15	21.10
18/11/2024	7:00	30.78	21.45
18/11/2024	8:00	33.95	22.33
18/11/2024	9:00	28.93	17.30
18/11/2024	10:00	41.38	24.88
18/11/2024	11:00	41.43	24.80
18/11/2024	12:00	32.80	19.83
18/11/2024	13:00	27.63	17.60
18/11/2024	14:00	30.73	18.93
18/11/2024	15:00	69.45	34.88
18/11/2024	16:00	76.08	40.35
18/11/2024	17:00	64.05	36.33
Average 24 hr		**35.35**	**21.59**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

4.1.5 AAQ-05

AAQ-05 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
11/11/2024	20:00	18.60	15.00
	21:00	22.13	17.10
	22:00	19.85	15.50
	23:00	19.43	15.78
12/11/2024	0:00	33.47	24.61
	1:00	42.90	33.40
	2:00	30.48	24.83
	3:00	31.48	27.13
	4:00	35.03	30.85
	5:00	24.20	20.78
	6:00	32.60	26.88
	7:00	55.08	41.03
	8:00	93.53	78.03
	9:00	34.28	27.03
	10:00	41.33	28.48
	11:00	37.88	26.98
	12:00	28.78	21.25
	13:00	27.80	20.38
	14:00	29.53	21.30
	15:00	62.83	43.25
	16:00	26.93	19.25
	17:00	25.95	19.13
	18:00	26.35	19.33
	19:00	30.68	21.83
Average 24 hr		**34.63**	**26.63**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
12/11/2024	20:00	23.03	17.00
	21:00	17.65	14.30
	22:00	16.83	13.70
	23:00	11.03	9.70
13/11/2024	0:00	10.63	9.40
	1:00	12.30	10.60
	2:00	18.48	16.13
	3:00	58.98	48.55
	4:00	68.00	53.30
	5:00	52.90	43.15
	6:00	53.68	46.08
	7:00	82.70	68.25
	8:00	77.63	63.93
	9:00	103.60	69.10
	10:00	45.38	32.88
	11:00	29.30	20.55

AAQ-05 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	12:00	35.78	26.48
	13:00	30.35	20.78
	14:00	24.13	18.45
	15:00	20.35	15.38
	16:00	22.58	16.85
	17:00	25.83	20.15
	18:00	24.50	19.68
	19:00	21.90	18.60
Average 24 hr		**36.98**	**28.87**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
13/11/2024	20:00	22.43	19.20
	21:00	22.80	19.90
	22:00	23.80	20.68
	23:00	22.50	20.58
14/11/2024	0:00	75.00	60.63
	1:00	82.28	68.18
	2:00	86.40	73.18
	3:00	96.75	85.58
	4:00	101.25	90.70
	5:00	114.00	102.35
	6:00	137.55	124.93
	7:00	158.85	144.03
	8:00	146.70	128.80
	9:00	82.93	61.60
	10:00	51.28	36.28
	11:00	39.63	29.98
	12:00	46.23	34.55
	13:00	48.95	37.50
	14:00	34.85	27.53
	15:00	34.93	28.10
	16:00	35.43	28.93
	17:00	40.80	32.65
	18:00	39.23	31.25
	19:00	35.03	28.33
Average 24 hr		**65.81**	**55.64**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
14/11/2024	20:00	30.68	25.10
	21:00	33.30	27.35
	22:00	27.40	23.25

AAQ-05 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	23:00	33.88	27.48
15/11/2024	0:00	30.40	25.18
	1:00	21.18	18.38
	2:00	47.48	39.73
	3:00	58.78	50.55
	4:00	67.83	56.23
	5:00	59.85	50.23
	6:00	67.68	54.10
	7:00	79.05	61.20
	8:00	74.80	56.13
	9:00	50.70	38.83
	10:00	42.58	31.68
	11:00	34.05	26.38
	12:00	20.55	17.25
	13:00	18.60	15.00
	14:00	14.28	11.63
	15:00	17.35	13.40
	16:00	21.48	15.95
	17:00	18.90	14.60
	18:00	21.73	16.85
	19:00	23.88	18.50
Average 24 hr		**38.18**	**30.62**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
15/11/2024	20:00	21.08	17.05
	21:00	22.78	17.98
	22:00	20.15	16.30
	23:00	17.10	13.75
16/11/2024	0:00	13.60	11.58
	1:00	19.48	15.98
	2:00	59.80	43.50
	3:00	62.30	45.68
	4:00	43.40	34.38
	5:00	43.98	33.78
	6:00	35.95	30.00
	7:00	70.03	52.45
	8:00	64.35	46.35
	9:00	38.75	28.63
	10:00	38.83	26.20
	11:00	14.88	11.15
	12:00	26.95	18.75
	13:00	28.25	21.08
	14:00	102.15	86.95
	15:00	39.95	29.15

AAQ-05 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM₁₀ particles (µg/m³)**
	16:00	18.80	13.75
	17:00	16.83	12.28
	18:00	11.90	9.38
	19:00	12.55	10.25
Average 24 hr		**35.16**	**26.93**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM₁₀ particles (µg/m³)**
16/11/2024	20:00	13.85	10.98
	21:00	10.65	8.88
	22:00	12.40	10.65
	23:00	10.60	8.73
17/11/2024	0:00	9.29	8.03
	1:00	26.03	20.03
	2:00	53.58	39.00
	3:00	53.85	38.20
	4:00	37.33	27.28
	5:00	34.33	24.50
	6:00	42.10	30.73
	7:00	56.58	39.43
	8:00	56.65	39.18
	9:00	62.68	41.48
	10:00	60.10	39.43
	11:00	33.30	22.68
	12:00	17.68	14.15
	13:00	16.85	12.93
	14:00	17.63	13.20
	15:00	29.43	20.68
	16:00	9.68	7.08
	17:00	10.05	7.65
	18:00	11.60	8.28
	19:00	12.20	9.03
Average 24 hr		**29.10**	**20.92**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

AAQ-05 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM₁₀ particles (µg/m³)**
17/11/2024	20:00	11.18	8.55
	21:00	11.85	9.25
	22:00	12.60	9.10
	23:00	38.25	28.75
18/11/2024	0:00	34.00	24.93
	1:00	34.55	26.58
	2:00	33.33	26.10

AAQ-05 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
	3:00	36.05	27.20
	4:00	41.75	29.38
	5:00	23.53	17.90
	6:00	33.05	24.50
	7:00	72.98	48.13
	8:00	155.53	98.05
	9:00	221.80	137.95
	10:00	136.60	85.80
	11:00	57.03	36.33
	12:00	42.58	26.68
	13:00	29.60	19.58
	14:00	26.60	16.85
	15:00	27.40	18.83
	16:00	31.10	21.63
	17:00	39.05	27.05
	18:00	33.83	24.98
	19:00	31.10	23.60
Average 24 hr		**50.64**	**34.07**
Limit		**230.00**	**150.00**
Status		**Pass**	**Pass**

4.1.6 AAQ-06

AAQ-06 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
20/11/2024	17:00	35.23	25.35
	18:00	27.50	20.50
	19:00	17.70	13.85
	20:00	17.58	13.70
	21:00	29.25	21.95
	22:00	28.45	22.45
	23:00	22.98	20.38
21/11/2024	0:00	28.06	23.18
	1:00	26.65	22.95
	2:00	26.88	23.88
	3:00	29.50	25.58
	4:00	31.30	27.48
	5:00	30.23	26.65
	6:00	38.65	33.70
	7:00	37.35	31.98
	8:00	47.53	38.15
	9:00	59.03	44.15
	10:00	44.68	32.80
	11:00	23.70	16.63
	12:00	24.28	17.05
	13:00	29.18	19.45
	14:00	31.35	22.08
	15:00	41.73	27.90
	16:00	35.40	24.88
Average 24 hr		**31.84**	**24.86**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
21/11/2024	17:00	35.93	25.53
	18:00	28.33	21.30
	19:00	25.48	20.08
	20:00	25.50	19.80
	21:00	26.50	21.10
	22:00	27.33	21.50
	23:00	26.80	21.45
22/11/2024	0:00	24.21	20.17
	1:00	22.33	19.80
	2:00	23.25	20.88
	3:00	26.90	24.33
	4:00	35.30	32.73
	5:00	54.90	51.80
	6:00	57.05	54.10
	7:00	63.48	58.93
	8:00	64.78	58.73

AAQ-06 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	9:00	41.78	32.85
	10:00	31.90	23.28
	11:00	26.83	19.63
	12:00	28.10	20.63
	13:00	38.33	26.80
	14:00	37.65	26.78
	15:00	43.43	29.75
	16:00	34.25	24.00
Average 24 hr		**35.43**	**29.00**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
22/11/2024	17:00	34.03	24.45
	18:00	29.55	22.75
	19:00	26.98	21.90
	20:00	23.38	19.43
	21:00	23.33	20.23
	22:00	28.05	23.98
	23:00	26.55	23.38
23/11/2024	0:00	32.15	28.90
	1:00	45.35	42.58
	2:00	52.20	49.60
	3:00	64.95	62.13
	4:00	94.03	90.33
	5:00	127.88	124.35
	6:00	156.70	151.15
	7:00	141.53	136.05
	8:00	130.10	121.05
	9:00	75.83	61.03
	10:00	60.83	45.78
	11:00	36.78	28.35
	12:00	39.30	31.45
	13:00	30.08	24.53
	14:00	30.65	24.68
	15:00	33.38	25.88
	16:00	35.88	27.18
Average 24 hr		**57.48**	**51.29**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
23/11/2024	17:00	33.05	26.38
	18:00	32.35	24.68
	19:00	23.15	19.10

AAQ-06 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
	20:00	20.48	17.03
	21:00	17.28	14.68
	22:00	17.50	15.10
	23:00	20.28	17.50
24/11/2024	0:00	31.68	27.64
	1:00	35.73	30.70
	2:00	33.15	28.70
	3:00	24.48	21.93
	4:00	38.03	32.63
	5:00	40.03	34.10
	6:00	35.85	31.00
	7:00	35.38	31.30
	8:00	44.85	37.23
	9:00	45.45	35.45
	10:00	44.83	33.23
	11:00	30.05	22.68
	12:00	24.98	19.98
	13:00	21.88	16.98
	14:00	17.93	14.60
	15:00	16.50	14.00
	16:00	22.58	18.53
Average 24 hr		**29.48**	**24.38**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
24/11/2024	17:00	22.00	17.75
	18:00	17.15	14.33
	19:00	15.18	12.48
	20:00	12.13	10.23
	21:00	10.93	9.23
	22:00	11.98	10.48
	23:00	17.58	15.10
25/11/2024	0:00	24.00	20.29
	1:00	20.63	17.68
	2:00	16.60	14.53
	3:00	15.28	13.65
	4:00	18.70	16.45
	5:00	12.45	11.55
	6:00	19.98	17.78
	7:00	24.68	21.48
	8:00	32.78	26.63
	9:00	56.08	40.38
	10:00	29.63	21.75
	11:00	28.88	21.35
	12:00	29.48	22.10

AAQ-06 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	13:00	26.40	19.20
	14:00	40.48	27.75
	15:00	36.73	26.00
	16:00	42.33	28.20
Average 24 hr		**24.25**	**19.01**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
25/11/2024	17:00	42.88	29.53
	18:00	45.43	32.05
	19:00	45.05	32.28
	20:00	40.90	30.23
	21:00	39.18	30.13
	22:00	37.48	28.40
	23:00	36.18	26.30
26/11/2024	0:00	29.63	21.43
	1:00	21.55	17.40
	2:00	20.65	16.85
	3:00	24.45	19.45
	4:00	21.10	17.60
	5:00	22.70	18.40
	6:00	26.53	22.28
	7:00	34.78	27.50
	8:00	63.63	46.40
	9:00	65.68	42.03
	10:00	46.55	30.85
	11:00	51.30	32.63
	12:00	60.85	38.50
	13:00	59.78	37.85
	14:00	53.48	35.60
	15:00	81.23	51.05
	16:00	65.03	41.98
Average 24 hr		**43.16**	**30.28**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-06 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
26/11/2024	17:00	52.23	35.23
	18:00	46.30	31.45
	19:00	39.95	28.83
	20:00	38.80	26.78
	21:00	34.58	25.25
	22:00	26.20	21.30
	23:00	34.80	26.83

AAQ-06 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM$_{10}$ particles (µg/m^3)**
27/11/2024	0:00	30.95	25.33
	1:00	34.83	29.55
	2:00	33.35	28.33
	3:00	37.20	32.58
	4:00	38.78	34.08
	5:00	33.65	29.80
	6:00	36.67	31.43
	7:00	38.83	31.50
	8:00	45.10	34.20
	9:00	44.83	32.43
	10:00	47.78	33.30
	11:00	56.95	37.58
	12:00	50.10	33.03
	13:00	33.18	24.10
	14:00	34.90	25.08
	15:00	28.53	20.53
	16:00	28.35	20.38
Average 24 hr		**38.62**	**29.12**
Limit		**230**	**150**
Status		**Pass**	**Pass**

4.1.7 AAQ-07

AAQ-07 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
20/11/2024	17:30	65.23	37.73
	18:30	51.85	30.30
	19:30	34.65	21.78
	20:30	35.00	21.03
	21:30	27.50	17.20
	22:30	29.83	18.73
	23:30	30.65	20.15
21/11/2024	0:30	43.74	28.68
	1:30	53.75	35.80
	2:30	49.45	34.73
	3:30	34.50	25.15
	4:30	43.80	32.23
	5:30	40.38	28.85
	6:30	52.68	42.13
	7:30	67.45	52.33
	8:30	45.73	31.58
	9:30	44.48	25.98
	10:30	41.80	24.20
	11:30	36.43	22.20
	12:30	50.35	29.18
	13:30	71.50	40.63
	14:30	71.23	40.88
	15:30	109.13	63.68
	16:30	75.43	42.60
Average 24 hr		**50.27**	**31.99**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
21/11/2024	17:30	58.60	33.53
	18:30	47.33	29.10
	19:30	40.30	26.50
	20:30	40.88	26.88
	21:30	46.15	29.45
	22:30	39.55	25.43
	23:30	33.05	22.70
22/11/2024	0:30	38.45	27.00
	1:30	34.98	26.30
	2:30	43.70	33.95
	3:30	60.65	49.30
	4:30	113.30	90.83
	5:30	111.18	93.98
	6:30	130.15	112.30
	7:30	88.13	75.33
	8:30	63.25	49.40

AAQ-07 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	9:30	62.08	38.23
	10:30	46.90	27.43
	11:30	50.33	29.88
	12:30	78.73	46.18
	13:30	65.98	38.85
	14:30	62.68	37.75
	15:30	75.60	44.25
	16:30	90.23	50.78
Average 24 hr		**63.42**	**44.39**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
22/11/2024	17:30	61.13	38.08
	18:30	45.75	31.00
	19:30	44.63	31.00
	20:30	43.33	29.53
	21:30	37.55	26.68
	22:30	33.88	25.10
	23:30	39.53	30.38
23/11/2024	0:30	86.68	72.50
	1:30	160.85	139.13
	2:30	117.75	102.78
	3:30	257.10	223.98
	4:30	256.98	228.28
	5:30	390.65	347.08
	6:30	332.78	294.15
	7:30	313.50	278.43
	8:30	156.05	135.48
	9:30	81.95	53.40
	10:30	103.75	60.40
	11:30	81.43	47.90
	12:30	76.35	46.38
	13:30	57.00	35.48
	14:30	75.78	45.90
	15:30	61.30	36.95
	16:30	62.33	37.98
Average 24 hr		**124.08**	**99.91**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
23/11/2024	17:30	54.40	34.45
	18:30	41.58	26.65
	19:30	34.65	23.48

AAQ-07 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	20:30	29.50	19.88
	21:30	25.58	17.93
	22:30	27.10	18.90
	23:30	45.45	30.23
24/11/2024	0:30	55.32	37.24
	1:30	49.63	34.65
	2:30	48.95	34.73
	3:30	50.40	36.85
	4:30	53.95	39.65
	5:30	53.05	39.03
	6:30	62.40	46.98
	7:30	64.05	47.73
	8:30	53.15	37.48
	9:30	49.33	32.20
	10:30	64.25	38.03
	11:30	70.75	41.65
	12:30	61.25	39.10
	13:30	47.98	30.75
	14:30	42.35	27.58
	15:30	41.35	27.20
	16:30	49.20	33.00
Average 24 hr		**48.98**	**33.14**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
24/11/2024	17:30	36.98	25.23
	18:30	31.53	21.35
	19:30	24.88	17.20
	20:30	21.98	15.38
	21:30	18.68	13.10
	22:30	18.03	12.65
	23:30	32.18	22.15
25/11/2024	0:30	30.58	21.80
	1:30	31.70	22.55
	2:30	42.93	28.73
	3:30	29.18	21.35
	4:30	21.53	16.08
	5:30	27.13	20.33
	6:30	29.30	22.38
	7:30	37.95	26.35
	8:30	140.50	85.08
	9:30	65.70	40.83
	10:30	149.65	75.93
	11:30	82.85	45.63
	12:30	108.98	63.43

AAQ-07 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	13:30	96.63	60.00
	14:30	78.38	45.05
	15:30	105.60	60.23
	16:30	87.13	49.23
Average 24 hr		**56.25**	**34.67**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
25/11/2024	17:30	99.55	57.13
	18:30	94.25	55.98
	19:30	77.35	47.28
	20:30	58.55	38.08
	21:30	49.80	34.45
	22:30	76.53	50.68
	23:30	58.03	35.93
26/11/2024	0:30	45.68	28.91
	1:30	35.73	23.43
	2:30	33.30	22.43
	3:30	37.05	25.73
	4:30	49.30	34.08
	5:30	43.35	30.60
	6:30	30.65	23.43
	7:30	115.93	66.28
	8:30	113.48	58.38
	9:30	85.60	43.38
	10:30	78.50	40.73
	11:30	130.70	62.80
	12:30	151.20	75.13
	13:30	127.13	64.20
	14:30	126.80	65.20
	15:30	147.15	74.30
	16:30	123.15	65.43
Average 24 hr		**82.86**	**46.83**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-07 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
26/11/2024	17:30	89.83	49.70
	18:30	72.25	41.28
	19:30	78.08	44.60
	20:30	107.15	63.65
	21:30	43.65	26.45
	22:30	39.00	24.68
	23:30	40.80	26.18

AAQ-07 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
27/11/2024	0:30	50.13	33.48
	1:30	51.55	33.55
	2:30	48.65	32.93
	3:30	63.33	42.98
	4:30	48.43	34.78
	5:30	47.78	35.43
	6:30	48.18	34.90
	7:30	50.65	40.20
	8:30	66.33	43.23
	9:30	84.03	48.50
	10:30	81.55	42.60
	11:30	93.55	48.73
	12:30	84.13	45.80
	13:30	75.63	41.15
	14:30	88.38	48.05
	15:30	83.18	43.20
	16:30	93.75	49.30
Average 24 hr		**67.91**	**40.64**
Limit		**230**	**150**
Status		**Pass**	**Pass**

4.1.8 AAQ-08

AAQ-08 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
20/11/2024	18:00	54.20	30.63
	19:00	41.13	25.23
	20:00	54.00	30.18
	21:00	39.15	24.33
	22:00	36.23	23.70
	23:00	43.95	27.50
21/11/2024	0:00	64.86	39.54
	1:00	68.23	42.50
	2:00	124.80	71.68
	3:00	136.95	80.05
	4:00	80.23	54.33
	5:00	83.25	55.90
	6:00	94.08	58.78
	7:00	137.38	82.83
	8:00	236.48	129.80
	9:00	168.00	93.20
	10:00	109.40	62.10
	11:00	43.63	24.35
	12:00	48.88	28.03
	13:00	49.75	28.43
	14:00	52.43	30.03
	15:00	57.20	32.73
	16:00	47.70	29.33
	17:00	62.23	35.60
Average 24 hr		**80.59**	**47.53**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
21/11/2024	18:00	55.25	32.50
	19:00	45.65	28.40
	20:00	63.15	36.38
	21:00	47.88	30.15
	22:00	47.10	29.63
	23:00	50.23	32.65
22/11/2024	0:00	52.80	34.98
	1:00	59.08	38.78
	2:00	86.28	54.60
	3:00	92.63	60.90
	4:00	100.48	69.20
	5:00	106.80	79.05
	6:00	139.98	96.95
	7:00	138.15	99.00
	8:00	133.73	92.63
	9:00	125.13	78.95

AAQ-08 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	10:00	91.18	52.15
	11:00	50.20	29.75
	12:00	59.35	35.20
	13:00	69.30	39.38
	14:00	52.95	30.58
	15:00	64.95	37.43
	16:00	63.28	37.88
	17:00	60.85	36.70
Average 24 hr		**77.35**	**49.74**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
22/11/2024	18:00	64.93	38.58
	19:00	59.53	37.38
	20:00	71.50	41.70
	21:00	82.78	47.55
	22:00	60.98	40.00
	23:00	66.60	45.05
23/11/2024	0:00	76.77	53.50
	1:00	103.30	77.43
	2:00	130.48	98.78
	3:00	167.70	131.08
	4:00	223.40	179.45
	5:00	250.20	206.65
	6:00	313.15	255.58
	7:00	333.80	275.48
	8:00	238.50	196.00
	9:00	149.15	103.40
	10:00	131.40	79.93
	11:00	139.25	79.68
	12:00	91.10	53.03
	13:00	83.10	49.93
	14:00	74.38	44.95
	15:00	90.40	53.63
	16:00	84.75	48.90
	17:00	75.73	44.18
Average 24 hr		**131.79**	**95.07**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
23/11/2024	18:00	77.53	44.03
	19:00	86.98	46.60
	20:00	63.50	37.58

AAQ-08 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	21:00	85.43	46.38
	22:00	76.08	42.10
	23:00	71.45	41.55
24/11/2024	0:00	72.45	44.68
	1:00	85.28	52.05
	2:00	101.50	60.58
	3:00	88.35	54.88
	4:00	90.63	55.95
	5:00	90.95	56.45
	6:00	90.15	56.63
	7:00	87.93	55.95
	8:00	84.93	55.50
	9:00	92.75	55.90
	10:00	78.15	46.35
	11:00	56.38	34.45
	12:00	91.63	49.08
	13:00	91.60	50.03
	14:00	68.00	36.33
	15:00	46.78	27.68
	16:00	62.08	36.83
	17:00	75.03	42.63
Average 24 hr		**79.81**	**47.09**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
24/11/2024	18:00	56.63	32.73
	19:00	62.10	33.53
	20:00	54.23	30.33
	21:00	107.23	55.08
	22:00	173.95	79.00
	23:00	57.73	34.08
25/11/2024	0:00	87.13	47.28
	1:00	53.08	33.50
	2:00	76.40	42.45
	3:00	85.33	47.28
	4:00	68.48	40.45
	5:00	81.93	46.80
	6:00	76.53	49.15
	7:00	89.38	56.03
	8:00	102.30	63.40
	9:00	92.73	58.35
	10:00	65.33	40.23
	11:00	55.78	33.53
	12:00	46.03	27.40
	13:00	53.93	29.90

AAQ-08 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	14:00	83.05	46.63
	15:00	67.58	39.25
	16:00	71.55	41.40
	17:00	75.43	43.65
Average 24 hr		**76.82**	**43.81**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
25/11/2024	18:00	61.48	37.40
	19:00	62.58	39.60
	20:00	78.95	49.55
	21:00	78.00	49.20
	22:00	77.08	48.40
	23:00	78.68	49.43
26/11/2024	0:00	72.67	43.39
	1:00	66.00	40.35
	2:00	89.00	50.38
	3:00	69.75	43.03
	4:00	67.18	42.00
	5:00	57.98	37.93
	6:00	76.20	47.13
	7:00	65.95	39.08
	8:00	99.88	53.00
	9:00	112.25	54.13
	10:00	131.95	61.40
	11:00	143.85	66.45
	12:00	168.93	72.68
	13:00	144.38	65.93
	14:00	137.20	64.10
	15:00	122.10	60.40
	16:00	177.75	92.33
	17:00	138.45	68.50
Average 24 hr		**99.09**	**53.16**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-08 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
26/11/2024	18:00	95.03	47.95
	19:00	78.55	41.15
	20:00	63.93	36.08
	21:00	57.58	35.30
	22:00	75.53	46.20
	23:00	133.53	79.23
27/11/2024	0:00	111.23	68.84

AAQ-08 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
	1:00	141.13	83.70
	2:00	143.78	84.43
	3:00	130.28	81.73
	4:00	119.60	77.48
	5:00	120.60	79.80
	6:00	126.88	79.73
	7:00	132.05	83.15
	8:00	204.60	119.60
	9:00	141.63	81.18
	10:00	114.53	63.00
	11:00	110.13	56.40
	12:00	179.88	103.33
	13:00	145.63	69.73
	14:00	166.70	94.35
	15:00	107.03	50.28
	16:00	108.78	49.80
	17:00	62.37	31.47
Average 24 hr		**119.62**	**68.49**
Limit		**230**	**150**
Status		**Pass**	**Pass**

4.1.9 AAQ-09

AAQ-09 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
20/11/2024	19:30	45.30	28.18
	20:30	18.73	13.05
	21:30	13.78	10.23
	22:30	11.95	9.08
	23:30	15.60	11.60
21/11/2024	0:30	22.70	17.10
	1:30	25.18	18.78
	2:30	25.70	19.45
	3:30	34.10	25.18
	4:30	33.45	25.05
	5:30	34.28	25.98
	6:30	57.78	36.68
	7:30	39.98	32.15
	8:30	61.43	44.10
	9:30	60.03	35.53
	10:30	33.88	20.18
	11:30	45.05	25.95
	12:30	28.98	17.45
	13:30	41.58	23.90
	14:30	39.85	24.05
	15:30	36.55	23.05
	16:30	39.55	23.90
	17:30	35.85	22.93
	18:30	39.05	25.53
Average 24 hr		**35.01**	**23.29**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-09 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
21/11/2024	19:30	43.05	28.08
	20:30	40.48	28.20
	21:30	39.35	27.00
	22:30	25.15	18.55
	23:30	21.48	16.98
22/11/2024	0:30	20.58	16.73
	1:30	27.40	22.28
	2:30	24.23	19.95
	3:30	38.63	33.13
	4:30	52.15	47.13
	5:30	71.25	65.73
	6:30	95.95	89.68
	7:30	121.55	112.03
	8:30	69.63	62.10
	9:30	90.65	56.53
	10:30	49.00	30.50

AAQ-09 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	11:30	31.98	20.13
	12:30	47.88	29.80
	13:30	52.28	30.25
	14:30	39.28	24.93
	15:30	45.35	27.93
	16:30	38.03	25.13
	17:30	40.68	26.13
	18:30	45.53	32.55
Average 24 hr		**48.81**	**37.14**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-09 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
22/11/2024	19:30	50.08	34.90
	20:30	48.80	34.63
	21:30	28.70	22.85
	22:30	26.73	22.10
	23:30	34.43	29.05
23/11/2024	0:30	409.38	391.68
	1:30	679.38	622.00
	2:30	1145.23	1118.65
	3:30	369.90	345.23
	4:30	796.35	781.80
	5:30	879.68	850.45
	6:30	1513.68	1484.10
	7:30	2143.93	2135.65
	8:30	4829.15	4818.45
	9:30	101.30	81.73
	10:30	64.68	42.73
	11:30	55.50	37.25
	12:30	48.03	32.05
	13:30	42.20	28.63
	14:30	40.93	27.48
	15:30	44.00	29.28
	16:30	50.83	31.75
	17:30	43.10	28.95
	18:30	44.15	29.73
Average 24 hr		**562.09**	**544.21**
Limit		**230**	**150**
Status		**Fail**	**Fail**

AAQ-09 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
23/11/2024	19:30	38.33	27.30
	20:30	24.00	17.75
	21:30	22.48	17.23

AAQ-09 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	22:30	19.63	15.68
	23:30	20.78	16.73
24/11/2024	0:30	43.40	32.95
	1:30	38.78	30.78
	2:30	34.73	27.73
	3:30	37.33	30.73
	4:30	78.08	62.23
	5:30	99.88	79.10
	6:30	113.70	90.00
	7:30	69.85	58.60
	8:30	75.80	57.18
	9:30	45.03	30.85
	10:30	35.25	23.68
	11:30	31.45	20.63
	12:30	30.20	20.65
	13:30	26.98	18.23
	14:30	29.08	19.58
	15:30	28.45	20.15
	16:30	34.03	24.15
	17:30	31.50	21.20
	18:30	28.75	20.43
Average 24 hr		**43.23**	**32.64**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-09 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
24/11/2024	19:30	25.00	17.68
	20:30	12.03	9.15
	21:30	12.05	9.38
	22:30	14.43	11.03
	23:30	15.43	11.45
25/11/2024	0:30	21.95	16.50
	1:30	43.03	29.85
	2:30	20.75	15.70
	3:30	17.44	13.21
	4:30	18.75	14.63
	5:30	16.55	13.23
	6:30	15.05	11.88
	7:30	19.98	15.63
	8:30	33.25	25.15
	9:30	36.40	25.98
	10:30	25.73	18.13
	11:30	30.08	19.75
	12:30	26.28	16.63
	13:30	36.35	21.78
	14:30	43.58	26.60

AAQ-09 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	15:30	50.25	29.95
	16:30	78.45	43.65
	17:30	64.70	39.03
	18:30	41.00	26.38
Average 24 hr		**29.94**	**20.10**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-09 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
25/11/2024	19:30	36.73	25.85
	20:30	38.05	28.48
	21:30	24.90	19.35
	22:30	42.58	33.00
	23:30	30.45	23.65
26/11/2024	0:30	22.85	18.20
	1:30	26.25	21.03
	2:30	28.10	22.55
	3:30	32.68	26.38
	4:30	27.85	23.48
	5:30	23.95	20.55
	6:30	32.98	28.08
	7:30	35.00	29.33
	8:30	73.68	44.73
	9:30	68.08	36.43
	10:30	58.65	32.75
	11:30	60.78	31.93
	12:30	75.03	40.93
	13:30	69.83	39.43
	14:30	79.35	43.15
	15:30	97.65	52.18
	16:30	94.88	51.83
	17:30	86.70	47.58
	18:30	70.10	40.60
Average 24 hr		**51.54**	**32.56**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-09 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
26/11/2024	19:30	40.68	25.00
	20:30	20.18	14.20
	21:30	18.33	13.05
	22:30	21.40	15.48
	23:30	27.80	19.93
27/11/2024	0:30	40.60	28.75
	1:30	30.75	22.46

AAQ-09 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
	2:30	27.46	20.59
	3:30	31.70	23.25
	4:30	27.33	21.40
	5:30	54.30	52.98
	6:30	48.28	41.55
	7:30	32.30	26.23
	8:30	80.10	53.13
	9:30	75.43	44.10
	10:30	50.38	29.08
	11:30	48.88	28.00
	12:30	48.05	28.40
	13:30	34.38	21.20
	14:30	37.50	23.13
	15:30	29.13	18.10
	16:30	36.68	22.00
	17:30	95.98	57.60
	18:30	47.25	29.65
Average 24 hr		**41.87**	**28.30**
Limit		**230**	**150**
Status		**Pass**	**Pass**

4.1.10 AAQ-10

AAQ-10 Day 1			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
20/11/2024	20:00	22.38	17.78
	21:00	17.43	14.25
	22:00	19.38	15.53
	23:00	29.75	25.13
21/11/2024	0:00	39.08	33.38
	1:00	24.88	21.95
	2:00	30.10	26.73
	3:00	28.40	25.35
	4:00	32.48	28.80
	5:00	26.65	24.68
	6:00	32.78	30.03
	7:00	51.73	44.53
	8:00	54.25	46.88
	9:00	37.15	29.85
	10:00	39.63	29.33
	11:00	29.95	22.10
	12:00	24.18	17.80
	13:00	36.63	26.30
	14:00	32.23	23.33
	15:00	35.03	25.45
	16:00	28.30	21.40
	17:00	33.23	24.13
	18:00	26.20	20.45
	19:00	27.00	20.73
Average 24 hr		**31.61**	**25.66**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
21/11/2024	20:00	25.68	20.78
	21:00	27.10	21.00
	22:00	25.55	20.00
	23:00	24.90	20.15
22/11/2024	0:00	24.15	19.90
	1:00	23.60	19.98
	2:00	26.65	24.05
	3:00	39.43	35.95
	4:00	45.65	43.08
	5:00	57.13	54.33
	6:00	64.85	61.43
	7:00	67.58	64.83
	8:00	71.33	67.75
	9:00	47.45	40.70
	10:00	44.98	34.88
	11:00	27.88	21.70

AAQ-10 Day 2			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
	12:00	35.50	26.68
	13:00	29.85	22.95
	14:00	37.70	26.73
	15:00	37.23	27.38
	16:00	31.90	23.98
	17:00	40.75	29.53
	18:00	32.43	25.60
	19:00	33.90	27.23
Average 24 hr		**38.46**	**32.52**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 3			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
22/11/2024	20:00	34.05	27.28
	21:00	43.55	35.58
	22:00	33.10	27.45
	23:00	35.05	29.10
23/11/2024	0:00	30.43	27.28
	1:00	39.58	36.33
	2:00	54.85	52.18
	3:00	85.00	81.78
	4:00	101.78	97.05
	5:00	90.80	88.70
	6:00	86.32	80.85
	7:00	72.33	69.14
	8:00	67.35	63.42
	9:00	73.68	69.42
	10:00	86.35	76.70
	11:00	71.74	61.82
	12:00	94.18	68.88
	13:00	67.65	45.65
	14:00	34.63	24.28
	15:00	34.30	24.85
	16:00	103.13	84.08
	17:00	52.93	37.90
	18:00	33.63	26.00
	19:00	30.18	23.48
Average 24 hr		**60.69**	**52.46**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM_{10} particles (µg/m³)**
23/11/2024	20:00	59.95	40.05

AAQ-10 Day 4			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM₁₀ particles (µg/m³)**
	21:00	38.60	29.28
	22:00	39.30	29.43
	23:00	34.50	28.05
24/11/2024	0:00	31.78	25.43
	1:00	27.95	22.53
	2:00	30.08	24.83
	3:00	23.15	18.98
	4:00	28.03	21.95
	5:00	29.78	23.13
	6:00	25.90	20.83
	7:00	25.75	21.78
	8:00	52.23	38.48
	9:00	76.90	49.08
	10:00	45.25	27.93
	11:00	55.38	34.95
	12:00	75.40	47.13
	13:00	103.20	72.23
	14:00	82.48	51.43
	15:00	68.43	42.60
	16:00	60.43	38.95
	17:00	76.83	48.80
	18:00	48.05	32.55
	19:00	32.83	23.83
Average 24 hr		**48.84**	**33.92**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM₁₀ particles (µg/m³)**
24/11/2024	20:00	29.75	22.73
	21:00	32.95	25.20
	22:00	31.93	25.05
	23:00	34.45	29.98
25/11/2024	0:00	31.03	27.38
	1:00	34.18	30.18
	2:00	43.98	37.50
	3:00	44.33	37.80
	4:00	36.35	32.45
	5:00	37.08	33.60
	6:00	38.00	34.18
	7:00	39.20	35.50
	8:00	51.98	44.60
	9:00	61.58	43.65
	10:00	58.98	41.45
	11:00	50.70	33.18
	12:00	100.45	76.25
	13:00	48.83	32.78

AAQ-10 Day 5			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
	14:00	83.08	59.23
	15:00	49.25	31.53
	16:00	46.98	31.23
	17:00	92.75	59.05
	18:00	41.98	27.58
	19:00	31.30	21.85
Average 24 hr		**47.96**	**36.41**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 6			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
25/11/2024	20:00	30.53	22.60
	21:00	38.20	29.58
	22:00	40.20	33.48
	23:00	36.00	29.73
26/11/2024	0:00	28.20	23.80
	1:00	23.03	20.75
	2:00	35.63	32.65
	3:00	39.33	34.90
	4:00	32.53	29.25
	5:00	35.90	31.98
	6:00	37.70	33.45
	7:00	46.45	41.60
	8:00	76.15	64.10
	9:00	70.20	54.70
	10:00	83.20	60.30
	11:00	46.73	32.50
	12:00	54.43	35.48
	13:00	64.65	41.38
	14:00	150.03	100.58
	15:00	220.70	179.55
	16:00	81.15	59.38
	17:00	99.98	67.38
	18:00	96.65	72.80
	19:00	57.18	40.60
Average 24 hr		**63.53**	**48.85**
Limit		**230**	**150**
Status		**Pass**	**Pass**

AAQ-10 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m³)**	**PM10 particles (µg/m³)**
26/11/2024	20:00	41.73	30.05
	21:00	44.20	32.23
	22:00	207.03	153.80
	23:00	69.05	50.75
27/11/2024	0:00	41.59	32.47

AAQ-10 Day 7			
Date	**Time**	**Total Suspended Particles (µg/m^3)**	**PM_{10} particles (µg/m^3)**
	1:00	37.00	27.35
	2:00	43.63	33.50
	3:00	46.85	35.33
	4:00	52.68	39.33
	5:00	46.50	35.18
	6:00	52.53	37.30
	7:00	45.48	33.78
	8:00	45.60	32.65
	9:00	46.73	32.55
	10:00	77.55	51.33
	11:00	77.15	48.58
	12:00	225.05	154.38
	13:00	240.90	170.38
	14:00	162.23	114.25
	15:00	87.70	38.20
	16:00	37.63	26.30
	17:00	52.40	31.63
	18:00	47.70	30.10
	19:00	40.28	27.20
Average 24 hr		**77.88**	**54.11**
Limit		**230**	**150**
Status		**Pass**	**Pass**

4.2 Odor

4.2.1 OMS-01

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
11/11/2024	16:00	196.33	Failed	75.83	Failed
11/11/2024	16:30	264.00	Failed	261.67	Failed
11/11/2024	17:00	284.83	Failed	147.83	Failed
11/11/2024	17:30	269.67	Failed	27.83	Failed
11/11/2024	18:00	247.50	Failed	65.00	Failed
11/11/2024	18:30	213.83	Failed	781.17	Failed
11/11/2024	19:00	183.67	Failed	2211.33	Failed
11/11/2024	19:30	155.00	Failed	2473.67	Failed
11/11/2024	20:00	133.17	Failed	1649.83	Failed
11/11/2024	20:30	107.00	Failed	418.83	Failed
11/11/2024	21:00	92.00	Failed	199.17	Failed
11/11/2024	21:30	86.33	Failed	166.33	Failed
11/11/2024	22:00	79.67	Failed	44.17	Failed
11/11/2024	22:30	66.00	Failed	24.67	Failed
11/11/2024	23:00	57.67	Failed	22.00	Failed
11/11/2024	23:30	49.50	Failed	23.67	Failed
12/11/2024	0:00	47.50	Failed	25.67	Failed
12/11/2024	0:30	40.00	Failed	24.00	Failed
12/11/2024	1:00	37.00	Failed	30.50	Failed
12/11/2024	1:30	35.00	Failed	28.67	Failed
12/11/2024	2:00	28.00	Pass	22.50	Failed
12/11/2024	2:30	27.00	Pass	26.67	Failed
12/11/2024	3:00	24.50	Pass	26.33	Failed
12/11/2024	3:30	22.50	Pass	33.50	Failed
12/11/2024	4:00	19.00	Pass	33.00	Failed
12/11/2024	4:30	9.33	Pass	27.00	Failed
12/11/2024	5:00	8.00	Pass	30.50	Failed
12/11/2024	5:30	8.00	Pass	32.00	Failed
12/11/2024	6:00	4.50	Pass	34.50	Failed
12/11/2024	6:30	1.67	Pass	33.50	Failed
12/11/2024	7:00	2.83	Pass	33.00	Failed
12/11/2024	7:30	16.50	Pass	30.00	Failed
12/11/2024	8:00	11.17	Pass	24.67	Failed
12/11/2024	8:30	0.00	Pass	22.00	Failed
12/11/2024	9:00	0.00	Pass	20.50	Failed
12/11/2024	9:30	3.67	Pass	21.50	Failed
12/11/2024	10:00	44.83	Failed	56.67	Failed
12/11/2024	10:30	129.17	Failed	57.67	Failed
12/11/2024	11:00	256.83	Failed	50.83	Failed

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
12/11/2024	11:30	380.83	Failed	110.83	Failed
12/11/2024	12:00	526.33	Failed	138.33	Failed
12/11/2024	12:30	654.50	Failed	181.33	Failed
12/11/2024	13:00	750.33	Failed	106.33	Failed
12/11/2024	13:30	853.00	Failed	58.50	Failed
12/11/2024	14:00	818.00	Failed	295.33	Failed
12/11/2024	14:30	705.50	Failed	178.33	Failed
12/11/2024	15:00	626.00	Failed	396.33	Failed
12/11/2024	15:30	562.33	Failed	169.33	Failed

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
11/11/2024	16:00	22.00	Pass	20.00	Pass	3.00	Pass
11/11/2024	16:10	22.80	Pass	21.50	Pass	3.10	Pass
11/11/2024	16:20	21.00	Pass	18.90	Pass	3.20	Pass
11/11/2024	16:30	21.50	Pass	19.00	Pass	3.70	Pass
11/11/2024	16:40	21.00	Pass	18.50	Pass	4.20	Pass
11/11/2024	16:50	20.50	Pass	18.00	Pass	4.10	Pass
11/11/2024	17:00	20.00	Pass	18.00	Pass	4.00	Pass
11/11/2024	17:10	19.50	Pass	17.50	Pass	4.30	Pass
11/11/2024	17:20	18.50	Pass	16.50	Pass	2.50	Pass
11/11/2024	17:30	16.00	Pass	14.00	Pass	2.66	Pass
11/11/2024	17:40	12.50	Pass	11.00	Pass	2.33	Pass
11/11/2024	17:50	11.00	Pass	9.50	Pass	2.10	Pass
11/11/2024	18:00	9.55	Pass	8.25	Pass	0.00	Pass
11/11/2024	18:10	7.50	Pass	6.50	Pass	0.20	Pass
11/11/2024	18:20	6.00	Pass	5.50	Pass	0.10	Pass
11/11/2024	18:30	5.00	Pass	4.50	Pass	0.00	Pass
11/11/2024	18:40	3.50	Pass	3.50	Pass	0.00	Pass
11/11/2024	18:50	2.50	Pass	2.00	Pass	0.00	Pass
11/11/2024	19:00	12.80	Pass	6.30	Pass	1.23	Pass
11/11/2024	19:10	15.77	Pass	9.44	Pass	3.75	Pass
11/11/2024	19:20	17.97	Pass	15.64	Pass	4.25	Pass
11/11/2024	19:30	22.78	Pass	18.36	Pass	5.60	Pass
11/11/2024	19:40	27.59	Pass	20.13	Pass	6.78	Pass
11/11/2024	19:50	27.42	Pass	20.13	Pass	6.89	Pass
11/11/2024	20:00	28.10	Pass	20.89	Pass	6.95	Pass
11/11/2024	20:10	28.46	Pass	22.40	Pass	7.10	Pass
11/11/2024	20:20	27.44	Pass	21.98	Pass	6.44	Pass
11/11/2024	20:30	27.56	Pass	22.70	Pass	6.78	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
11/11/2024	20:40	27.10	Pass	21.70	Pass	6.30	Pass
11/11/2024	20:50	30.22	Pass	24.50	Pass	7.12	Pass
11/11/2024	21:00	31.55	Pass	25.70	Pass	7.18	Pass
11/11/2024	21:10	31.78	Pass	26.42	Pass	7.49	Pass
11/11/2024	21:20	29.45	Pass	25.79	Pass	7.23	Pass
11/11/2024	21:30	28.78	Pass	24.76	Pass	7.01	Pass
11/11/2024	21:40	28.33	Pass	22.10	Pass	6.40	Pass
11/11/2024	21:50	27.33	Pass	21.70	Pass	6.40	Pass
11/11/2024	22:00	27.12	Pass	21.50	Pass	6.10	Pass
11/11/2024	22:10	25.90	Pass	19.70	Pass	5.70	Pass
11/11/2024	22:20	25.80	Pass	19.70	Pass	5.50	Pass
11/11/2024	22:30	24.33	Pass	18.43	Pass	5.10	Pass
11/11/2024	22:40	23.78	Pass	18.10	Pass	4.75	Pass
11/11/2024	22:50	23.21	Pass	17.45	Pass	4.25	Pass
11/11/2024	23:00	23.12	Pass	17.45	Pass	4.12	Pass
11/11/2024	23:10	22.85	Pass	16.32	Pass	3.89	Pass
11/11/2024	23:20	22.85	Pass	16.23	Pass	3.85	Pass
11/11/2024	23:30	21.77	Pass	15.78	Pass	3.75	Pass
11/11/2024	23:40	21.10	Pass	15.30	Pass	3.27	Pass
11/11/2024	23:50	20.89	Pass	14.70	Pass	3.17	Pass
12/11/2024	0:00	19.90	Pass	14.45	Pass	3.10	Pass
12/11/2024	0:10	19.77	Pass	14.45	Pass	3.00	Pass
12/11/2024	0:20	19.50	Pass	17.50	Pass	2.78	Pass
12/11/2024	0:30	18.50	Pass	16.50	Pass	2.45	Pass
12/11/2024	0:40	16.00	Pass	14.00	Pass	2.10	Pass
12/11/2024	0:50	12.50	Pass	11.00	Pass	2.00	Pass
12/11/2024	1:00	11.00	Pass	10.50	Pass	2.12	Pass
12/11/2024	1:10	9.00	Pass	7.50	Pass	2.12	Pass
12/11/2024	1:20	8.77	Pass	6.31	Pass	1.45	Pass
12/11/2024	1:30	8.77	Pass	6.31	Pass	1.45	Pass
12/11/2024	1:40	8.79	Pass	6.45	Pass	1.49	Pass
12/11/2024	1:50	8.77	Pass	6.31	Pass	1.45	Pass
12/11/2024	2:00	10.45	Pass	7.49	Pass	2.20	Pass
12/11/2024	2:10	11.73	Pass	8.21	Pass	2.88	Pass
12/11/2024	2:20	12.45	Pass	9.66	Pass	3.12	Pass
12/11/2024	2:30	12.89	Pass	9.89	Pass	3.45	Pass
12/11/2024	2:40	13.78	Pass	10.45	Pass	3.46	Pass
12/11/2024	2:50	14.33	Pass	11.69	Pass	3.56	Pass
12/11/2024	3:00	15.78	Pass	12.45	Pass	3.89	Pass
12/11/2024	3:10	16.77	Pass	13.42	Pass	4.25	Pass
12/11/2024	3:20	15.50	Pass	14.00	Pass	4.65	Pass
12/11/2024	3:30	16.23	Pass	15.20	Pass	4.88	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
12/11/2024	3:40	16.77	Pass	15.20	Pass	4.88	Pass
12/11/2024	3:50	20.00	Pass	18.00	Pass	5.33	Pass
12/11/2024	4:00	21.00	Pass	18.50	Pass	5.33	Pass
12/11/2024	4:10	21.00	Pass	18.00	Pass	5.41	Pass
12/11/2024	4:20	20.50	Pass	18.00	Pass	5.35	Pass
12/11/2024	4:30	21.00	Pass	18.50	Pass	5.35	Pass
12/11/2024	4:40	20.50	Pass	18.00	Pass	5.32	Pass
12/11/2024	4:50	20.00	Pass	18.00	Pass	5.35	Pass
12/11/2024	5:00	27.59	Pass	20.13	Pass	6.78	Pass
12/11/2024	5:10	27.42	Pass	20.13	Pass	6.89	Pass
12/11/2024	5:20	28.10	Pass	20.89	Pass	6.95	Pass
12/11/2024	5:30	28.46	Pass	22.40	Pass	7.10	Pass
12/11/2024	5:40	27.44	Pass	21.98	Pass	6.44	Pass
12/11/2024	5:50	27.56	Pass	22.70	Pass	6.78	Pass
12/11/2024	6:00	27.10	Pass	21.70	Pass	6.30	Pass
12/11/2024	6:10	29.47	Pass	24.35	Pass	7.13	Pass
12/11/2024	6:20	31.55	Pass	25.70	Pass	7.18	Pass
12/11/2024	6:30	31.78	Pass	26.42	Pass	7.49	Pass
12/11/2024	6:40	30.45	Pass	25.89	Pass	7.10	Pass
12/11/2024	6:50	28.45	Pass	24.00	Pass	6.45	Pass
12/11/2024	7:00	25.66	Pass	23.15	Pass	6.12	Pass
12/11/2024	7:10	24.50	Pass	22.50	Pass	5.72	Pass
12/11/2024	7:20	24.00	Pass	22.00	Pass	5.54	Pass
12/11/2024	7:30	23.75	Pass	21.40	Pass	5.20	Pass
12/11/2024	7:40	18.78	Pass	16.40	Pass	3.40	Pass
12/11/2024	7:50	18.45	Pass	15.40	Pass	3.10	Pass
12/11/2024	8:00	15.78	Pass	13.78	Pass	2.24	Pass
12/11/2024	8:10	12.30	Pass	10.46	Pass	2.30	Pass
12/11/2024	8:20	10.90	Pass	8.64	Pass	2.10	Pass
12/11/2024	8:30	8.50	Pass	6.40	Pass	1.48	Pass
12/11/2024	8:40	4.00	Pass	3.50	Pass	1.50	Pass
12/11/2024	8:50	5.00	Pass	3.50	Pass	1.50	Pass
12/11/2024	9:00	6.50	Pass	6.00	Pass	1.50	Pass
12/11/2024	9:10	8.50	Pass	7.00	Pass	1.50	Pass
12/11/2024	9:20	9.50	Pass	7.50	Pass	1.50	Pass
12/11/2024	9:30	4.70	Pass	3.10	Pass	1.10	Pass
12/11/2024	9:40	2.10	Pass	1.70	Pass	0.45	Pass
12/11/2024	9:50	0.00	Pass	4.50	Pass	0.00	Pass
12/11/2024	10:00	1.00	Pass	1.00	Pass	1.00	Pass
12/11/2024	10:10	2.50	Pass	2.50	Pass	1.20	Pass
12/11/2024	10:20	4.00	Pass	3.50	Pass	1.45	Pass
12/11/2024	10:30	5.00	Pass	4.50	Pass	1.78	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
12/11/2024	10:40	6.50	Pass	6.00	Pass	2.12	Pass
12/11/2024	10:50	8.50	Pass	7.00	Pass	4.25	Pass
12/11/2024	11:00	9.50	Pass	8.50	Pass	4.65	Pass
12/11/2024	11:10	11.50	Pass	10.50	Pass	4.88	Pass
12/11/2024	11:20	13.50	Pass	12.00	Pass	4.88	Pass
12/11/2024	11:30	15.00	Pass	13.00	Pass	5.33	Pass
12/11/2024	11:40	16.00	Pass	14.50	Pass	5.33	Pass
12/11/2024	11:50	17.50	Pass	15.50	Pass	5.41	Pass
12/11/2024	12:00	18.50	Pass	16.50	Pass	5.35	Pass
12/11/2024	12:10	20.00	Pass	18.00	Pass	5.35	Pass
12/11/2024	12:20	21.00	Pass	18.50	Pass	5.32	Pass
12/11/2024	12:30	21.00	Pass	18.00	Pass	5.35	Pass
12/11/2024	12:40	20.50	Pass	18.00	Pass	3.00	Pass
12/11/2024	12:50	21.00	Pass	18.50	Pass	3.10	Pass
12/11/2024	13:00	20.50	Pass	18.00	Pass	3.20	Pass
12/11/2024	13:10	20.00	Pass	18.00	Pass	3.70	Pass
12/11/2024	13:20	19.50	Pass	17.50	Pass	4.20	Pass
12/11/2024	13:30	18.50	Pass	16.50	Pass	4.10	Pass
12/11/2024	13:40	16.00	Pass	14.00	Pass	4.00	Pass
12/11/2024	13:50	12.50	Pass	11.00	Pass	4.30	Pass
12/11/2024	14:00	11.00	Pass	9.50	Pass	2.50	Pass
12/11/2024	14:10	9.00	Pass	7.50	Pass	2.66	Pass
12/11/2024	14:20	7.50	Pass	6.50	Pass	2.33	Pass
12/11/2024	14:30	6.00	Pass	5.50	Pass	2.10	Pass
12/11/2024	14:40	5.00	Pass	4.50	Pass	2.10	Pass
12/11/2024	14:50	3.50	Pass	3.50	Pass	2.17	Pass
12/11/2024	15:00	2.50	Pass	2.00	Pass	2.32	Pass
12/11/2024	15:10	0.00	Pass	0.00	Pass	2.10	Pass
12/11/2024	15:20	18.50	Pass	15.80	Pass	2.15	Pass
12/11/2024	15:30	31.50	Pass	15.30	Pass	2.10	Pass
12/11/2024	15:40	0.00	Pass	19.70	Pass	3.14	Pass
12/11/2024	15:50	0.00	Pass	0.00	Pass	0.00	Pass

4.2.2 OMS-02

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
12/11/2024	18:00	282.60	Failed	188.40	Failed
12/11/2024	18:30	208.67	Failed	12.83	Failed
12/11/2024	19:00	167.17	Failed	0.17	Pass
12/11/2024	19:30	140.00	Failed	0.00	Pass
12/11/2024	20:00	123.00	Failed	0.00	Pass
12/11/2024	20:30	109.17	Failed	0.00	Pass
12/11/2024	21:00	98.50	Failed	0.00	Pass
12/11/2024	21:30	88.00	Failed	0.00	Pass
12/11/2024	22:00	82.67	Failed	0.00	Pass
12/11/2024	22:30	73.50	Failed	0.17	Pass
12/11/2024	23:00	72.00	Failed	6.83	Pass
12/11/2024	23:30	73.00	Failed	11.33	Failed
13/11/2024	0:00	71.00	Failed	12.50	Failed
13/11/2024	0:30	62.00	Failed	11.33	Failed
13/11/2024	1:00	58.33	Failed	14.00	Failed
13/11/2024	1:30	55.83	Failed	30.50	Failed
13/11/2024	2:00	51.00	Failed	68.83	Failed
13/11/2024	2:30	45.00	Failed	47.83	Failed
13/11/2024	3:00	41.00	Failed	44.50	Failed
13/11/2024	3:30	39.00	Failed	82.67	Failed
13/11/2024	4:00	36.33	Failed	34.33	Failed
13/11/2024	4:30	33.33	Failed	24.00	Failed
13/11/2024	5:00	27.00	Pass	25.00	Failed
13/11/2024	5:30	28.00	Pass	27.00	Failed
13/11/2024	6:00	28.50	Pass	29.00	Failed
13/11/2024	6:30	22.50	Pass	28.50	Failed
13/11/2024	7:00	21.50	Pass	31.00	Failed
13/11/2024	7:30	29.00	Pass	31.50	Failed
13/11/2024	8:00	29.50	Pass	25.83	Failed
13/11/2024	8:30	19.50	Pass	20.00	Failed
13/11/2024	9:00	27.17	Pass	201.33	Failed
13/11/2024	9:30	58.00	Failed	273.33	Failed
13/11/2024	10:00	116.00	Failed	54.17	Failed
13/11/2024	10:30	191.50	Failed	28.17	Failed
13/11/2024	11:00	281.83	Failed	23.67	Failed
13/11/2024	11:30	369.33	Failed	20.33	Failed
13/11/2024	12:00	437.67	Failed	16.17	Failed
13/11/2024	12:30	479.33	Failed	7.33	Failed
13/11/2024	13:00	535.33	Failed	9.50	Failed
13/11/2024	13:30	565.00	Failed	1.00	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
13/11/2024	14:00	641.33	Failed	13.50	Failed
13/11/2024	14:30	673.17	Failed	3.67	Pass
13/11/2024	15:00	625.00	Failed	0.50	Pass
13/11/2024	15:30	555.17	Failed	0.50	Pass
13/11/2024	16:00	495.17	Failed	1.83	Pass
13/11/2024	16:30	433.17	Failed	5.00	Pass
13/11/2024	17:00	378.17	Failed	7.00	Pass
13/11/2024	17:30	332.00	Failed	14.00	Failed

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
12/11/2024	17:40	9.30	Pass	8.40	Pass	3.06	Pass
12/11/2024	17:50	11.00	Pass	7.90	Pass	2.10	Pass
12/11/2024	18:00	15.30	Pass	7.60	Pass	1.90	Pass
12/11/2024	18:10	19.20	Pass	9.40	Pass	1.60	Pass
12/11/2024	18:20	22.90	Pass	11.26	Pass	0.80	Pass
12/11/2024	18:30	20.10	Pass	12.60	Pass	0.60	Pass
12/11/2024	18:40	18.30	Pass	14.56	Pass	0.90	Pass
12/11/2024	18:50	16.30	Pass	13.90	Pass	0.40	Pass
12/11/2024	19:00	12.80	Pass	13.45	Pass	0.00	Pass
12/11/2024	19:10	17.50	Pass	14.82	Pass	0.00	Pass
12/11/2024	19:20	16.94	Pass	14.21	Pass	0.00	Pass
12/11/2024	19:30	18.34	Pass	15.02	Pass	0.68	Pass
12/11/2024	19:40	21.70	Pass	17.64	Pass	1.40	Pass
12/11/2024	19:50	22.30	Pass	16.80	Pass	0.90	Pass
12/11/2024	20:00	23.40	Pass	17.90	Pass	0.64	Pass
12/11/2024	20:10	22.80	Pass	18.57	Pass	1.20	Pass
12/11/2024	20:20	22.60	Pass	19.24	Pass	1.94	Pass
12/11/2024	20:30	21.80	Pass	19.86	Pass	2.14	Pass
12/11/2024	20:40	23.60	Pass	17.06	Pass	2.68	Pass
12/11/2024	20:50	25.31	Pass	16.84	Pass	2.91	Pass
12/11/2024	21:00	26.54	Pass	16.32	Pass	2.18	Pass
12/11/2024	21:10	27.24	Pass	14.92	Pass	3.49	Pass
12/11/2024	21:20	29.45	Pass	15.42	Pass	4.31	Pass
12/11/2024	21:30	28.21	Pass	13.86	Pass	4.68	Pass
12/11/2024	21:40	27.26	Pass	12.14	Pass	4.92	Pass
12/11/2024	21:50	27.13	Pass	11.28	Pass	5.21	Pass
12/11/2024	22:00	25.20	Pass	9.68	Pass	5.64	Pass
12/11/2024	22:10	23.14	Pass	8.04	Pass	5.70	Pass
12/11/2024	22:20	24.34	Pass	7.92	Pass	5.50	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
12/11/2024	22:30	21.36	Pass	5.26	Pass	5.90	Pass
12/11/2024	22:40	19.24	Pass	8.64	Pass	6.40	Pass
12/11/2024	22:50	17.20	Pass	10.65	Pass	6.86	Pass
12/11/2024	23:00	15.04	Pass	11.86	Pass	5.20	Pass
12/11/2024	23:10	12.18	Pass	9.24	Pass	3.89	Pass
12/11/2024	23:20	13.85	Pass	9.56	Pass	3.85	Pass
12/11/2024	23:30	15.78	Pass	10.05	Pass	3.75	Pass
12/11/2024	23:40	15.30	Pass	9.86	Pass	2.94	Pass
12/11/2024	23:50	16.96	Pass	10.15	Pass	2.16	Pass
13/11/2024	0:00	14.20	Pass	9.42	Pass	1.94	Pass
13/11/2024	0:10	14.45	Pass	9.05	Pass	1.62	Pass
13/11/2024	0:20	16.57	Pass	8.86	Pass	1.26	Pass
13/11/2024	0:30	16.09	Pass	9.05	Pass	0.95	Pass
13/11/2024	0:40	15.46	Pass	10.24	Pass	0.42	Pass
13/11/2024	0:50	14.36	Pass	11.26	Pass	0.00	Pass
13/11/2024	1:00	13.24	Pass	10.86	Pass	0.00	Pass
13/11/2024	1:10	11.96	Pass	9.53	Pass	0.00	Pass
13/11/2024	1:20	9.32	Pass	8.06	Pass	0.45	Pass
13/11/2024	1:30	8.36	Pass	7.54	Pass	0.62	Pass
13/11/2024	1:40	7.45	Pass	5.94	Pass	0.91	Pass
13/11/2024	1:50	8.31	Pass	6.25	Pass	1.10	Pass
13/11/2024	2:00	9.10	Pass	7.49	Pass	1.29	Pass
13/11/2024	2:10	11.34	Pass	8.21	Pass	2.64	Pass
13/11/2024	2:20	14.62	Pass	9.06	Pass	2.34	Pass
13/11/2024	2:30	13.50	Pass	9.89	Pass	2.86	Pass
13/11/2024	2:40	15.64	Pass	11.23	Pass	3.16	Pass
13/11/2024	2:50	17.62	Pass	12.39	Pass	3.56	Pass
13/11/2024	3:00	19.02	Pass	12.45	Pass	3.96	Pass
13/11/2024	3:10	21.34	Pass	13.42	Pass	4.08	Pass
13/11/2024	3:20	23.15	Pass	13.76	Pass	4.67	Pass
13/11/2024	3:30	25.72	Pass	14.09	Pass	5.68	Pass
13/11/2024	3:40	26.77	Pass	14.75	Pass	6.24	Pass
13/11/2024	3:50	28.45	Pass	15.12	Pass	6.84	Pass
13/11/2024	4:00	24.53	Pass	15.94	Pass	7.64	Pass
13/11/2024	4:10	21.03	Pass	12.53	Pass	7.98	Pass
13/11/2024	4:20	20.50	Pass	11.55	Pass	8.26	Pass
13/11/2024	4:30	19.64	Pass	10.50	Pass	8.02	Pass
13/11/2024	4:40	18.24	Pass	9.00	Pass	7.94	Pass
13/11/2024	4:50	16.24	Pass	8.75	Pass	6.35	Pass
13/11/2024	5:00	14.34	Pass	7.00	Pass	5.94	Pass
13/11/2024	5:10	11.05	Pass	6.13	Pass	5.21	Pass
13/11/2024	5:20	9.21	Pass	5.05	Pass	4.93	Pass
13/11/2024	5:30	8.62	Pass	3.61	Pass	3.21	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
13/11/2024	5:40	5.28	Pass	1.67	Pass	2.65	Pass
13/11/2024	5:50	3.06	Pass	0.00	Pass	2.04	Pass
13/11/2024	6:00	0.00	Pass	0.00	Pass	1.65	Pass
13/11/2024	6:10	0.00	Pass	0.00	Pass	1.20	Pass
13/11/2024	6:20	0.00	Pass	0.00	Pass	0.00	Pass
13/11/2024	6:30	1.30	Pass	0.00	Pass	0.00	Pass
13/11/2024	6:40	1.50	Pass	2.30	Pass	0.00	Pass
13/11/2024	6:50	2.05	Pass	1.90	Pass	0.00	Pass
13/11/2024	7:00	2.97	Pass	0.00	Pass	0.61	Pass
13/11/2024	7:10	4.65	Pass	0.00	Pass	0.95	Pass
13/11/2024	7:20	7.16	Pass	0.60	Pass	1.45	Pass
13/11/2024	7:30	13.24	Pass	1.40	Pass	2.20	Pass
13/11/2024	7:40	15.37	Pass	1.80	Pass	2.40	Pass
13/11/2024	7:50	16.21	Pass	2.20	Pass	3.10	Pass
13/11/2024	8:00	17.51	Pass	2.90	Pass	3.65	Pass
13/11/2024	8:10	18.16	Pass	4.10	Pass	3.95	Pass
13/11/2024	8:20	17.66	Pass	5.61	Pass	4.10	Pass
13/11/2024	8:30	18.14	Pass	8.12	Pass	4.64	Pass
13/11/2024	8:40	16.24	Pass	10.24	Pass	3.86	Pass
13/11/2024	8:50	15.23	Pass	13.50	Pass	3.15	Pass
13/11/2024	9:00	13.20	Pass	9.26	Pass	2.60	Pass
13/11/2024	9:10	14.80	Pass	7.00	Pass	1.80	Pass
13/11/2024	9:20	14.03	Pass	6.21	Pass	1.24	Pass
13/11/2024	9:30	13.64	Pass	4.98	Pass	1.10	Pass
13/11/2024	9:40	11.28	Pass	3.70	Pass	0.30	Pass
13/11/2024	9:50	9.20	Pass	2.94	Pass	0.00	Pass
13/11/2024	10:00	7.64	Pass	2.08	Pass	1.00	Pass
13/11/2024	10:10	2.50	Pass	2.50	Pass	1.20	Pass
13/11/2024	10:20	4.00	Pass	1.86	Pass	1.98	Pass
13/11/2024	10:30	5.20	Pass	0.40	Pass	2.16	Pass
13/11/2024	10:40	7.10	Pass	0.00	Pass	2.58	Pass
13/11/2024	10:50	7.90	Pass	0.00	Pass	3.25	Pass
13/11/2024	11:00	8.20	Pass	1.34	Pass	4.18	Pass
13/11/2024	11:10	10.23	Pass	2.65	Pass	4.85	Pass
13/11/2024	11:20	11.00	Pass	3.74	Pass	5.23	Pass
13/11/2024	11:30	12.40	Pass	4.26	Pass	5.86	Pass
13/11/2024	11:40	14.00	Pass	5.14	Pass	6.25	Pass
13/11/2024	11:50	13.50	Pass	6.15	Pass	6.41	Pass
13/11/2024	12:00	16.28	Pass	8.10	Pass	6.35	Pass
13/11/2024	12:10	19.40	Pass	9.26	Pass	6.12	Pass
13/11/2024	12:20	21.00	Pass	11.20	Pass	5.64	Pass
13/11/2024	12:30	22.00	Pass	13.80	Pass	4.95	Pass
13/11/2024	12:40	21.50	Pass	15.90	Pass	4.23	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
13/11/2024	12:50	23.64	Pass	17.54	Pass	3.95	Pass
13/11/2024	13:00	24.12	Pass	18.65	Pass	3.20	Pass
13/11/2024	13:10	22.80	Pass	18.00	Pass	2.60	Pass
13/11/2024	13:20	21.90	Pass	17.50	Pass	2.10	Pass
13/11/2024	13:30	19.60	Pass	16.50	Pass	3.68	Pass
13/11/2024	13:40	17.00	Pass	14.00	Pass	3.42	Pass
13/11/2024	13:50	16.50	Pass	10.60	Pass	3.12	Pass
13/11/2024	14:00	12.00	Pass	9.50	Pass	2.98	Pass
13/11/2024	14:10	11.70	Pass	7.60	Pass	2.31	Pass
13/11/2024	14:20	11.00	Pass	6.40	Pass	2.33	Pass
13/11/2024	14:30	9.00	Pass	4.50	Pass	1.90	Pass
13/11/2024	14:40	6.50	Pass	3.80	Pass	1.25	Pass
13/11/2024	14:50	6.20	Pass	3.50	Pass	0.96	Pass
13/11/2024	15:00	6.00	Pass	2.80	Pass	0.00	Pass
13/11/2024	15:10	5.80	Pass	0.00	Pass	0.00	Pass
13/11/2024	15:20	5.40	Pass	0.00	Pass	0.00	Pass
13/11/2024	15:30	4.90	Pass	0.00	Pass	0.00	Pass
13/11/2024	15:40	3.60	Pass	0.68	Pass	0.00	Pass
13/11/2024	15:50	2.10	Pass	1.86	Pass	0.00	Pass
13/11/2024	16:00	2.94	Pass	2.24	Pass	0.45	Pass
13/11/2024	16:10	3.65	Pass	2.96	Pass	0.98	Pass
13/11/2024	16:20	4.26	Pass	3.56	Pass	1.25	Pass
13/11/2024	16:30	5.94	Pass	5.12	Pass	1.91	Pass
13/11/2024	16:40	7.32	Pass	6.05	Pass	2.20	Pass
13/11/2024	16:50	9.50	Pass	6.54	Pass	2.50	Pass
13/11/2024	17:00	11.64	Pass	6.75	Pass	2.60	Pass
13/11/2024	17:10	10.24	Pass	5.91	Pass	1.80	Pass
13/11/2024	17:20	8.56	Pass	5.42	Pass	1.22	Pass
13/11/2024	17:30	6.24	Pass	4.94	Pass	0.80	Pass

4.2.3 OMS-03

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
13/11/2024	18:30	255.17	Failed	30.00	Failed
13/11/2024	19:00	155.17	Failed	10.17	Failed
13/11/2024	19:30	115.83	Failed	13.00	Failed
13/11/2024	20:00	100.00	Failed	14.00	Failed
13/11/2024	20:30	93.00	Failed	12.00	Failed
13/11/2024	21:00	87.50	Failed	15.50	Failed
13/11/2024	21:30	80.00	Failed	12.83	Failed
13/11/2024	22:00	76.00	Failed	8.50	Failed
13/11/2024	22:30	71.00	Failed	8.50	Failed
13/11/2024	23:00	66.50	Failed	18.33	Failed
13/11/2024	23:30	57.00	Failed	19.17	Failed
14/11/2024	0:00	60.00	Failed	22.83	Failed
14/11/2024	0:30	49.00	Failed	20.00	Failed
14/11/2024	1:00	39.00	Failed	22.83	Failed
14/11/2024	1:30	40.00	Failed	23.50	Failed
14/11/2024	2:00	40.50	Failed	24.33	Failed
14/11/2024	2:30	35.00	Failed	21.00	Failed
14/11/2024	3:00	31.00	Failed	21.00	Failed
14/11/2024	3:30	27.50	Pass	21.00	Failed
14/11/2024	4:00	25.50	Pass	21.00	Failed
14/11/2024	4:30	21.50	Pass	22.00	Failed
14/11/2024	5:00	16.50	Pass	20.00	Failed
14/11/2024	5:30	17.00	Pass	21.83	Failed
14/11/2024	6:00	12.83	Pass	18.00	Failed
14/11/2024	6:30	13.00	Pass	15.00	Failed
14/11/2024	7:00	16.50	Pass	13.00	Failed
14/11/2024	7:30	20.50	Pass	15.00	Failed
14/11/2024	8:00	25.00	Pass	11.33	Failed
14/11/2024	8:30	28.00	Pass	5.83	Pass
14/11/2024	9:00	26.00	Pass	3.50	Pass
14/11/2024	9:30	38.67	Failed	3.83	Pass
14/11/2024	10:00	67.17	Failed	6.50	Pass
14/11/2024	10:30	112.67	Failed	10.50	Failed
14/11/2024	11:00	178.00	Failed	22.50	Failed
14/11/2024	11:30	256.00	Failed	18.00	Failed
14/11/2024	12:00	340.67	Failed	18.00	Failed
14/11/2024	12:30	424.17	Failed	12.17	Failed
14/11/2024	13:00	495.17	Failed	6.83	Pass
14/11/2024	13:30	585.83	Failed	5.83	Pass
14/11/2024	14:00	627.00	Failed	0.17	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
14/11/2024	14:30	649.83	Failed	1.67	Pass
14/11/2024	15:00	647.33	Failed	2.17	Pass
14/11/2024	15:30	615.17	Failed	6.33	Pass
14/11/2024	16:00	560.83	Failed	10.50	Failed
14/11/2024	16:30	488.83	Failed	18.17	Failed
14/11/2024	17:00	412.83	Failed	19.50	Failed
14/11/2024	17:30	330.00	Failed	23.00	Failed
14/11/2024	18:00	275.25	Failed	25.00	Failed

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
13/11/2024	18:10	3.00	Pass	2.00	Pass	0.00	Pass
13/11/2024	18:20	1.61	Pass	15.46	Pass	0.42	Pass
13/11/2024	18:30	2.54	Pass	14.36	Pass	0.00	Pass
13/11/2024	18:40	5.60	Pass	13.24	Pass	0.00	Pass
13/11/2024	18:50	6.20	Pass	11.96	Pass	0.00	Pass
13/11/2024	19:00	8.77	Pass	9.32	Pass	0.45	Pass
13/11/2024	19:10	7.24	Pass	8.36	Pass	0.62	Pass
13/11/2024	19:20	8.48	Pass	7.45	Pass	0.91	Pass
13/11/2024	19:30	7.60	Pass	8.31	Pass	1.10	Pass
13/11/2024	19:40	9.10	Pass	7.49	Pass	1.29	Pass
13/11/2024	19:50	11.34	Pass	8.21	Pass	2.64	Pass
13/11/2024	20:00	14.62	Pass	9.06	Pass	2.34	Pass
13/11/2024	20:10	13.50	Pass	9.89	Pass	2.86	Pass
13/11/2024	20:20	15.64	Pass	11.23	Pass	3.16	Pass
13/11/2024	20:30	17.62	Pass	12.39	Pass	3.56	Pass
13/11/2024	20:40	19.02	Pass	12.45	Pass	3.96	Pass
13/11/2024	20:50	21.34	Pass	13.42	Pass	4.08	Pass
13/11/2024	21:00	24.15	Pass	14.76	Pass	4.67	Pass
13/11/2024	21:10	25.72	Pass	14.09	Pass	5.68	Pass
13/11/2024	21:20	26.77	Pass	14.75	Pass	6.24	Pass
13/11/2024	21:30	35.45	Pass	15.12	Pass	6.84	Pass
13/11/2024	21:40	24.53	Pass	15.94	Pass	7.64	Pass
13/11/2024	21:50	21.03	Pass	12.53	Pass	7.98	Pass
13/11/2024	22:00	20.50	Pass	11.55	Pass	7.26	Pass
13/11/2024	22:10	19.64	Pass	10.50	Pass	7.02	Pass
13/11/2024	22:20	18.24	Pass	9.00	Pass	7.94	Pass
13/11/2024	22:30	24.24	Pass	8.75	Pass	6.35	Pass
13/11/2024	22:40	14.34	Pass	12.36	Pass	5.94	Pass
13/11/2024	22:50	11.05	Pass	6.13	Pass	5.21	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
13/11/2024	23:00	9.21	Pass	5.05	Pass	4.93	Pass
13/11/2024	23:10	8.62	Pass	3.61	Pass	3.21	Pass
13/11/2024	23:20	5.28	Pass	1.67	Pass	1.65	Pass
13/11/2024	23:30	7.10	Pass	0.00	Pass	2.58	Pass
13/11/2024	23:40	7.90	Pass	0.00	Pass	3.25	Pass
13/11/2024	23:50	8.20	Pass	1.34	Pass	4.18	Pass
14/11/2024	0:00	10.23	Pass	2.65	Pass	4.98	Pass
14/11/2024	0:10	11.00	Pass	3.74	Pass	5.23	Pass
14/11/2024	0:20	12.40	Pass	4.26	Pass	5.86	Pass
14/11/2024	0:30	14.00	Pass	5.14	Pass	6.25	Pass
14/11/2024	0:40	13.50	Pass	6.15	Pass	6.41	Pass
14/11/2024	0:50	16.28	Pass	8.10	Pass	6.35	Pass
14/11/2024	1:00	19.40	Pass	9.26	Pass	6.12	Pass
14/11/2024	1:10	21.00	Pass	14.20	Pass	5.64	Pass
14/11/2024	1:20	22.00	Pass	13.80	Pass	4.95	Pass
14/11/2024	1:30	21.50	Pass	15.90	Pass	4.23	Pass
14/11/2024	1:40	26.64	Pass	17.54	Pass	3.95	Pass
14/11/2024	1:50	24.12	Pass	18.65	Pass	3.20	Pass
14/11/2024	2:00	22.80	Pass	18.00	Pass	2.60	Pass
14/11/2024	2:10	27.90	Pass	17.50	Pass	2.10	Pass
14/11/2024	2:20	19.60	Pass	16.50	Pass	3.68	Pass
14/11/2024	2:30	18.21	Pass	14.00	Pass	3.42	Pass
14/11/2024	2:40	16.50	Pass	10.60	Pass	3.12	Pass
14/11/2024	2:50	15.38	Pass	11.50	Pass	3.11	Pass
14/11/2024	3:00	11.70	Pass	7.60	Pass	2.31	Pass
14/11/2024	3:10	8.65	Pass	5.55	Pass	1.88	Pass
14/11/2024	3:20	9.00	Pass	4.50	Pass	1.90	Pass
14/11/2024	3:30	7.50	Pass	6.50	Pass	2.33	Pass
14/11/2024	3:40	6.00	Pass	5.50	Pass	2.10	Pass
14/11/2024	3:50	5.00	Pass	4.50	Pass	2.10	Pass
14/11/2024	4:00	3.50	Pass	3.50	Pass	2.17	Pass
14/11/2024	4:10	2.50	Pass	2.00	Pass	2.32	Pass
14/11/2024	4:20	0.00	Pass	0.00	Pass	2.10	Pass
14/11/2024	4:30	18.50	Pass	15.80	Pass	2.15	Pass
14/11/2024	4:40	31.50	Pass	15.30	Pass	2.10	Pass
14/11/2024	4:50	0.00	Pass	19.70	Pass	3.14	Pass
14/11/2024	5:00	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	5:10	1.00	Pass	1.00	Pass	1.00	Pass
14/11/2024	5:20	2.50	Pass	2.50	Pass	1.20	Pass
14/11/2024	5:30	4.00	Pass	3.50	Pass	1.45	Pass
14/11/2024	5:40	5.00	Pass	4.50	Pass	1.78	Pass
14/11/2024	5:50	6.50	Pass	6.00	Pass	2.12	Pass
14/11/2024	6:00	8.50	Pass	7.00	Pass	4.25	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
14/11/2024	6:10	9.50	Pass	8.50	Pass	4.65	Pass
14/11/2024	6:20	11.50	Pass	10.50	Pass	4.88	Pass
14/11/2024	6:30	13.50	Pass	12.00	Pass	4.88	Pass
14/11/2024	6:40	15.00	Pass	13.00	Pass	5.33	Pass
14/11/2024	6:50	16.00	Pass	14.50	Pass	5.33	Pass
14/11/2024	7:00	17.50	Pass	15.50	Pass	5.41	Pass
14/11/2024	7:10	18.50	Pass	16.50	Pass	5.35	Pass
14/11/2024	7:20	20.00	Pass	18.00	Pass	5.35	Pass
14/11/2024	7:30	21.00	Pass	18.50	Pass	5.32	Pass
14/11/2024	7:40	21.00	Pass	18.00	Pass	5.35	Pass
14/11/2024	7:50	20.50	Pass	18.00	Pass	3.00	Pass
14/11/2024	8:00	21.00	Pass	18.50	Pass	3.10	Pass
14/11/2024	8:10	20.50	Pass	18.00	Pass	3.20	Pass
14/11/2024	8:20	21.00	Pass	18.50	Pass	5.35	Pass
14/11/2024	8:30	20.50	Pass	18.00	Pass	5.32	Pass
14/11/2024	8:40	20.00	Pass	18.00	Pass	5.35	Pass
14/11/2024	8:50	27.59	Pass	20.13	Pass	6.78	Pass
14/11/2024	9:00	27.42	Pass	20.13	Pass	6.89	Pass
14/11/2024	9:10	28.10	Pass	20.89	Pass	6.95	Pass
14/11/2024	9:20	28.46	Pass	22.40	Pass	7.10	Pass
14/11/2024	9:30	27.44	Pass	21.98	Pass	6.44	Pass
14/11/2024	9:40	27.56	Pass	22.70	Pass	6.78	Pass
14/11/2024	9:50	27.10	Pass	21.70	Pass	6.30	Pass
14/11/2024	10:00	29.47	Pass	24.35	Pass	7.13	Pass
14/11/2024	10:10	31.55	Pass	25.70	Pass	7.18	Pass
14/11/2024	10:20	31.78	Pass	26.42	Pass	7.49	Pass
14/11/2024	10:30	15.47	Pass	10.78	Pass	5.46	Pass
14/11/2024	10:40	0.50	Pass	0.50	Pass	0.00	Pass
14/11/2024	10:50	3.50	Pass	3.00	Pass	0.27	Pass
14/11/2024	11:00	5.50	Pass	5.00	Pass	1.23	Pass
14/11/2024	11:10	7.50	Pass	7.00	Pass	1.25	Pass
14/11/2024	11:20	9.50	Pass	8.50	Pass	1.55	Pass
14/11/2024	11:30	10.50	Pass	9.50	Pass	1.69	Pass
14/11/2024	11:40	12.00	Pass	10.50	Pass	1.47	Pass
14/11/2024	11:50	13.00	Pass	11.00	Pass	2.47	Pass
14/11/2024	12:00	13.00	Pass	11.00	Pass	2.31	Pass
14/11/2024	12:10	13.00	Pass	12.00	Pass	2.44	Pass
14/11/2024	12:20	13.50	Pass	12.00	Pass	2.76	Pass
14/11/2024	12:30	14.00	Pass	12.50	Pass	2.54	Pass
14/11/2024	12:40	15.00	Pass	13.00	Pass	2.45	Pass
14/11/2024	12:50	16.00	Pass	14.50	Pass	2.64	Pass
14/11/2024	13:00	17.00	Pass	15.00	Pass	2.55	Pass
14/11/2024	13:10	18.00	Pass	16.00	Pass	2.78	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
14/11/2024	13:20	18.00	Pass	16.00	Pass	2.47	Pass
14/11/2024	13:30	18.00	Pass	16.00	Pass	2.98	Pass
14/11/2024	13:40	18.00	Pass	16.00	Pass	2.84	Pass
14/11/2024	13:50	17.00	Pass	15.00	Pass	2.55	Pass
14/11/2024	14:00	17.00	Pass	15.00	Pass	2.44	Pass
14/11/2024	14:10	16.50	Pass	15.00	Pass	2.35	Pass
14/11/2024	14:20	16.00	Pass	14.00	Pass	2.44	Pass
14/11/2024	14:30	15.00	Pass	13.00	Pass	2.78	Pass
14/11/2024	14:40	14.00	Pass	12.50	Pass	2.45	Pass
14/11/2024	14:50	13.00	Pass	12.00	Pass	2.31	Pass
14/11/2024	15:00	12.00	Pass	10.50	Pass	2.35	Pass
14/11/2024	15:10	11.00	Pass	10.00	Pass	2.22	Pass
14/11/2024	15:20	9.00	Pass	8.50	Pass	1.85	Pass
14/11/2024	15:30	8.50	Pass	7.50	Pass	1.65	Pass
14/11/2024	15:40	6.50	Pass	6.00	Pass	1.45	Pass
14/11/2024	15:50	4.50	Pass	4.50	Pass	1.20	Pass
14/11/2024	16:00	3.50	Pass	3.00	Pass	1.10	Pass
14/11/2024	16:10	1.00	Pass	1.50	Pass	1.10	Pass
14/11/2024	16:20	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	16:30	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	16:40	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	16:50	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:00	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:10	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:20	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:30	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:40	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	17:50	0.00	Pass	0.00	Pass	0.00	Pass
14/11/2024	18:00	0.00	Pass	0.00	Pass	0.00	Pass

4.2.4 OMS-04

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
14/11/2024	19:30	169.83	Failed	8.50	Failed
14/11/2024	20:00	91.83	Failed	0.00	Pass
14/11/2024	20:30	75.67	Failed	1.50	Pass
14/11/2024	21:00	79.67	Failed	7.50	Failed
14/11/2024	21:30	73.50	Failed	6.00	Pass
14/11/2024	22:00	60.17	Failed	3.00	Pass
14/11/2024	22:30	56.33	Failed	9.83	Failed
14/11/2024	23:00	54.67	Failed	11.83	Failed
14/11/2024	23:30	51.00	Failed	18.17	Failed
15/11/2024	0:00	49.00	Failed	18.50	Failed
15/11/2024	0:30	37.67	Failed	23.50	Failed
15/11/2024	1:00	46.00	Failed	20.50	Failed
15/11/2024	1:30	36.83	Failed	17.67	Failed
15/11/2024	2:00	36.00	Failed	20.00	Failed
15/11/2024	2:30	22.00	Pass	19.50	Failed
15/11/2024	3:00	20.50	Pass	40.33	Failed
15/11/2024	3:30	19.00	Pass	68.83	Failed
15/11/2024	4:00	12.17	Pass	56.67	Failed
15/11/2024	4:30	5.00	Pass	50.50	Failed
15/11/2024	5:00	1.33	Pass	50.33	Failed
15/11/2024	5:30	2.00	Pass	62.83	Failed
15/11/2024	6:00	0.67	Pass	37.83	Failed
15/11/2024	6:30	0.00	Pass	17.00	Failed
15/11/2024	7:00	0.00	Pass	14.00	Failed
15/11/2024	7:30	0.67	Pass	12.00	Failed
15/11/2024	8:00	0.33	Pass	11.33	Failed
15/11/2024	8:30	0.00	Pass	16.50	Failed
15/11/2024	9:00	0.00	Pass	26.33	Failed
15/11/2024	9:30	1.17	Pass	30.50	Failed
15/11/2024	10:00	26.67	Pass	12.83	Failed
15/11/2024	10:30	63.83	Pass	0.83	Pass
15/11/2024	11:00	110.33	Failed	1.17	Pass
15/11/2024	11:30	180.17	Failed	1.00	Pass
15/11/2024	12:00	247.33	Failed	3.50	Pass
15/11/2024	12:30	290.67	Failed	2.00	Pass
15/11/2024	13:00	316.33	Failed	1.00	Pass
15/11/2024	13:30	349.17	Failed	2.00	Pass
15/11/2024	14:00	370.50	Failed	1.17	Pass
15/11/2024	14:30	379.83	Failed	0.00	Pass
15/11/2024	15:00	393.83	Failed	0.17	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
15/11/2024	15:30	386.00	Failed	0.33	Pass
15/11/2024	16:00	371.67	Failed	1.17	Pass
15/11/2024	16:30	320.83	Failed	0.00	Pass
15/11/2024	17:00	292.67	Failed	0.17	Pass
15/11/2024	17:30	259.33	Failed	0.17	Pass
15/11/2024	18:00	230.17	Failed	0.00	Pass
15/11/2024	18:30	194.17	Failed	0.33	Pass
15/11/2024	19:00	157.50	Failed	0.17	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
14/11/2024	19:10	3.10	Pass	1.40	Pass	2.34	Pass
14/11/2024	19:20	6.42	Pass	3.26	Pass	2.86	Pass
14/11/2024	19:30	7.23	Pass	4.25	Pass	3.20	Pass
14/11/2024	19:40	7.80	Pass	4.86	Pass	2.98	Pass
14/11/2024	19:50	9.02	Pass	4.92	Pass	2.65	Pass
14/11/2024	20:00	10.95	Pass	5.45	Pass	2.31	Pass
14/11/2024	20:10	11.45	Pass	6.75	Pass	2.58	Pass
14/11/2024	20:20	11.36	Pass	6.94	Pass	2.86	Pass
14/11/2024	20:30	11.74	Pass	7.24	Pass	3.16	Pass
14/11/2024	20:40	12.13	Pass	7.86	Pass	3.58	Pass
14/11/2024	20:50	12.84	Pass	8.21	Pass	3.75	Pass
14/11/2024	21:00	12.75	Pass	9.18	Pass	4.18	Pass
14/11/2024	21:10	13.20	Pass	9.56	Pass	4.65	Pass
14/11/2024	21:20	15.41	Pass	10.23	Pass	4.98	Pass
14/11/2024	21:30	17.20	Pass	10.86	Pass	5.06	Pass
14/11/2024	21:40	19.68	Pass	11.94	Pass	5.24	Pass
14/11/2024	21:50	21.03	Pass	12.65	Pass	5.68	Pass
14/11/2024	22:00	20.30	Pass	14.23	Pass	6.03	Pass
14/11/2024	22:10	21.90	Pass	14.95	Pass	5.94	Pass
14/11/2024	22:20	21.60	Pass	15.31	Pass	5.96	Pass
14/11/2024	22:30	22.03	Pass	16.32	Pass	5.82	Pass
14/11/2024	22:40	22.45	Pass	14.92	Pass	6.42	Pass
14/11/2024	22:50	22.95	Pass	15.42	Pass	6.51	Pass
14/11/2024	23:00	23.02	Pass	13.86	Pass	6.91	Pass
14/11/2024	23:10	25.16	Pass	12.14	Pass	7.03	Pass
14/11/2024	23:20	24.35	Pass	11.28	Pass	7.23	Pass
14/11/2024	23:30	25.12	Pass	9.68	Pass	6.95	Pass
14/11/2024	23:40	26.08	Pass	8.04	Pass	6.82	Pass
14/11/2024	23:50	24.32	Pass	7.92	Pass	5.02	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
15/11/2024	0:00	23.48	Pass	5.26	Pass	4.91	Pass
15/11/2024	0:10	23.01	Pass	8.64	Pass	2.31	Pass
15/11/2024	0:20	21.98	Pass	10.65	Pass	2.03	Pass
15/11/2024	0:30	21.56	Pass	11.86	Pass	1.66	Pass
15/11/2024	0:40	21.24	Pass	12.64	Pass	1.25	Pass
15/11/2024	0:50	20.14	Pass	13.85	Pass	0.96	Pass
15/11/2024	1:00	19.50	Pass	15.78	Pass	0.43	Pass
15/11/2024	1:10	19.46	Pass	15.30	Pass	0.02	Pass
15/11/2024	1:20	18.86	Pass	16.96	Pass	0.00	Pass
15/11/2024	1:30	18.40	Pass	14.20	Pass	0.00	Pass
15/11/2024	1:40	18.12	Pass	14.45	Pass	0.00	Pass
15/11/2024	1:50	16.57	Pass	12.32	Pass	0.15	Pass
15/11/2024	2:00	16.09	Pass	12.06	Pass	0.32	Pass
15/11/2024	2:10	15.46	Pass	11.94	Pass	0.98	Pass
15/11/2024	2:20	14.36	Pass	11.62	Pass	1.06	Pass
15/11/2024	2:30	13.24	Pass	10.98	Pass	1.53	Pass
15/11/2024	2:40	11.96	Pass	9.23	Pass	1.94	Pass
15/11/2024	2:50	9.32	Pass	8.96	Pass	2.30	Pass
15/11/2024	3:00	8.36	Pass	7.23	Pass	2.56	Pass
15/11/2024	3:10	7.45	Pass	6.33	Pass	2.94	Pass
15/11/2024	3:20	8.31	Pass	6.52	Pass	3.26	Pass
15/11/2024	3:30	7.49	Pass	6.31	Pass	4.26	Pass
15/11/2024	3:40	8.21	Pass	6.85	Pass	4.86	Pass
15/11/2024	3:50	9.06	Pass	7.06	Pass	5.20	Pass
15/11/2024	4:00	9.89	Pass	7.46	Pass	5.98	Pass
15/11/2024	4:10	11.23	Pass	8.52	Pass	6.05	Pass
15/11/2024	4:20	12.39	Pass	8.74	Pass	6.18	Pass
15/11/2024	4:30	12.45	Pass	9.16	Pass	5.94	Pass
15/11/2024	4:40	13.42	Pass	9.26	Pass	5.32	Pass
15/11/2024	4:50	13.76	Pass	9.84	Pass	4.96	Pass
15/11/2024	5:00	14.09	Pass	10.23	Pass	4.53	Pass
15/11/2024	5:10	14.75	Pass	10.56	Pass	5.26	Pass
15/11/2024	5:20	15.12	Pass	11.22	Pass	5.84	Pass
15/11/2024	5:30	15.94	Pass	11.86	Pass	5.92	Pass
15/11/2024	5:40	12.53	Pass	9.23	Pass	6.32	Pass
15/11/2024	5:50	11.55	Pass	10.26	Pass	6.86	Pass
15/11/2024	6:00	10.50	Pass	9.84	Pass	5.26	Pass
15/11/2024	6:10	9.00	Pass	8.23	Pass	4.23	Pass
15/11/2024	6:20	8.75	Pass	6.23	Pass	3.12	Pass
15/11/2024	6:30	7.00	Pass	4.35	Pass	2.62	Pass
15/11/2024	6:40	6.13	Pass	3.26	Pass	0.25	Pass
15/11/2024	6:50	5.05	Pass	1.23	Pass	0.00	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
15/11/2024	7:00	1.12	Pass	0.62	Pass	0.00	Pass
15/11/2024	7:10	0.00	Pass	0.00	Pass	0.00	Pass
15/11/2024	7:20	0.00	Pass	0.00	Pass	0.00	Pass
15/11/2024	7:30	0.00	Pass	0.00	Pass	0.00	Pass
15/11/2024	7:40	0.85	Pass	0.00	Pass	0.00	Pass
15/11/2024	7:50	1.04	Pass	0.21	Pass	0.00	Pass
15/11/2024	8:00	2.65	Pass	0.64	Pass	0.00	Pass
15/11/2024	8:10	3.26	Pass	1.18	Pass	0.00	Pass
15/11/2024	8:20	4.21	Pass	1.90	Pass	0.00	Pass
15/11/2024	8:30	4.65	Pass	2.24	Pass	0.02	Pass
15/11/2024	8:40	4.98	Pass	2.52	Pass	0.23	Pass
15/11/2024	8:50	5.12	Pass	3.26	Pass	0.46	Pass
15/11/2024	9:00	7.26	Pass	3.58	Pass	0.57	Pass
15/11/2024	9:10	9.24	Pass	4.26	Pass	1.65	Pass
15/11/2024	9:20	11.26	Pass	4.95	Pass	2.16	Pass
15/11/2024	9:30	14.68	Pass	5.02	Pass	2.85	Pass
15/11/2024	9:40	15.26	Pass	5.12	Pass	2.85	Pass
15/11/2024	9:50	18.65	Pass	5.61	Pass	3.21	Pass
15/11/2024	10:00	20.94	Pass	6.82	Pass	2.62	Pass
15/11/2024	10:10	22.35	Pass	7.23	Pass	2.12	Pass
15/11/2024	10:20	23.68	Pass	8.56	Pass	1.95	Pass
15/11/2024	10:30	25.15	Pass	9.26	Pass	1.85	Pass
15/11/2024	10:40	26.84	Pass	11.23	Pass	1.45	Pass
15/11/2024	10:50	27.05	Pass	12.35	Pass	2.56	Pass
15/11/2024	11:00	27.94	Pass	13.65	Pass	3.87	Pass
15/11/2024	11:10	28.34	Pass	15.26	Pass	4.86	Pass
15/11/2024	11:20	27.54	Pass	15.23	Pass	5.95	Pass
15/11/2024	11:30	26.32	Pass	16.94	Pass	5.62	Pass
15/11/2024	11:40	24.65	Pass	17.26	Pass	5.97	Pass
15/11/2024	11:50	23.15	Pass	17.56	Pass	6.80	Pass
15/11/2024	12:00	22.48	Pass	18.95	Pass	6.80	Pass
15/11/2024	12:10	21.68	Pass	18.56	Pass	6.24	Pass
15/11/2024	12:20	19.28	Pass	18.43	Pass	5.86	Pass
15/11/2024	12:30	21.45	Pass	19.26	Pass	5.36	Pass
15/11/2024	12:40	20.97	Pass	16.25	Pass	4.95	Pass
15/11/2024	12:50	21.65	Pass	15.23	Pass	5.97	Pass
15/11/2024	13:00	22.35	Pass	15.23	Pass	4.21	Pass
15/11/2024	13:10	23.45	Pass	14.26	Pass	3.90	Pass
15/11/2024	13:20	24.14	Pass	13.26	Pass	3.53	Pass
15/11/2024	13:30	23.94	Pass	12.30	Pass	2.96	Pass
15/11/2024	13:40	23.54	Pass	11.66	Pass	2.15	Pass
15/11/2024	13:50	23.12	Pass	11.20	Pass	1.85	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
15/11/2024	14:00	22.90	Pass	13.80	Pass	1.23	Pass
15/11/2024	14:10	22.54	Pass	15.90	Pass	0.65	Pass
15/11/2024	14:20	22.12	Pass	17.54	Pass	0.00	Pass
15/11/2024	14:30	22.06	Pass	18.65	Pass	0.00	Pass
15/11/2024	14:40	21.80	Pass	18.00	Pass	0.00	Pass
15/11/2024	14:50	21.55	Pass	17.50	Pass	0.00	Pass
15/11/2024	15:00	21.09	Pass	16.50	Pass	0.00	Pass
15/11/2024	15:10	19.24	Pass	14.00	Pass	0.00	Pass
15/11/2024	15:20	18.26	Pass	10.60	Pass	0.00	Pass
15/11/2024	15:30	18.12	Pass	9.50	Pass	0.00	Pass
15/11/2024	15:40	17.84	Pass	8.56	Pass	0.00	Pass
15/11/2024	15:50	16.45	Pass	7.25	Pass	0.00	Pass
15/11/2024	16:00	15.23	Pass	6.26	Pass	0.00	Pass
15/11/2024	16:10	15.26	Pass	7.95	Pass	0.00	Pass
15/11/2024	16:20	14.97	Pass	7.25	Pass	0.00	Pass
15/11/2024	16:30	14.25	Pass	6.89	Pass	0.00	Pass
15/11/2024	16:40	13.26	Pass	6.77	Pass	0.00	Pass
15/11/2024	16:50	13.06	Pass	7.02	Pass	0.42	Pass
15/11/2024	17:00	11.94	Pass	6.84	Pass	0.13	Pass
15/11/2024	17:10	12.64	Pass	6.23	Pass	0.00	Pass
15/11/2024	17:20	14.65	Pass	5.85	Pass	0.02	Pass
15/11/2024	17:30	16.42	Pass	5.21	Pass	0.45	Pass
15/11/2024	17:40	17.45	Pass	4.23	Pass	0.52	Pass
15/11/2024	17:50	17.26	Pass	5.26	Pass	0.20	Pass
15/11/2024	18:00	18.21	Pass	5.12	Pass	0.34	Pass
15/11/2024	18:10	18.65	Pass	6.05	Pass	0.65	Pass
15/11/2024	18:20	19.03	Pass	6.54	Pass	1.23	Pass
15/11/2024	18:30	19.65	Pass	6.75	Pass	1.20	Pass
15/11/2024	18:40	19.55	Pass	5.91	Pass	1.18	Pass
15/11/2024	18:50	19.94	Pass	5.42	Pass	1.05	Pass
15/11/2024	19:00	20.31	Pass	4.94	Pass	0.95	Pass

4.2.5 OMS-05

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
20/11/2024	12:35	0.77	Pass	0.01	Pass
20/11/2024	13:05	0.81	Pass	0.01	Pass
20/11/2024	13:35	0.93	Pass	0.01	Pass
20/11/2024	14:05	0.94	Pass	0.00	Pass
20/11/2024	14:35	1.00	Pass	0.01	Pass
20/11/2024	15:05	0.88	Pass	0.00	Pass
20/11/2024	15:35	0.78	Pass	0.00	Pass
20/11/2024	16:05	0.75	Pass	0.00	Pass
20/11/2024	16:35	0.71	Pass	0.00	Pass
20/11/2024	17:05	0.66	Pass	0.00	Pass
20/11/2024	17:35	0.61	Pass	0.00	Pass
20/11/2024	18:05	0.52	Pass	0.00	Pass
20/11/2024	18:35	0.46	Pass	0.00	Pass
20/11/2024	19:05	0.43	Pass	0.00	Pass
20/11/2024	19:35	0.39	Pass	0.00	Pass
20/11/2024	20:05	0.47	Pass	0.00	Pass
20/11/2024	20:35	0.56	Pass	0.02	Pass
20/11/2024	21:05	0.69	Pass	0.03	Pass
20/11/2024	21:35	0.74	Pass	0.04	Pass
20/11/2024	22:05	0.76	Pass	0.03	Pass
20/11/2024	22:35	0.78	Pass	0.04	Pass
20/11/2024	23:05	0.78	Pass	0.03	Pass
20/11/2024	23:35	0.79	Pass	0.04	Pass
21/11/2024	0:05	0.77	Pass	0.02	Pass
21/11/2024	0:35	0.77	Pass	0.01	Pass
21/11/2024	1:05	0.78	Pass	0.01	Pass
21/11/2024	1:35	0.78	Pass	0.01	Pass
21/11/2024	2:05	0.75	Pass	0.02	Pass
21/11/2024	2:35	0.76	Pass	0.03	Pass
21/11/2024	3:05	0.79	Pass	0.03	Pass
21/11/2024	3:35	0.75	Pass	0.02	Pass
21/11/2024	4:05	0.71	Pass	0.03	Pass
21/11/2024	4:35	0.69	Pass	0.03	Pass
21/11/2024	5:05	0.71	Pass	0.03	Pass
21/11/2024	5:35	0.70	Pass	0.04	Pass
21/11/2024	6:05	0.70	Pass	0.03	Pass
21/11/2024	6:35	0.71	Pass	0.03	Pass
21/11/2024	7:05	0.70	Pass	0.03	Pass
21/11/2024	7:35	0.72	Pass	0.03	Pass
21/11/2024	8:05	0.87	Pass	0.02	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
21/11/2024	8:35	1.04	Pass	0.00	Pass
21/11/2024	9:05	0.97	Pass	0.00	Pass
21/11/2024	9:35	0.88	Pass	0.01	Pass
21/11/2024	10:05	0.80	Pass	0.02	Pass
21/11/2024	10:35	0.80	Pass	0.01	Pass
21/11/2024	11:05	0.83	Pass	0.01	Pass
21/11/2024	11:35	0.94	Pass	0.00	Pass
21/11/2024	12:05	1.06	Pass	0.00	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
20/11/2024	12:15	0.52	Pass	0.38	Pass	0.87	Pass
20/11/2024	12:25	0.22	Pass	0.16	Pass	0.37	Pass
20/11/2024	12:35	0.21	Pass	0.15	Pass	0.34	Pass
20/11/2024	12:45	0.21	Pass	0.15	Pass	0.34	Pass
20/11/2024	12:55	0.21	Pass	0.15	Pass	0.35	Pass
20/11/2024	13:05	0.21	Pass	0.16	Pass	0.36	Pass
20/11/2024	13:15	0.21	Pass	0.16	Pass	0.36	Pass
20/11/2024	13:25	0.21	Pass	0.16	Pass	0.35	Pass
20/11/2024	13:35	0.21	Pass	0.15	Pass	0.35	Pass
20/11/2024	13:45	0.21	Pass	0.15	Pass	0.34	Pass
20/11/2024	13:55	0.20	Pass	0.15	Pass	0.33	Pass
20/11/2024	14:05	0.20	Pass	0.14	Pass	0.33	Pass
20/11/2024	14:15	0.19	Pass	0.14	Pass	0.32	Pass
20/11/2024	14:25	0.18	Pass	0.14	Pass	0.31	Pass
20/11/2024	14:35	0.18	Pass	0.13	Pass	0.30	Pass
20/11/2024	14:45	0.17	Pass	0.13	Pass	0.29	Pass
20/11/2024	14:55	0.17	Pass	0.12	Pass	0.28	Pass
20/11/2024	15:05	0.16	Pass	0.12	Pass	0.27	Pass
20/11/2024	15:15	0.16	Pass	0.12	Pass	0.26	Pass
20/11/2024	15:25	0.15	Pass	0.11	Pass	0.26	Pass
20/11/2024	15:35	0.15	Pass	0.11	Pass	0.25	Pass
20/11/2024	15:45	0.14	Pass	0.11	Pass	0.24	Pass
20/11/2024	15:55	0.14	Pass	0.10	Pass	0.23	Pass
20/11/2024	16:05	0.13	Pass	0.10	Pass	0.22	Pass
20/11/2024	16:15	0.13	Pass	0.09	Pass	0.21	Pass
20/11/2024	16:25	0.13	Pass	0.09	Pass	0.21	Pass
20/11/2024	16:35	0.12	Pass	0.09	Pass	0.20	Pass
20/11/2024	16:45	0.12	Pass	0.09	Pass	0.20	Pass
20/11/2024	16:55	0.11	Pass	0.08	Pass	0.19	Pass
20/11/2024	17:05	0.11	Pass	0.08	Pass	0.18	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
20/11/2024	17:15	0.10	Pass	0.07	Pass	0.17	Pass
20/11/2024	17:25	0.10	Pass	0.07	Pass	0.16	Pass
20/11/2024	17:35	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	17:45	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	17:55	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	18:05	0.09	Pass	0.06	Pass	0.15	Pass
20/11/2024	18:15	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	18:25	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	18:35	0.09	Pass	0.07	Pass	0.15	Pass
20/11/2024	18:45	0.10	Pass	0.07	Pass	0.17	Pass
20/11/2024	18:55	0.11	Pass	0.08	Pass	0.18	Pass
20/11/2024	19:05	0.11	Pass	0.08	Pass	0.19	Pass
20/11/2024	19:15	0.12	Pass	0.08	Pass	0.19	Pass
20/11/2024	19:25	0.12	Pass	0.09	Pass	0.21	Pass
20/11/2024	19:35	0.14	Pass	0.10	Pass	0.23	Pass
20/11/2024	19:45	0.15	Pass	0.11	Pass	0.26	Pass
20/11/2024	19:55	0.18	Pass	0.13	Pass	0.30	Pass
20/11/2024	20:05	0.18	Pass	0.13	Pass	0.30	Pass
20/11/2024	20:15	0.17	Pass	0.13	Pass	0.29	Pass
20/11/2024	20:25	0.19	Pass	0.14	Pass	0.32	Pass
20/11/2024	20:35	0.20	Pass	0.15	Pass	0.34	Pass
20/11/2024	20:45	0.21	Pass	0.15	Pass	0.34	Pass
20/11/2024	20:55	0.21	Pass	0.15	Pass	0.35	Pass
20/11/2024	21:05	0.22	Pass	0.16	Pass	0.36	Pass
20/11/2024	21:15	0.21	Pass	0.16	Pass	0.36	Pass
20/11/2024	21:25	0.21	Pass	0.16	Pass	0.36	Pass
20/11/2024	21:35	0.22	Pass	0.16	Pass	0.37	Pass
20/11/2024	21:45	0.22	Pass	0.16	Pass	0.37	Pass
20/11/2024	21:55	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	22:05	0.22	Pass	0.16	Pass	0.37	Pass
20/11/2024	22:15	0.22	Pass	0.16	Pass	0.37	Pass
20/11/2024	22:25	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	22:35	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	22:45	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	22:55	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	23:05	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	23:15	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	23:25	0.23	Pass	0.17	Pass	0.38	Pass
20/11/2024	23:35	0.36	Pass	0.27	Pass	0.60	Pass
20/11/2024	23:45	0.36	Pass	0.27	Pass	0.61	Pass
20/11/2024	23:55	0.37	Pass	0.27	Pass	0.62	Pass
21/11/2024	0:05	0.37	Pass	0.27	Pass	0.62	Pass
21/11/2024	0:15	0.38	Pass	0.28	Pass	0.64	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
21/11/2024	0:25	0.39	Pass	0.29	Pass	0.66	Pass
21/11/2024	0:35	0.40	Pass	0.29	Pass	0.66	Pass
21/11/2024	0:45	0.41	Pass	0.30	Pass	0.68	Pass
21/11/2024	0:55	0.41	Pass	0.30	Pass	0.68	Pass
21/11/2024	1:05	0.40	Pass	0.30	Pass	0.67	Pass
21/11/2024	1:15	0.42	Pass	0.31	Pass	0.70	Pass
21/11/2024	1:25	0.43	Pass	0.31	Pass	0.72	Pass
21/11/2024	1:35	0.43	Pass	0.32	Pass	0.73	Pass
21/11/2024	1:45	0.44	Pass	0.32	Pass	0.73	Pass
21/11/2024	1:55	0.39	Pass	0.28	Pass	0.65	Pass
21/11/2024	2:05	0.41	Pass	0.30	Pass	0.68	Pass
21/11/2024	2:15	0.32	Pass	0.23	Pass	0.53	Pass
21/11/2024	2:25	0.30	Pass	0.22	Pass	0.50	Pass
21/11/2024	2:35	0.43	Pass	0.32	Pass	0.72	Pass
21/11/2024	2:45	0.47	Pass	0.34	Pass	0.78	Pass
21/11/2024	2:55	0.46	Pass	0.34	Pass	0.77	Pass
21/11/2024	3:05	0.50	Pass	0.36	Pass	0.83	Pass
21/11/2024	3:15	0.49	Pass	0.36	Pass	0.82	Pass
21/11/2024	3:25	0.50	Pass	0.37	Pass	0.83	Pass
21/11/2024	3:35	0.49	Pass	0.36	Pass	0.81	Pass
21/11/2024	3:45	0.43	Pass	0.32	Pass	0.72	Pass
21/11/2024	3:55	0.42	Pass	0.30	Pass	0.69	Pass
21/11/2024	4:05	0.48	Pass	0.35	Pass	0.81	Pass
21/11/2024	4:15	0.54	Pass	0.39	Pass	0.89	Pass
21/11/2024	4:25	0.44	Pass	0.32	Pass	0.74	Pass
21/11/2024	4:35	0.41	Pass	0.30	Pass	0.69	Pass
21/11/2024	4:45	0.44	Pass	0.32	Pass	0.73	Pass
21/11/2024	4:55	0.55	Pass	0.40	Pass	0.92	Pass
21/11/2024	5:05	0.47	Pass	0.34	Pass	0.78	Pass
21/11/2024	5:15	0.42	Pass	0.30	Pass	0.69	Pass
21/11/2024	5:25	0.48	Pass	0.35	Pass	0.80	Pass
21/11/2024	5:35	0.51	Pass	0.37	Pass	0.84	Pass
21/11/2024	5:45	0.55	Pass	0.41	Pass	0.92	Pass
21/11/2024	5:55	0.50	Pass	0.37	Pass	0.84	Pass
21/11/2024	6:05	0.50	Pass	0.37	Pass	0.84	Pass
21/11/2024	6:15	0.55	Pass	0.41	Pass	0.92	Pass
21/11/2024	6:25	0.62	Pass	0.46	Pass	1.04	Pass
21/11/2024	6:35	0.59	Pass	0.43	Pass	0.98	Pass
21/11/2024	6:45	0.57	Pass	0.42	Pass	0.96	Pass
21/11/2024	6:55	0.65	Pass	0.48	Pass	1.09	Pass
21/11/2024	7:05	0.66	Pass	0.48	Pass	1.09	Pass
21/11/2024	7:15	0.68	Pass	0.50	Pass	1.14	Pass
21/11/2024	7:25	0.51	Pass	0.37	Pass	0.85	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
21/11/2024	7:35	0.58	Pass	0.42	Pass	0.96	Pass
21/11/2024	7:45	0.62	Pass	0.46	Pass	1.03	Pass
21/11/2024	7:55	0.62	Pass	0.46	Pass	1.03	Pass
21/11/2024	8:05	0.57	Pass	0.42	Pass	0.95	Pass
21/11/2024	8:15	0.52	Pass	0.38	Pass	0.86	Pass
21/11/2024	8:25	0.46	Pass	0.34	Pass	0.76	Pass
21/11/2024	8:35	0.42	Pass	0.30	Pass	0.69	Pass
21/11/2024	8:45	0.31	Pass	0.22	Pass	0.51	Pass
21/11/2024	8:55	0.23	Pass	0.17	Pass	0.38	Pass
21/11/2024	9:05	0.22	Pass	0.16	Pass	0.36	Pass
21/11/2024	9:15	0.21	Pass	0.15	Pass	0.35	Pass
21/11/2024	9:25	0.20	Pass	0.14	Pass	0.33	Pass
21/11/2024	9:35	0.18	Pass	0.13	Pass	0.31	Pass
21/11/2024	9:45	0.17	Pass	0.12	Pass	0.28	Pass
21/11/2024	9:55	0.16	Pass	0.12	Pass	0.27	Pass
21/11/2024	10:05	0.16	Pass	0.12	Pass	0.27	Pass
21/11/2024	10:15	0.16	Pass	0.12	Pass	0.27	Pass
21/11/2024	10:25	0.16	Pass	0.12	Pass	0.27	Pass
21/11/2024	10:35	0.17	Pass	0.12	Pass	0.28	Pass
21/11/2024	10:45	0.17	Pass	0.13	Pass	0.29	Pass
21/11/2024	10:55	0.18	Pass	0.13	Pass	0.30	Pass
21/11/2024	11:05	0.18	Pass	0.13	Pass	0.30	Pass
21/11/2024	11:15	0.19	Pass	0.14	Pass	0.31	Pass
21/11/2024	11:25	0.19	Pass	0.14	Pass	0.32	Pass
21/11/2024	11:35	0.19	Pass	0.14	Pass	0.32	Pass
21/11/2024	11:45	0.20	Pass	0.14	Pass	0.33	Pass
21/11/2024	11:55	0.20	Pass	0.14	Pass	0.33	Pass
21/11/2024	12:05	0.20	Pass	0.14	Pass	0.33	Pass

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Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
25/11/2024	13:00	0.09	Pass	0.05	Pass
25/11/2024	13:30	0.28	Pass	0.06	Pass
25/11/2024	14:00	0.45	Pass	0.06	Pass
25/11/2024	14:30	0.55	Pass	0.05	Pass
25/11/2024	15:00	0.62	Pass	0.05	Pass
25/11/2024	15:30	0.66	Pass	0.04	Pass
25/11/2024	16:00	0.68	Pass	0.05	Pass
25/11/2024	16:30	0.66	Pass	0.05	Pass
25/11/2024	17:00	0.56	Pass	0.05	Pass
25/11/2024	17:30	0.46	Pass	0.05	Pass
25/11/2024	18:00	0.40	Pass	0.05	Pass
25/11/2024	18:30	0.36	Pass	0.06	Pass
25/11/2024	19:00	0.33	Pass	0.06	Pass
25/11/2024	19:30	0.31	Pass	0.07	Pass
25/11/2024	20:00	0.29	Pass	0.07	Pass
25/11/2024	20:30	0.27	Pass	0.08	Pass
25/11/2024	21:00	0.26	Pass	0.07	Pass
25/11/2024	21:30	0.25	Pass	0.07	Pass
25/11/2024	22:00	0.25	Pass	0.07	Pass
25/11/2024	22:30	0.23	Pass	0.07	Pass
25/11/2024	23:00	0.23	Pass	0.08	Pass
25/11/2024	23:30	0.23	Pass	0.08	Pass
26/11/2024	0:00	0.23	Pass	0.31	Pass
26/11/2024	0:30	0.23	Pass	0.49	Pass
26/11/2024	1:00	0.22	Pass	0.12	Pass
26/11/2024	1:30	0.22	Pass	0.13	Pass
26/11/2024	2:00	0.21	Pass	0.10	Pass
26/11/2024	2:30	0.21	Pass	0.09	Pass
26/11/2024	3:00	0.21	Pass	0.09	Pass
26/11/2024	3:30	0.21	Pass	0.08	Pass
26/11/2024	4:00	0.21	Pass	0.09	Pass
26/11/2024	4:30	0.20	Pass	0.09	Pass
26/11/2024	5:00	0.20	Pass	0.09	Pass
26/11/2024	5:30	0.20	Pass	0.11	Pass
26/11/2024	6:00	0.20	Pass	0.10	Pass
26/11/2024	6:30	0.20	Pass	0.10	Pass
26/11/2024	7:00	0.21	Pass	0.11	Pass
26/11/2024	7:30	0.21	Pass	0.24	Pass
26/11/2024	8:00	0.22	Pass	0.10	Pass
26/11/2024	8:30	0.21	Pass	0.09	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
26/11/2024	9:00	0.21	Pass	0.09	Pass
26/11/2024	9:30	0.22	Pass	0.10	Pass
26/11/2024	10:00	0.23	Pass	0.10	Pass
26/11/2024	10:30	0.25	Pass	0.09	Pass
26/11/2024	11:00	0.24	Pass	0.09	Pass
26/11/2024	11:30	0.33	Pass	0.09	Pass
26/11/2024	12:00	0.48	Pass	0.09	Pass
26/11/2024	12:30	0.61	Pass	0.09	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
25/11/2024	12:40	0.81	Pass	0.60	Pass	1.31	Pass
25/11/2024	12:50	0.21	Pass	0.16	Pass	0.36	Pass
25/11/2024	13:00	0.20	Pass	0.15	Pass	0.34	Pass
25/11/2024	13:10	0.20	Pass	0.15	Pass	0.34	Pass
25/11/2024	13:20	0.20	Pass	0.15	Pass	0.34	Pass
25/11/2024	13:30	0.20	Pass	0.15	Pass	0.33	Pass
25/11/2024	13:40	0.20	Pass	0.15	Pass	0.33	Pass
25/11/2024	13:50	0.20	Pass	0.14	Pass	0.33	Pass
25/11/2024	14:00	0.20	Pass	0.14	Pass	0.33	Pass
25/11/2024	14:10	0.19	Pass	0.14	Pass	0.32	Pass
25/11/2024	14:20	0.19	Pass	0.14	Pass	0.32	Pass
25/11/2024	14:30	0.19	Pass	0.14	Pass	0.32	Pass
25/11/2024	14:40	0.19	Pass	0.14	Pass	0.32	Pass
25/11/2024	14:50	0.19	Pass	0.14	Pass	0.31	Pass
25/11/2024	15:00	0.19	Pass	0.14	Pass	0.31	Pass
25/11/2024	15:10	0.18	Pass	0.13	Pass	0.30	Pass
25/11/2024	15:20	0.18	Pass	0.13	Pass	0.30	Pass
25/11/2024	15:30	0.18	Pass	0.13	Pass	0.30	Pass
25/11/2024	15:40	0.17	Pass	0.13	Pass	0.29	Pass
25/11/2024	15:50	0.17	Pass	0.12	Pass	0.28	Pass
25/11/2024	16:00	0.16	Pass	0.12	Pass	0.27	Pass
25/11/2024	16:10	0.15	Pass	0.11	Pass	0.25	Pass
25/11/2024	16:20	0.14	Pass	0.10	Pass	0.23	Pass
25/11/2024	16:30	0.13	Pass	0.10	Pass	0.22	Pass
25/11/2024	16:40	0.13	Pass	0.09	Pass	0.21	Pass
25/11/2024	16:50	0.12	Pass	0.09	Pass	0.20	Pass
25/11/2024	17:00	0.12	Pass	0.09	Pass	0.20	Pass
25/11/2024	17:10	0.11	Pass	0.08	Pass	0.19	Pass
25/11/2024	17:20	0.11	Pass	0.08	Pass	0.19	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
25/11/2024	17:30	0.11	Pass	0.08	Pass	0.18	Pass
25/11/2024	17:40	0.11	Pass	0.08	Pass	0.18	Pass
25/11/2024	17:50	0.10	Pass	0.08	Pass	0.17	Pass
25/11/2024	18:00	0.10	Pass	0.07	Pass	0.17	Pass
25/11/2024	18:10	0.10	Pass	0.07	Pass	0.17	Pass
25/11/2024	18:20	0.10	Pass	0.07	Pass	0.16	Pass
25/11/2024	18:30	0.10	Pass	0.07	Pass	0.16	Pass
25/11/2024	18:40	0.09	Pass	0.07	Pass	0.15	Pass
25/11/2024	18:50	0.09	Pass	0.07	Pass	0.15	Pass
25/11/2024	19:00	0.09	Pass	0.07	Pass	0.15	Pass
25/11/2024	19:10	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	19:20	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	19:30	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	19:40	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	19:50	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:00	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:10	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:20	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:30	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:40	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	20:50	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:00	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:10	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:20	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:30	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:40	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	21:50	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:00	0.08	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:10	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:20	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:30	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:40	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	22:50	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:00	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:10	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:20	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:30	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:40	0.09	Pass	0.06	Pass	0.14	Pass
25/11/2024	23:50	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	0:00	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	0:10	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	0:20	0.09	Pass	0.07	Pass	0.16	Pass
26/11/2024	0:30	0.09	Pass	0.07	Pass	0.15	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
26/11/2024	0:40	0.09	Pass	0.06	Pass	0.15	Pass
26/11/2024	0:50	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:00	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:10	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:20	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:30	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:40	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	1:50	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:00	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:10	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:20	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:30	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:40	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	2:50	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:00	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:10	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:20	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:30	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:40	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	3:50	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	4:00	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	4:10	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	4:20	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	4:30	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	4:40	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	4:50	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	5:00	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	5:10	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	5:20	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	5:30	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	5:40	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	5:50	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:00	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:10	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:20	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:30	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:40	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	6:50	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	7:00	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	7:10	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	7:20	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	7:30	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	7:40	0.10	Pass	0.07	Pass	0.17	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
26/11/2024	7:50	0.10	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:00	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:10	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:20	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:30	0.10	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:40	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	8:50	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	9:00	0.10	Pass	0.08	Pass	0.17	Pass
26/11/2024	9:10	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	9:20	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	9:30	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	9:40	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	9:50	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	10:00	0.10	Pass	0.08	Pass	0.17	Pass
26/11/2024	10:10	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	10:20	0.12	Pass	0.08	Pass	0.19	Pass
26/11/2024	10:30	0.12	Pass	0.09	Pass	0.21	Pass
26/11/2024	10:40	0.14	Pass	0.10	Pass	0.23	Pass
26/11/2024	10:50	0.15	Pass	0.11	Pass	0.24	Pass
26/11/2024	11:00	0.16	Pass	0.11	Pass	0.26	Pass
26/11/2024	11:10	0.17	Pass	0.12	Pass	0.28	Pass
26/11/2024	11:20	0.17	Pass	0.13	Pass	0.29	Pass
26/11/2024	11:30	0.18	Pass	0.13	Pass	0.30	Pass
26/11/2024	11:40	0.19	Pass	0.14	Pass	0.31	Pass
26/11/2024	11:50	0.19	Pass	0.14	Pass	0.32	Pass
26/11/2024	12:00	0.19	Pass	0.14	Pass	0.32	Pass
26/11/2024	12:10	0.20	Pass	0.14	Pass	0.33	Pass
26/11/2024	12:20	0.20	Pass	0.15	Pass	0.33	Pass
26/11/2024	12:30	0.20	Pass	0.15	Pass	0.32	Pass

4.2.7 OMS-07

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
26/11/2024	13:30	0.47	Pass	0.06	Pass
26/11/2024	14:00	0.56	Pass	0.07	Pass
26/11/2024	14:30	0.68	Pass	0.08	Pass
26/11/2024	15:00	0.75	Pass	0.08	Pass
26/11/2024	15:30	0.72	Pass	0.07	Pass
26/11/2024	16:00	0.68	Pass	0.07	Pass
26/11/2024	16:30	0.62	Pass	0.07	Pass
26/11/2024	17:00	0.58	Pass	0.08	Pass
26/11/2024	17:30	0.51	Pass	0.07	Pass
26/11/2024	18:00	0.47	Pass	0.08	Pass
26/11/2024	18:30	0.42	Pass	0.08	Pass
26/11/2024	19:00	0.38	Pass	0.08	Pass
26/11/2024	19:30	0.36	Pass	0.08	Pass
26/11/2024	20:00	0.33	Pass	0.08	Pass
26/11/2024	20:30	0.30	Pass	0.08	Pass
26/11/2024	21:00	0.29	Pass	0.08	Pass
26/11/2024	21:30	0.28	Pass	0.08	Pass
26/11/2024	22:00	0.28	Pass	0.08	Pass
26/11/2024	22:30	0.26	Pass	0.07	Pass
26/11/2024	23:00	0.26	Pass	0.07	Pass
26/11/2024	23:30	0.24	Pass	0.08	Pass
27/11/2024	0:00	0.23	Pass	0.09	Pass
27/11/2024	0:30	0.23	Pass	0.09	Pass
27/11/2024	1:00	0.23	Pass	0.09	Pass
27/11/2024	1:30	0.23	Pass	0.08	Pass
27/11/2024	2:00	0.22	Pass	0.09	Pass
27/11/2024	2:30	0.22	Pass	0.09	Pass
27/11/2024	3:00	0.22	Pass	0.09	Pass
27/11/2024	3:30	0.21	Pass	0.09	Pass
27/11/2024	4:00	0.21	Pass	0.09	Pass
27/11/2024	4:30	0.21	Pass	0.10	Pass
27/11/2024	5:00	0.20	Pass	0.08	Pass
27/11/2024	5:30	0.21	Pass	0.08	Pass
27/11/2024	6:00	0.20	Pass	0.08	Pass
27/11/2024	6:30	0.20	Pass	0.08	Pass
27/11/2024	7:00	0.20	Pass	0.08	Pass
27/11/2024	7:30	0.21	Pass	0.08	Pass
27/11/2024	8:00	0.22	Pass	0.07	Pass
27/11/2024	8:30	0.20	Pass	0.06	Pass
27/11/2024	9:00	0.18	Pass	0.06	Pass
27/11/2024	9:30	0.24	Pass	0.07	Pass
27/11/2024	10:00	0.31	Pass	0.07	Pass
27/11/2024	10:30	0.41	Pass	0.07	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
27/11/2024	11:00	0.50	Pass	0.07	Pass
27/11/2024	11:30	0.59	Pass	0.07	Pass
27/11/2024	12:00	0.68	Pass	0.07	Pass
27/11/2024	12:30	0.79	Pass	0.07	Pass
27/11/2024	13:00	0.91	Pass	0.06	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
26/11/2024	13:20	0.18	Pass	0.13	Pass	0.30	Pass
26/11/2024	13:30	0.17	Pass	0.12	Pass	0.28	Pass
26/11/2024	13:40	0.17	Pass	0.12	Pass	0.28	Pass
26/11/2024	13:50	0.17	Pass	0.13	Pass	0.28	Pass
26/11/2024	14:00	0.17	Pass	0.13	Pass	0.29	Pass
26/11/2024	14:10	0.17	Pass	0.13	Pass	0.29	Pass
26/11/2024	14:20	0.17	Pass	0.13	Pass	0.29	Pass
26/11/2024	14:30	0.17	Pass	0.13	Pass	0.29	Pass
26/11/2024	14:40	0.17	Pass	0.12	Pass	0.28	Pass
26/11/2024	14:50	0.16	Pass	0.12	Pass	0.27	Pass
26/11/2024	15:00	0.16	Pass	0.12	Pass	0.26	Pass
26/11/2024	15:10	0.15	Pass	0.11	Pass	0.26	Pass
26/11/2024	15:20	0.15	Pass	0.11	Pass	0.25	Pass
26/11/2024	15:30	0.15	Pass	0.11	Pass	0.25	Pass
26/11/2024	15:40	0.14	Pass	0.11	Pass	0.24	Pass
26/11/2024	15:50	0.14	Pass	0.10	Pass	0.24	Pass
26/11/2024	16:00	0.14	Pass	0.10	Pass	0.23	Pass
26/11/2024	16:10	0.14	Pass	0.10	Pass	0.23	Pass
26/11/2024	16:20	0.13	Pass	0.10	Pass	0.22	Pass
26/11/2024	16:30	0.13	Pass	0.10	Pass	0.22	Pass
26/11/2024	16:40	0.13	Pass	0.09	Pass	0.21	Pass
26/11/2024	16:50	0.12	Pass	0.09	Pass	0.21	Pass
26/11/2024	17:00	0.12	Pass	0.09	Pass	0.20	Pass
26/11/2024	17:10	0.12	Pass	0.08	Pass	0.19	Pass
26/11/2024	17:20	0.11	Pass	0.08	Pass	0.19	Pass
26/11/2024	17:30	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	17:40	0.11	Pass	0.08	Pass	0.18	Pass
26/11/2024	17:50	0.10	Pass	0.08	Pass	0.17	Pass
26/11/2024	18:00	0.10	Pass	0.07	Pass	0.17	Pass
26/11/2024	18:10	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	18:20	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	18:30	0.09	Pass	0.07	Pass	0.16	Pass
26/11/2024	18:40	0.09	Pass	0.07	Pass	0.15	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
26/11/2024	18:50	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	19:00	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	19:10	0.09	Pass	0.06	Pass	0.15	Pass
26/11/2024	19:20	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	19:30	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	19:40	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	19:50	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	20:00	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	20:10	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	20:20	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	20:30	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	20:40	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	20:50	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:00	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:10	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:20	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:30	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:40	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	21:50	0.08	Pass	0.06	Pass	0.13	Pass
26/11/2024	22:00	0.08	Pass	0.06	Pass	0.14	Pass
26/11/2024	22:10	0.09	Pass	0.06	Pass	0.14	Pass
26/11/2024	22:20	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	22:30	0.09	Pass	0.07	Pass	0.16	Pass
26/11/2024	22:40	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	22:50	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	23:00	0.10	Pass	0.07	Pass	0.16	Pass
26/11/2024	23:10	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	23:20	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	23:30	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	23:40	0.09	Pass	0.07	Pass	0.15	Pass
26/11/2024	23:50	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	0:00	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	0:10	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	0:20	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	0:30	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	0:40	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	0:50	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	1:00	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	1:10	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	1:20	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	1:30	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	1:40	0.09	Pass	0.07	Pass	0.15	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
27/11/2024	1:50	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	2:00	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	2:10	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	2:20	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	2:30	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	2:40	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	2:50	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:00	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:10	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:20	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:30	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:40	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	3:50	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	4:00	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	4:10	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	4:20	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	4:30	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	4:40	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	4:50	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:00	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:10	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:20	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:30	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:40	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	5:50	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	6:00	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	6:10	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	6:20	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	6:30	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	6:40	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	6:50	0.10	Pass	0.08	Pass	0.17	Pass
27/11/2024	7:00	0.10	Pass	0.08	Pass	0.17	Pass
27/11/2024	7:10	0.11	Pass	0.08	Pass	0.18	Pass
27/11/2024	7:20	0.11	Pass	0.08	Pass	0.18	Pass
27/11/2024	7:30	0.11	Pass	0.08	Pass	0.19	Pass
27/11/2024	7:40	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	7:50	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	8:00	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	8:10	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	8:20	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	8:30	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	8:40	0.12	Pass	0.09	Pass	0.21	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
27/11/2024	8:50	0.13	Pass	0.10	Pass	0.22	Pass
27/11/2024	9:00	0.14	Pass	0.10	Pass	0.23	Pass
27/11/2024	9:10	0.14	Pass	0.10	Pass	0.23	Pass
27/11/2024	9:20	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	9:30	0.15	Pass	0.11	Pass	0.26	Pass
27/11/2024	9:40	0.16	Pass	0.12	Pass	0.27	Pass
27/11/2024	9:50	0.16	Pass	0.12	Pass	0.27	Pass
27/11/2024	10:00	0.16	Pass	0.12	Pass	0.27	Pass
27/11/2024	10:10	0.16	Pass	0.12	Pass	0.27	Pass
27/11/2024	10:20	0.16	Pass	0.12	Pass	0.26	Pass
27/11/2024	10:30	0.16	Pass	0.12	Pass	0.26	Pass
27/11/2024	10:40	0.16	Pass	0.12	Pass	0.27	Pass
27/11/2024	10:50	0.17	Pass	0.12	Pass	0.28	Pass
27/11/2024	11:00	0.17	Pass	0.12	Pass	0.28	Pass
27/11/2024	11:10	0.17	Pass	0.12	Pass	0.28	Pass
27/11/2024	11:20	0.17	Pass	0.13	Pass	0.29	Pass
27/11/2024	11:30	0.17	Pass	0.13	Pass	0.29	Pass
27/11/2024	11:40	0.18	Pass	0.13	Pass	0.29	Pass
27/11/2024	11:50	0.18	Pass	0.13	Pass	0.29	Pass
27/11/2024	12:00	0.18	Pass	0.13	Pass	0.30	Pass
27/11/2024	12:10	0.18	Pass	0.13	Pass	0.30	Pass
27/11/2024	12:20	0.18	Pass	0.13	Pass	0.30	Pass
27/11/2024	12:30	0.19	Pass	0.14	Pass	0.31	Pass
27/11/2024	12:40	0.19	Pass	0.14	Pass	0.32	Pass
27/11/2024	12:50	0.19	Pass	0.14	Pass	0.32	Pass
27/11/2024	13:00	0.19	Pass	0.14	Pass	0.32	Pass
27/11/2024	13:10	0.19	Pass	0.14	Pass	0.32	Pass

4.2.8 OMS-08

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
27/11/2024	15:00	0.70	Pass	0.07	Pass
27/11/2024	15:30	0.72	Pass	0.07	Pass
27/11/2024	16:00	0.76	Pass	0.06	Pass
27/11/2024	16:30	0.76	Pass	0.07	Pass
27/11/2024	17:00	0.73	Pass	0.07	Pass
27/11/2024	17:30	0.65	Pass	0.07	Pass
27/11/2024	18:00	0.61	Pass	0.08	Pass
27/11/2024	18:30	0.52	Pass	0.07	Pass
27/11/2024	19:00	0.45	Pass	0.07	Pass
27/11/2024	19:30	0.42	Pass	0.07	Pass
27/11/2024	20:00	0.37	Pass	0.06	Pass
27/11/2024	20:30	0.34	Pass	0.06	Pass
27/11/2024	21:00	0.32	Pass	0.07	Pass
27/11/2024	21:30	0.30	Pass	0.07	Pass
27/11/2024	22:00	0.30	Pass	0.07	Pass
27/11/2024	22:30	0.28	Pass	0.07	Pass
27/11/2024	23:00	0.25	Pass	0.07	Pass
27/11/2024	23:30	0.24	Pass	0.07	Pass
28/11/2024	0:00	0.23	Pass	0.08	Pass
28/11/2024	0:30	0.22	Pass	0.08	Pass
28/11/2024	1:00	0.21	Pass	0.08	Pass
28/11/2024	1:30	0.18	Pass	0.07	Pass
28/11/2024	2:00	0.19	Pass	0.07	Pass
28/11/2024	2:30	0.20	Pass	0.07	Pass
28/11/2024	3:00	0.19	Pass	0.08	Pass
28/11/2024	3:30	0.19	Pass	0.08	Pass
28/11/2024	4:00	0.19	Pass	0.08	Pass
28/11/2024	4:30	0.19	Pass	0.08	Pass
28/11/2024	5:00	0.19	Pass	0.08	Pass
28/11/2024	5:30	0.19	Pass	0.08	Pass
28/11/2024	6:00	0.19	Pass	0.08	Pass
28/11/2024	6:30	0.19	Pass	0.08	Pass
28/11/2024	7:00	0.20	Pass	0.08	Pass
28/11/2024	7:30	0.21	Pass	0.08	Pass
28/11/2024	8:00	0.22	Pass	0.07	Pass
28/11/2024	8:30	0.20	Pass	0.07	Pass
28/11/2024	9:00	0.19	Pass	0.07	Pass
28/11/2024	9:30	0.19	Pass	0.07	Pass
28/11/2024	10:00	0.22	Pass	0.07	Pass
28/11/2024	10:30	0.27	Pass	0.07	Pass

Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
28/11/2024	11:00	0.37	Pass	0.08	Pass
28/11/2024	11:30	0.48	Pass	0.09	Pass
28/11/2024	12:00	0.55	Pass	0.09	Pass
28/11/2024	12:30	0.61	Pass	0.09	Pass
28/11/2024	13:00	0.64	Pass	0.09	Pass
28/11/2024	13:30	0.64	Pass	0.09	Pass
28/11/2024	14:00	0.62	Pass	0.09	Pass
28/11/2024	14:30	0.54	Pass	0.08	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
27/11/2024	14:40	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	14:50	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	15:00	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	15:10	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	15:20	0.15	Pass	0.11	Pass	0.26	Pass
27/11/2024	15:30	0.15	Pass	0.11	Pass	0.26	Pass
27/11/2024	15:40	0.15	Pass	0.11	Pass	0.26	Pass
27/11/2024	15:50	0.15	Pass	0.11	Pass	0.26	Pass
27/11/2024	16:00	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	16:10	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	16:20	0.15	Pass	0.11	Pass	0.25	Pass
27/11/2024	16:30	0.15	Pass	0.11	Pass	0.24	Pass
27/11/2024	16:40	0.14	Pass	0.10	Pass	0.24	Pass
27/11/2024	16:50	0.14	Pass	0.10	Pass	0.23	Pass
27/11/2024	17:00	0.13	Pass	0.10	Pass	0.22	Pass
27/11/2024	17:10	0.13	Pass	0.09	Pass	0.21	Pass
27/11/2024	17:20	0.12	Pass	0.09	Pass	0.21	Pass
27/11/2024	17:30	0.12	Pass	0.09	Pass	0.20	Pass
27/11/2024	17:40	0.11	Pass	0.08	Pass	0.19	Pass
27/11/2024	17:50	0.11	Pass	0.08	Pass	0.18	Pass
27/11/2024	18:00	0.11	Pass	0.08	Pass	0.18	Pass
27/11/2024	18:10	0.10	Pass	0.08	Pass	0.17	Pass
27/11/2024	18:20	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	18:30	0.10	Pass	0.07	Pass	0.17	Pass
27/11/2024	18:40	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	18:50	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	19:00	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	19:10	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	19:20	0.10	Pass	0.07	Pass	0.16	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
27/11/2024	19:30	0.10	Pass	0.07	Pass	0.16	Pass
27/11/2024	19:40	0.09	Pass	0.07	Pass	0.16	Pass
27/11/2024	19:50	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	20:00	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	20:10	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	20:20	0.09	Pass	0.07	Pass	0.15	Pass
27/11/2024	20:30	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	20:40	0.09	Pass	0.06	Pass	0.15	Pass
27/11/2024	20:50	0.09	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:00	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:10	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:20	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:30	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:40	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	21:50	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:00	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:10	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:20	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:30	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:40	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	22:50	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:00	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:10	0.08	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:20	0.09	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:30	0.09	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:40	0.09	Pass	0.06	Pass	0.14	Pass
27/11/2024	23:50	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	0:00	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	0:10	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	0:20	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	0:30	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	0:40	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	0:50	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	1:00	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	1:10	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	1:20	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	1:30	0.09	Pass	0.06	Pass	0.14	Pass
28/11/2024	1:40	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	1:50	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	2:00	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	2:10	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	2:20	0.08	Pass	0.06	Pass	0.14	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
28/11/2024	2:30	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	2:40	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	2:50	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:00	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:10	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:20	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:30	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:40	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	3:50	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	4:00	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	4:10	0.07	Pass	0.05	Pass	0.13	Pass
28/11/2024	4:20	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	4:30	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	4:40	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	4:50	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	5:00	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	5:10	0.10	Pass	0.07	Pass	0.16	Pass
28/11/2024	5:20	0.11	Pass	0.08	Pass	0.18	Pass
28/11/2024	5:30	0.13	Pass	0.10	Pass	0.22	Pass
28/11/2024	5:40	0.12	Pass	0.09	Pass	0.20	Pass
28/11/2024	5:50	0.12	Pass	0.08	Pass	0.19	Pass
28/11/2024	6:00	0.13	Pass	0.09	Pass	0.21	Pass
28/11/2024	6:10	0.12	Pass	0.09	Pass	0.20	Pass
28/11/2024	6:20	0.11	Pass	0.08	Pass	0.19	Pass
28/11/2024	6:30	0.11	Pass	0.08	Pass	0.18	Pass
28/11/2024	6:40	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	6:50	0.09	Pass	0.07	Pass	0.16	Pass
28/11/2024	7:00	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	7:10	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	7:20	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	7:30	0.09	Pass	0.06	Pass	0.14	Pass
28/11/2024	7:40	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	7:50	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	8:00	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	8:10	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	8:20	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	8:30	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	8:40	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	8:50	0.09	Pass	0.07	Pass	0.16	Pass
28/11/2024	9:00	0.10	Pass	0.07	Pass	0.16	Pass
28/11/2024	9:10	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	9:20	0.11	Pass	0.08	Pass	0.18	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
28/11/2024	9:30	0.11	Pass	0.08	Pass	0.18	Pass
28/11/2024	9:40	0.12	Pass	0.09	Pass	0.20	Pass
28/11/2024	9:50	0.13	Pass	0.09	Pass	0.21	Pass
28/11/2024	10:00	0.14	Pass	0.10	Pass	0.23	Pass
28/11/2024	10:10	0.14	Pass	0.11	Pass	0.24	Pass
28/11/2024	10:20	0.15	Pass	0.11	Pass	0.26	Pass
28/11/2024	10:30	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	10:40	0.17	Pass	0.12	Pass	0.28	Pass
28/11/2024	10:50	0.17	Pass	0.12	Pass	0.28	Pass
28/11/2024	11:00	0.17	Pass	0.12	Pass	0.28	Pass
28/11/2024	11:10	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	11:20	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	11:30	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	11:40	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	11:50	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	12:00	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	12:10	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	12:20	0.16	Pass	0.12	Pass	0.27	Pass
28/11/2024	12:30	0.16	Pass	0.12	Pass	0.26	Pass
28/11/2024	12:40	0.16	Pass	0.11	Pass	0.26	Pass
28/11/2024	12:50	0.16	Pass	0.11	Pass	0.26	Pass
28/11/2024	13:00	0.16	Pass	0.11	Pass	0.26	Pass
28/11/2024	13:10	0.15	Pass	0.11	Pass	0.26	Pass
28/11/2024	13:20	0.15	Pass	0.11	Pass	0.26	Pass
28/11/2024	13:30	0.15	Pass	0.11	Pass	0.25	Pass
28/11/2024	13:40	0.15	Pass	0.11	Pass	0.24	Pass
28/11/2024	13:50	0.14	Pass	0.10	Pass	0.24	Pass
28/11/2024	14:00	0.14	Pass	0.10	Pass	0.23	Pass
28/11/2024	14:10	0.13	Pass	0.10	Pass	0.22	Pass
28/11/2024	14:20	0.13	Pass	0.10	Pass	0.22	Pass
28/11/2024	14:30	0.13	Pass	0.10	Pass	0.22	Pass

4.2.9 OMS-09

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
28/11/2024	16:30	0.39	Pass	0.09	Pass
28/11/2024	17:00	0.36	Pass	0.09	Pass
28/11/2024	17:30	0.43	Pass	0.10	Pass
28/11/2024	18:00	0.38	Pass	0.09	Pass
28/11/2024	18:30	0.32	Pass	0.09	Pass
28/11/2024	19:00	0.31	Pass	0.09	Pass
28/11/2024	19:30	0.29	Pass	0.09	Pass
28/11/2024	20:00	0.25	Pass	0.09	Pass
28/11/2024	20:30	0.23	Pass	0.08	Pass
28/11/2024	21:00	0.24	Pass	0.09	Pass
28/11/2024	21:30	0.25	Pass	0.09	Pass
28/11/2024	22:00	0.24	Pass	0.09	Pass
28/11/2024	22:30	0.22	Pass	0.09	Pass
28/11/2024	23:00	0.21	Pass	0.09	Pass
28/11/2024	23:30	0.21	Pass	0.09	Pass
29/11/2024	0:00	0.21	Pass	0.09	Pass
29/11/2024	0:30	0.21	Pass	0.09	Pass
29/11/2024	1:00	0.21	Pass	0.09	Pass
29/11/2024	1:30	0.22	Pass	0.09	Pass
29/11/2024	2:00	0.20	Pass	0.09	Pass
29/11/2024	2:30	0.20	Pass	0.08	Pass
29/11/2024	3:00	0.20	Pass	0.09	Pass
29/11/2024	3:30	0.21	Pass	0.09	Pass
29/11/2024	4:00	0.20	Pass	0.09	Pass
29/11/2024	4:30	0.21	Pass	0.09	Pass
29/11/2024	5:00	0.21	Pass	0.09	Pass
29/11/2024	5:30	0.20	Pass	0.09	Pass
29/11/2024	6:00	0.21	Pass	0.09	Pass
29/11/2024	6:30	0.21	Pass	0.08	Pass
29/11/2024	7:00	0.21	Pass	0.08	Pass
29/11/2024	7:30	0.21	Pass	0.08	Pass
29/11/2024	8:00	0.20	Pass	0.08	Pass
29/11/2024	8:30	0.17	Pass	0.08	Pass
29/11/2024	9:00	0.17	Pass	0.09	Pass
29/11/2024	9:30	0.19	Pass	0.09	Pass
29/11/2024	10:00	0.22	Pass	0.09	Pass
29/11/2024	10:30	0.26	Pass	0.09	Pass
29/11/2024	11:00	0.29	Pass	0.09	Pass
29/11/2024	11:30	0.33	Pass	0.09	Pass
29/11/2024	12:00	0.38	Pass	0.09	Pass
29/11/2024	12:30	0.42	Pass	0.09	Pass

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
29/11/2024	13:00	0.47	Pass	0.09	Pass
29/11/2024	13:30	0.48	Pass	0.09	Pass
29/11/2024	14:00	0.51	Pass	0.09	Pass
29/11/2024	14:30	0.51	Pass	0.09	Pass
29/11/2024	15:00	0.50	Pass	0.09	Pass
29/11/2024	15:30	0.49	Pass	0.09	Pass
29/11/2024	16:00	0.47	Pass	0.09	Pass

Date	Time	C_2H_6S ($\mu g/m^3$) (Limit =56)		$C_2H_6S_2$ ($\mu g/m^3$) (Limit =30)		CH_4S ($\mu g/m^3$) (Limit =13)	
		Result	Status	Result	Status	Result	Status
28/11/2024	16:10	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	16:20	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	16:30	0.10	Pass	0.08	Pass	0.17	Pass
28/11/2024	16:40	0.10	Pass	0.08	Pass	0.17	Pass
28/11/2024	16:50	0.10	Pass	0.08	Pass	0.17	Pass
28/11/2024	17:00	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	17:10	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	17:20	0.10	Pass	0.07	Pass	0.17	Pass
28/11/2024	17:30	0.10	Pass	0.07	Pass	0.16	Pass
28/11/2024	17:40	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	17:50	0.09	Pass	0.07	Pass	0.15	Pass
28/11/2024	18:00	0.09	Pass	0.06	Pass	0.15	Pass
28/11/2024	18:10	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	18:20	0.08	Pass	0.06	Pass	0.14	Pass
28/11/2024	18:30	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	18:40	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	18:50	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	19:00	0.08	Pass	0.06	Pass	0.13	Pass
28/11/2024	19:10	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	19:20	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	19:30	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	19:40	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	19:50	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:00	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:10	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:20	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:30	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:40	0.07	Pass	0.05	Pass	0.12	Pass
28/11/2024	20:50	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	21:00	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	21:10	0.07	Pass	0.05	Pass	0.11	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
28/11/2024	21:20	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	21:30	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	21:40	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	21:50	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:00	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:10	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:20	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:30	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:40	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	22:50	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:00	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:10	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:20	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:30	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:40	0.07	Pass	0.05	Pass	0.11	Pass
28/11/2024	23:50	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	0:00	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	0:10	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	0:20	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	0:30	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	0:40	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	0:50	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	1:00	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	1:10	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	1:20	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	1:30	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	1:40	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	1:50	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:00	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:10	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:20	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:30	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:40	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	2:50	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:00	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:10	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:20	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:30	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:40	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	3:50	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	4:00	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	4:10	0.06	Pass	0.05	Pass	0.11	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
29/11/2024	4:20	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	4:30	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	4:40	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	4:50	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:00	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:10	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:20	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:30	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:40	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	5:50	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:00	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:10	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:20	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:30	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:40	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	6:50	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:00	0.06	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:10	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:20	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:30	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:40	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	7:50	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	8:00	0.07	Pass	0.05	Pass	0.11	Pass
29/11/2024	8:10	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	8:20	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	8:30	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	8:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	8:50	0.08	Pass	0.06	Pass	0.14	Pass
29/11/2024	9:00	0.08	Pass	0.06	Pass	0.14	Pass
29/11/2024	9:10	0.09	Pass	0.07	Pass	0.15	Pass
29/11/2024	9:20	0.09	Pass	0.07	Pass	0.16	Pass
29/11/2024	9:30	0.10	Pass	0.07	Pass	0.16	Pass
29/11/2024	9:40	0.10	Pass	0.07	Pass	0.17	Pass
29/11/2024	9:50	0.10	Pass	0.08	Pass	0.17	Pass
29/11/2024	10:00	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	10:10	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	10:20	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	10:30	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	10:40	0.11	Pass	0.08	Pass	0.19	Pass
29/11/2024	10:50	0.11	Pass	0.08	Pass	0.19	Pass
29/11/2024	11:00	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	11:10	0.12	Pass	0.09	Pass	0.20	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
29/11/2024	11:20	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	11:30	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	11:40	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	11:50	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:00	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:10	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:20	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:30	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:40	0.12	Pass	0.09	Pass	0.21	Pass
29/11/2024	12:50	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:00	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:10	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:20	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:30	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:40	0.12	Pass	0.09	Pass	0.20	Pass
29/11/2024	13:50	0.12	Pass	0.09	Pass	0.19	Pass
29/11/2024	14:00	0.12	Pass	0.08	Pass	0.19	Pass
29/11/2024	14:10	0.11	Pass	0.08	Pass	0.19	Pass
29/11/2024	14:20	0.11	Pass	0.08	Pass	0.19	Pass
29/11/2024	14:30	0.11	Pass	0.08	Pass	0.19	Pass
29/11/2024	14:40	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	14:50	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	15:00	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	15:10	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	15:20	0.11	Pass	0.08	Pass	0.18	Pass
29/11/2024	15:30	0.10	Pass	0.08	Pass	0.18	Pass
29/11/2024	15:40	0.10	Pass	0.08	Pass	0.17	Pass
29/11/2024	15:50	0.10	Pass	0.07	Pass	0.17	Pass
29/11/2024	16:00	0.10	Pass	0.07	Pass	0.17	Pass

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Date	Time	NH_3 (µg/m³) (Limit =30)		H_2S (µg/m³) (Limit =7)	
		Result	Status	Result	Status
29/11/2024	17:30	0.39	Pass	0.10	Pass
29/11/2024	18:00	0.33	Pass	0.09	Pass
29/11/2024	18:30	0.30	Pass	0.09	Pass
29/11/2024	19:00	0.28	Pass	0.09	Pass
29/11/2024	19:30	0.26	Pass	0.09	Pass
29/11/2024	20:00	0.25	Pass	0.09	Pass
29/11/2024	20:30	0.25	Pass	0.09	Pass
29/11/2024	21:00	0.24	Pass	0.09	Pass
29/11/2024	21:30	0.24	Pass	0.09	Pass
29/11/2024	22:00	0.23	Pass	0.09	Pass
29/11/2024	22:30	0.22	Pass	0.09	Pass
29/11/2024	23:00	0.22	Pass	0.09	Pass
29/11/2024	23:30	0.22	Pass	0.09	Pass
30/11/2024	0:00	0.22	Pass	0.09	Pass
30/11/2024	0:30	0.22	Pass	0.09	Pass
30/11/2024	1:00	0.23	Pass	0.09	Pass
30/11/2024	1:30	0.22	Pass	0.09	Pass
30/11/2024	2:00	0.21	Pass	0.09	Pass
30/11/2024	2:30	0.22	Pass	0.09	Pass
30/11/2024	3:00	0.21	Pass	0.09	Pass
30/11/2024	3:30	0.22	Pass	0.09	Pass
30/11/2024	4:00	0.22	Pass	0.09	Pass
30/11/2024	4:30	0.22	Pass	0.09	Pass
30/11/2024	5:00	0.22	Pass	0.09	Pass
30/11/2024	5:30	0.21	Pass	0.09	Pass
30/11/2024	6:00	0.20	Pass	0.09	Pass
30/11/2024	6:30	0.21	Pass	0.09	Pass
30/11/2024	7:00	0.21	Pass	0.09	Pass
30/11/2024	7:30	0.23	Pass	0.09	Pass
30/11/2024	8:00	0.24	Pass	0.09	Pass
30/11/2024	8:30	0.22	Pass	0.09	Pass
30/11/2024	9:00	0.20	Pass	0.08	Pass
30/11/2024	9:30	0.18	Pass	0.08	Pass
30/11/2024	10:00	0.18	Pass	0.08	Pass
30/11/2024	10:30	0.20	Pass	0.09	Pass
30/11/2024	11:00	0.23	Pass	0.09	Pass
30/11/2024	11:30	0.28	Pass	0.09	Pass
30/11/2024	12:00	0.33	Pass	0.09	Pass
30/11/2024	12:30	0.36	Pass	0.09	Pass
30/11/2024	13:00	0.40	Pass	0.09	Pass

Date	Time	NH_3 ($\mu g/m^3$) (Limit =30)		H_2S ($\mu g/m^3$) (Limit =7)	
		Result	Status	Result	Status
30/11/2024	13:30	0.46	Pass	0.09	Pass
30/11/2024	14:00	0.51	Pass	0.09	Pass
30/11/2024	14:30	0.52	Pass	0.09	Pass
30/11/2024	15:00	0.52	Pass	0.09	Pass
30/11/2024	15:30	0.52	Pass	0.09	Pass
30/11/2024	16:00	0.52	Pass	0.09	Pass
30/11/2024	16:30	0.51	Pass	0.09	Pass
30/11/2024	17:00	0.49	Pass	0.09	Pass

Date	Time	C_2H_6S ($\mu g/m^3$) (Limit =56)		$C_2H_6S_2$ ($\mu g/m^3$) (Limit =30)		CH_4S ($\mu g/m^3$) (Limit =13)	
		Result	Status	Result	Status	Result	Status
29/11/2024	17:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	17:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	17:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	17:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	17:50	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:00	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	18:50	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:00	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	19:50	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:00	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	20:50	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	21:00	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	21:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	21:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	21:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	21:40	0.07	Pass	0.05	Pass	0.12	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
29/11/2024	21:50	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	22:00	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	22:10	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	22:20	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	22:30	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	22:40	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	22:50	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	23:00	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	23:10	0.07	Pass	0.05	Pass	0.12	Pass
29/11/2024	23:20	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	23:30	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	23:40	0.08	Pass	0.06	Pass	0.13	Pass
29/11/2024	23:50	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	0:00	0.07	Pass	0.05	Pass	0.13	Pass
30/11/2024	0:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	0:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	0:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	0:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	0:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	1:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	2:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	3:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	3:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	3:20	0.08	Pass	0.06	Pass	0.12	Pass
30/11/2024	3:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	3:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	3:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	4:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	4:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	4:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	4:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	4:40	0.07	Pass	0.05	Pass	0.12	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
30/11/2024	4:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	5:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	6:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	6:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	6:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	6:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	6:40	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	6:50	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	7:00	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	7:10	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	7:20	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	7:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	7:40	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	7:50	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	8:00	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	8:10	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	8:20	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	8:30	0.07	Pass	0.05	Pass	0.12	Pass
30/11/2024	8:40	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	8:50	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	9:00	0.08	Pass	0.06	Pass	0.13	Pass
30/11/2024	9:10	0.08	Pass	0.06	Pass	0.14	Pass
30/11/2024	9:20	0.08	Pass	0.06	Pass	0.14	Pass
30/11/2024	9:30	0.09	Pass	0.06	Pass	0.14	Pass
30/11/2024	9:40	0.09	Pass	0.07	Pass	0.15	Pass
30/11/2024	9:50	0.09	Pass	0.07	Pass	0.15	Pass
30/11/2024	10:00	0.09	Pass	0.07	Pass	0.16	Pass
30/11/2024	10:10	0.10	Pass	0.07	Pass	0.17	Pass
30/11/2024	10:20	0.10	Pass	0.08	Pass	0.17	Pass
30/11/2024	10:30	0.11	Pass	0.08	Pass	0.18	Pass
30/11/2024	10:40	0.11	Pass	0.08	Pass	0.18	Pass
30/11/2024	10:50	0.11	Pass	0.08	Pass	0.19	Pass
30/11/2024	11:00	0.11	Pass	0.08	Pass	0.19	Pass
30/11/2024	11:10	0.11	Pass	0.08	Pass	0.19	Pass
30/11/2024	11:20	0.12	Pass	0.08	Pass	0.19	Pass
30/11/2024	11:30	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	11:40	0.12	Pass	0.09	Pass	0.20	Pass

Date	Time	C_2H_6S (µg/m³) (Limit =56)		$C_2H_6S_2$ (µg/m³) (Limit =30)		CH_4S (µg/m³) (Limit =13)	
		Result	Status	Result	Status	Result	Status
30/11/2024	11:50	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	12:00	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	12:10	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	12:20	0.12	Pass	0.09	Pass	0.21	Pass
30/11/2024	12:30	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	12:40	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	12:50	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:00	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:10	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:20	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:30	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:40	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	13:50	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	14:00	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	14:10	0.13	Pass	0.09	Pass	0.21	Pass
30/11/2024	14:20	0.12	Pass	0.09	Pass	0.21	Pass
30/11/2024	14:30	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	14:40	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	14:50	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	15:00	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	15:10	0.12	Pass	0.09	Pass	0.20	Pass
30/11/2024	15:20	0.12	Pass	0.08	Pass	0.19	Pass
30/11/2024	15:30	0.11	Pass	0.08	Pass	0.19	Pass
30/11/2024	15:40	0.11	Pass	0.08	Pass	0.19	Pass
30/11/2024	15:50	0.11	Pass	0.08	Pass	0.18	Pass
30/11/2024	16:00	0.11	Pass	0.08	Pass	0.18	Pass
30/11/2024	16:10	0.11	Pass	0.08	Pass	0.18	Pass
30/11/2024	16:20	0.10	Pass	0.08	Pass	0.17	Pass
30/11/2024	16:30	0.10	Pass	0.07	Pass	0.17	Pass
30/11/2024	16:40	0.10	Pass	0.07	Pass	0.16	Pass
30/11/2024	16:50	0.09	Pass	0.07	Pass	0.16	Pass
30/11/2024	17:00	0.09	Pass	0.07	Pass	0.15	Pass

5 Summary of Results

Air quality and odor monitoring were conducted at ten locations to assess the concentration levels of dust and odor compounds. Dust concentrations were monitored over a 24-hour period for seven consecutive days, while odor was measured over a 24-hour period on a single day. The results below summarize the average concentrations of these pollutants across the ten locations, compared to regulatory limits where applicable.

5.1 Summary of Air Quality Results

Table 5-1 Summary of 24-hour average concentrations of TSP monitored at ten locations compared to regulatory limits.

#	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	TSP limit
AAQ-01	50.03	44.27	136.84	66.84	30.77	26.53	19.49	230 µg/m^3
AAQ-02	69.07	60.53	107.24	95.39	68.70	54.73	68.12	
AAQ-03	40.82	30.85	50.44	40.38	32.20	22.19	29.01	
AAQ-04	55.33	46.26	84.69	61.58	50.17	44.76	35.35	
AAQ-05	34.63	36.98	65.81	38.18	35.16	29.10	50.64	
AAQ-06	31.84	35.43	57.48	29.48	24.25	43.16	38.62	
AAQ-07	50.27	63.42	124.08	48.98	56.25	82.86	67.91	
AAQ-08	80.59	77.35	131.79	79.81	76.82	99.09	119.62	
AAQ-09	35.01	48.81	562.09	43.23	29.94	51.54	41.87	
AAQ-10	31.61	38.46	60.69	48.84	47.96	63.53	77.88	

Table 5-2 Summary of 24-hour average concentrations of PM_{10} measured at seven locations compared to regulatory limits.

#	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	PM_{10} limit
AAQ-01	39.77	35.34	120.76	54.15	22.53	17.90	13.24	150 µg/m^3
AAQ-02	46.18	41.27	77.76	64.17	44.92	32.58	41.96	
AAQ-03	31.17	23.33	42.90	32.44	23.39	16.52	20.30	
AAQ-04	38.43	30.49	63.57	41.91	31.17	27.14	21.59	
AAQ-05	26.63	28.87	55.64	30.62	26.93	20.92	34.07	
AAQ-06	24.86	29.00	51.29	24.38	19.01	30.28	29.12	
AAQ-07	31.99	44.39	99.91	33.14	34.67	46.83	40.64	
AAQ-08	47.53	49.74	95.07	47.09	43.81	53.16	68.49	
AAQ-09	23.29	37.14	544.21	32.64	20.10	32.56	28.30	
AAQ-10	25.66	32.52	52.46	33.92	36.41	48.85	54.11	

5.2 Summary of Odor Results

The line graph illustrates the variation in NH_3 concentrations (µg/Nm³) across ten locations over a 24-hour period. The red dashed line indicates the regulatory NH_3 limit of 30 µg/m³.

- NH_3 levels exceeded the regulatory limit at four out of ten locations during peak daytime hours, particularly between 10:00 and 15:00.
- The highest NH_3 concentration recorded was 853.00 µg/m³ at OMS-01 at 13:30.
- A consistent decline in NH_3 levels was observed during nighttime and early morning hours, with concentrations dropping below the regulatory limit after 3:00.

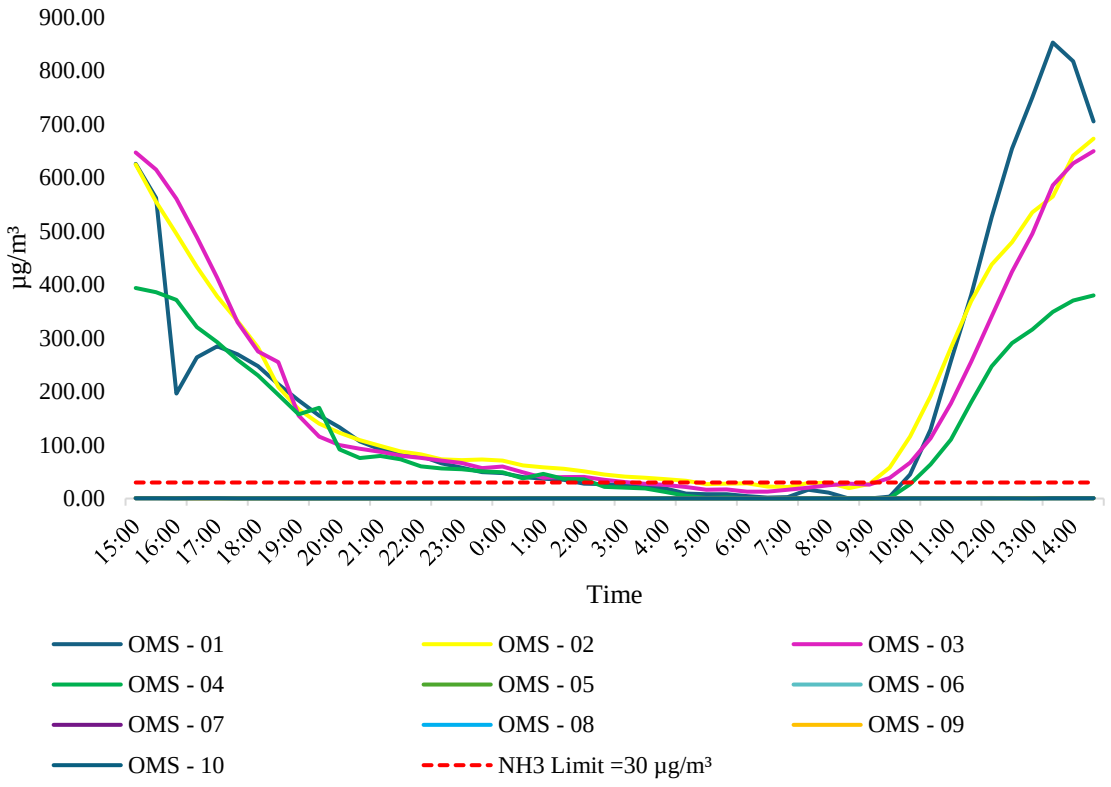

Figure 5-1 NH_3 (Ammonia) Levels over 24 Hours at Ten Measuring Points

This graph illustrates the variation in H_2S concentrations (µg/m³) across ten locations over a 24-hour period. The red dashed line represents the regulatory H_2S limit of 7 µg/m³.

- H_2S levels significantly exceeded the regulatory limit at OMS-01, particularly between 18:00 and 22:00, with a peak concentration of 2473.6 µg/m³ at 19:30.
- Minimal exceedances were observed at other locations, with H_2S levels generally remaining close to or below the regulatory limit.

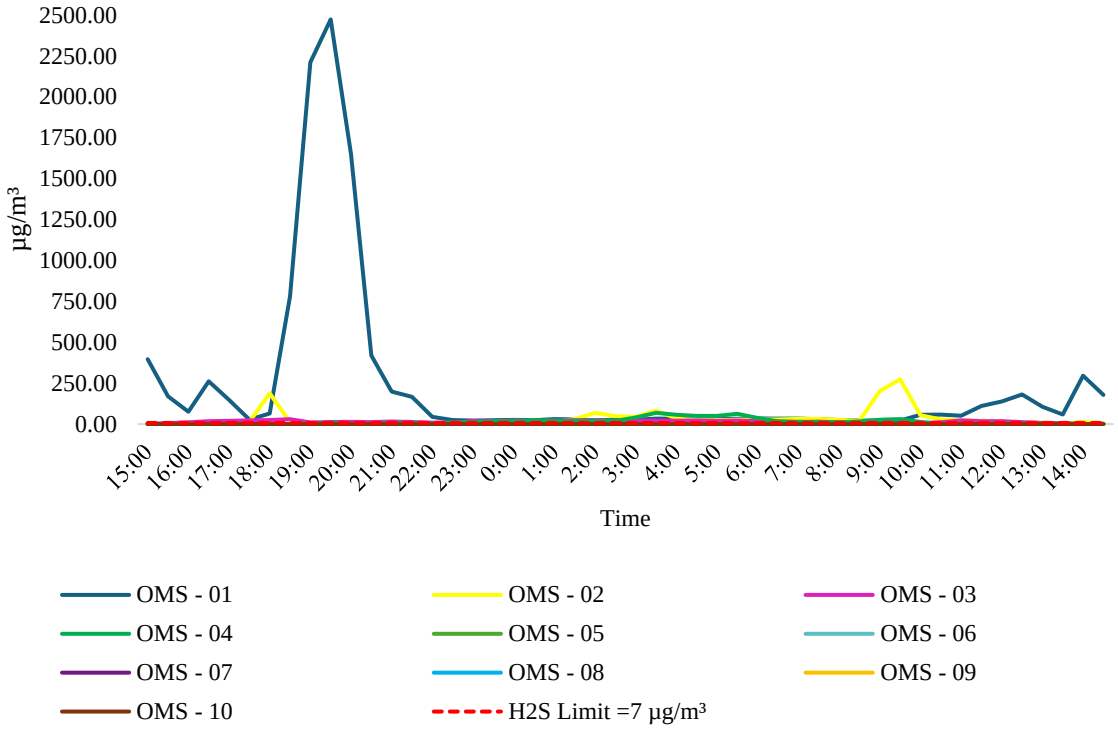

Figure 5-2 H_2S (Hydrogen Sulfide) Levels over 24 Hours at Ten Measuring Points

6 Photos of Measurements Taken During Site Preparation and Monitoring



Figure 6-1 Photographs of Monitoring Equipment at Measurement Locations

7 Conclusion

This report details the findings of an ambient air quality assessment conducted at 10 locations in Dubai. The monitoring program, conducted over seven consecutive days with 24-hour average readings, focused on Dust (TSP – PM_{10}) and odorous gases (NH_3, H_2S, C_2H_6S, $C_2H_6S_2$, and CH_4S) measured for 24 hours on a single day.

The air quality data indicates that Total Suspended Particles (TSP) and Particulate Matter (PM_{10}) levels generally remained within the permissible limits, except on Day 3 at monitoring site AAQ-09, where both parameters significantly exceeded the regulatory thresholds. This suggests localized activities or environmental factors contributing to high emissions on that day.

NH_3 concentrations exceeded the regulatory limit at OMS-01, OMS-02, OMS-03, and OMS-04, with OMS-01 consistently recording the highest concentrations. H_2S levels also showed extreme exceedances at OMS-01, particularly during the evening hours. OMS-02, OMS-03, and OMS-04 displayed occasional exceedances, while the remaining locations largely stayed within regulatory limits.

C_2H_6S, $C_2H_6S_2$, and CH_4S remained below the regulatory limits at all monitoring locations throughout the measurement period.

8 References

- Decree No. 12 for the year 2006 of the Executive Regulation of Federal Law 24 for 1999 of the United Arab Emirates.
- Guidance on Environmental Clearance (EC) Requirements for Development Infrastructure Industrial Projects in the Emirate of Dubai.

9 Consultant Technical Advisor

The key contact details are provided below:



10 Annexes

- Calibration Certificates of Odor Stations.
- Calibration Certificates of Topas - Particulate Monitoring Stations.

Certificate of Calibration

Calibration Test Result					
Device	**Odor Monitor**		**Calibration Date**	**2024.07.13**	
Type	**ZWIN-ECO6**		**Device ID**	20240712040001	
No.	**Product**	**Standard Gas Concentration**	**Technical Requirement**	**Test Result**	**Conclusion**
1	**H2S**	Zero Gas	Indication error : ±20%FS	0.031PPM	☑Qualified
		8 PPM		7.682 PPM	
2	**NH3**	Zero Gas	Indication error : ±20%FS	0.028 PPM	☑Qualified
		8PPM		7.691PPM	
3	**CH4S**	Zero Gas	Indication error : ±20%FS	0.031PPM	☑Qualified
		8 PPM		7.798 PPM	
4	**C2H6S**	Zero Gas	Indication error : ±20%FS	0.028 PPM	☑Qualified
		8PPM		7.792PPM	
5	**C2H6S2**	Zero Gas	Indication error : ±20%FS	0.021 PPM	☑Qualified
		8 PPM		7.799PPM	
6	**Temperature**	29.3	≤±3℃	30.1	☑Qualified
7	**Humidity**	45.3	≤±3%RH	44.6	☑Qualified
8	**Pressure**	100.6	≤±1KPa	100.6	☑Qualified
9	**Wind Speed**	5.2	±（0.5+0.05V）M/S	5.2	☑Qualified
10	**Wind Direction**	180	±5°（风速＜10M/S）	180	☑Qualified

Inspection : Qualified

Based on above calibration test result, the instrument meets all calibration criteria.

Calibration result:

Tested by:

Certificate of Calibration

Calibration Test Result					
Device	**Miniature Air Quality Monitor**		**Calibration Date**	**November 2024**	
Type	**ZWIN-AQMS06**		**Device ID**	**20241026050001**	
No.	**Product**	**Standard Gas Concentration**	**Technical Requirement**	**Test Result**	**Conclusion**
1	**NH3（PPM）**	Zero Gas	Indication error : ±2%FS	0.142PPM	☑Qualified
		8PPM		7.981PPM	
2	**H2S（PPM）**	Zero Gas	Indication error : ±2%FS	0.031PPM	☑Qualified
		8PPM		8.051PPM	
3	**CH4S（PPM）**	Zero Gas	Indication error : ±2%FS	0.070PPM	☑Qualified
		8PPM		8.096PPM	
4	**C2H6S（PPM）**	Zero Gas	Indication error : ±2%FS	0.042PPM	☑Qualified
		8PPM		8.041PPM	
6	**C2H6S2（PPM）**	Zero Gas	Indication error : ±2%FS	0.031PPM	☑Qualified
		8PPM		8.011PPM	
7	**Temperature**	28.6	≤±3℃	28.1	☑Qualified
8	**Humidity**	45.6	≤±3%RH	45.1	☑Qualified
9	**Atmosphere**	100.2	≤±1KPa	100.2	☑Qualified
10	**Wind speed**	5.0	±（0.5+0.05V）M/S	4.9	☑Qualified

11	**Direction**	180	±5°（风速＜10M/S）	180	☑Qualified

Inspection : Qualified

Based on above calibration test result, the instrument meets all calibration criteria.

Calibration result:

Tested by:

Scientific Business Solutions

Calibration Certificate

Reference No.: SBS-CER-011

Customer & Instrument Information

Calibration No.:04

Customer:	SBS	**Instrument Serial No:**	TNT1567
Date Supplied New:	05-May. -2015	**SBS Internal Coding:**	SBS-014
Date of Last Calibration:	20-Jul.-2024	**Last Certificate Number:**	SBS131887

Instrument Inspection

Measured Flow Rate:	600 Cc/min	**Total Pump Usage:**	25113 Hours
TSP MCF: 1.0	**PM10 MCF:** 1.0	**PM2.5 MCF:** 1.0	**PM1.0 MCF:** 1.0
Comments:			

Service & Recalibration

Photometer Scale:	3750	**Laser Current:**	34 mA
Flow Rate:	600 Cc/min	**Stray Light:**	0 mV

Parts Replaced

Glass Microfibers Paper Filter

Calibration Against Reference

Fraction	Zero	Reading	Reference	New MCF
TSP	0.0 µg/m^3	94.2 µg/m^3	93.1 µg/m^3	1.0
PM10	0.0 µg/m^3	88.3 µg/m^3	86.5 µg/m^3	1.0
PM2.5	0.0 µg/m^3	81.79 µg/m^3	81.44 µg/m^3	1.0
PM1.0	0.0 µg/m^3	54.58 µg/m^3	59.64 µg/m^3	1.0

Reference Instrument: TNO3344	**Reference Calibration No.:** GA/231219.2.1
Calibration Date Label: YES [√] NO [ ]	**Final Inspection:** YES [√] NO [ ]

Calibration Certificate Number: SBS131952	**Date of Calibration:** 15-Oct.-2024
Temperature: 22 °C	**Valid To:** 14-Jan.-2025
Calibrated by:	**Approved by:**
Name: Mohamed Taha	Name: Mohamed Khater
Job position: Instrument Engineer	Job position: Technical Engineer
PASSED SBS CALIBRATION TEAM	APPROVED

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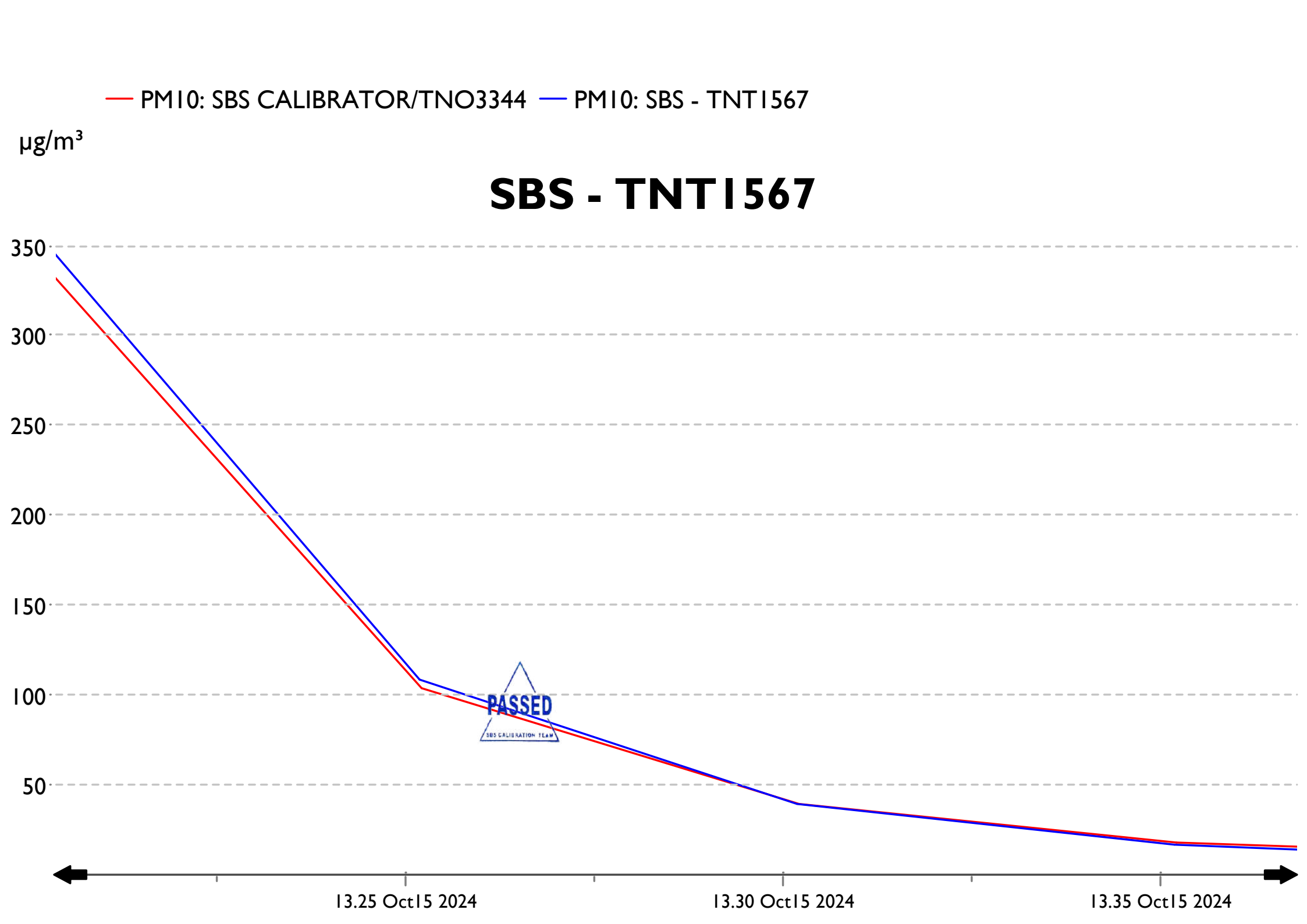
Email: info@sbs-website.com
Website: www.sbs-website.com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PM10: SBS - TNT1567
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SBS - TNT1567
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300
250
200
150
100
50
PASSED
SBS CALIBRATION TEAM
13.25 Oct15 2024
13.30 Oct15 2024
13.35 Oct15 2024

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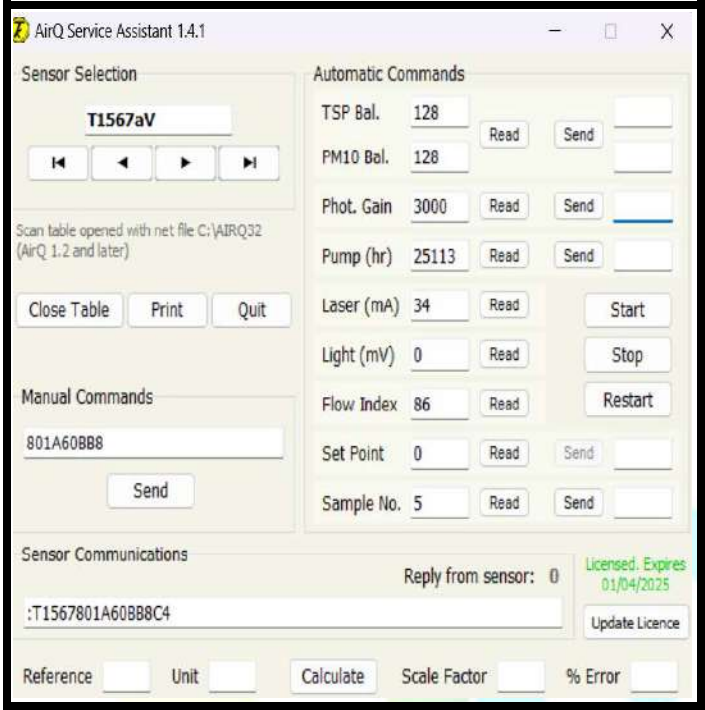
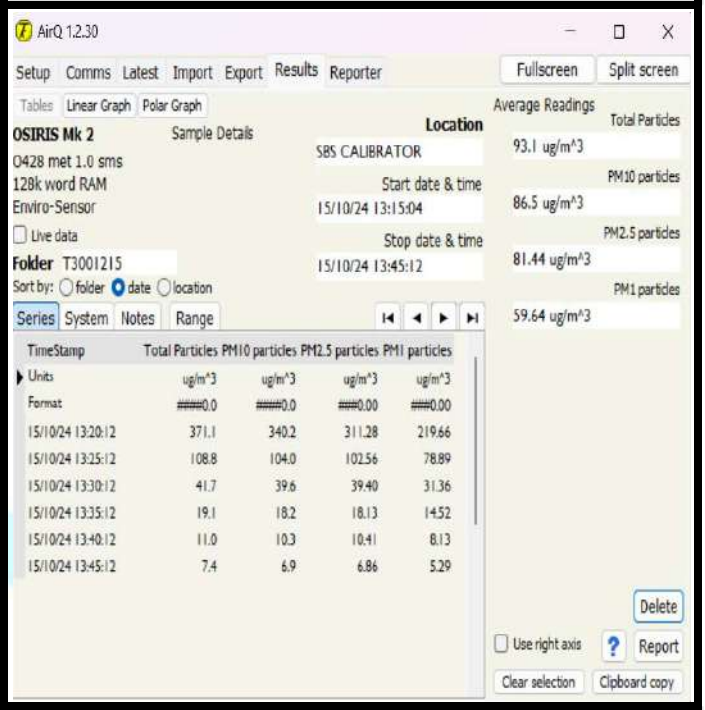
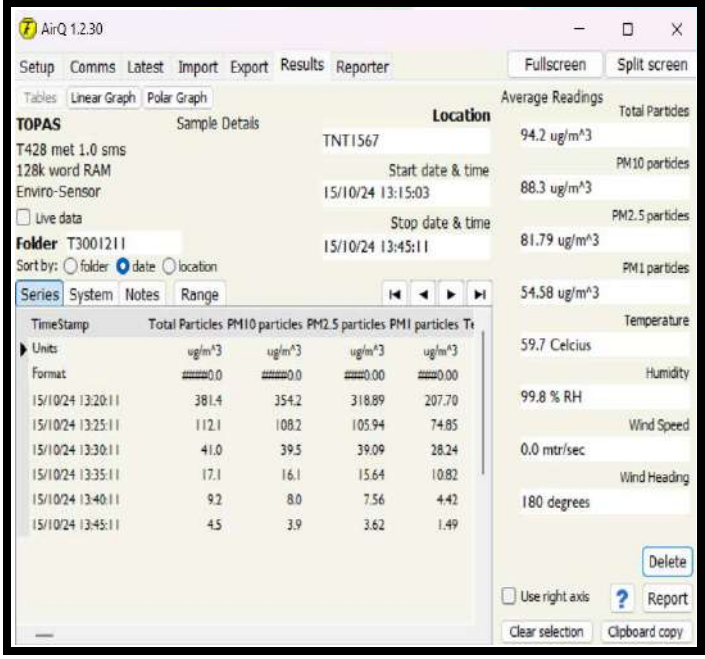
Current Result Before Calibration



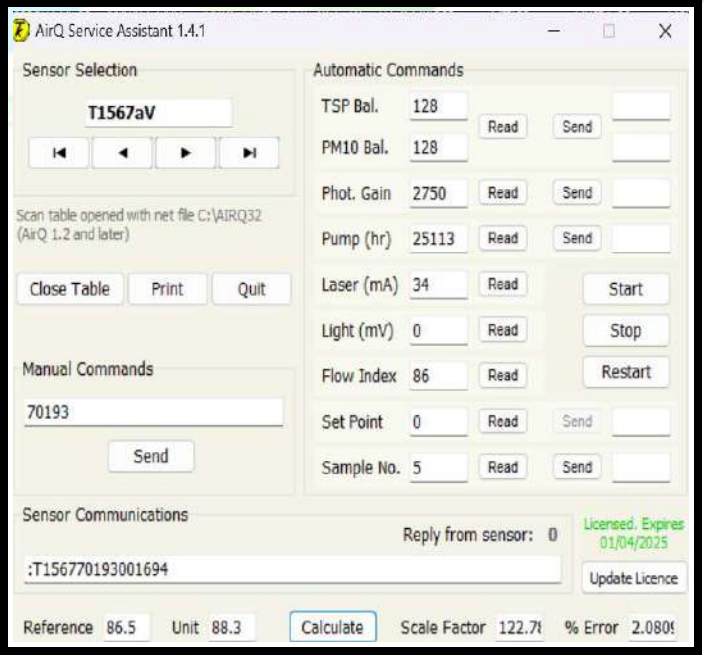
Calibrator Reading



After Calibration Results



Nephelometer Adjustment



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Fax: +971 45 507 801

Email: info@sbs-website.com
Website: www.sbs-website.com

Scientific Business Solutions

Calibration Certificate

Reference No.: SBS-CER-011

Customer & Instrument Information

Calibration No.: 04

Customer:	SBS	**Instrument Serial No:**	TNT1869
Date Supplied New:	01-Feb-2021	**SBS Internal Coding:**	SBS-082
Date of Last Calibration:	01-Jul.-2024	**Last Certificate Number**:	SBS131860

Instrument Inspection							
Measured Flow Rate:	600	Cc/min		**Total Pump Usage**:	10658	Hours	
TSP MCF:	1.0	**PM10 MCF:**	1.0	**PM2.5 MCF**:	1.0	**PM1.0 MCF**:	1.0
Comments:							

Service & Recalibration				
Photometer Scale:	2900		**Laser Current:**	28 mA
Flow Rate:	600	Cc/min	**Stray Light:**	0 mV
Parts Replaced				
Glass Microfiber Paper Filter				

Calibration Against Reference

Fraction	Zero	Reading	Reference	New MCF
TSP	0.0 µg/m^3	81.3 µg/m^3	70.6 µg/m^3	1.0
PM10	0.0 µg/m^3	73.4 µg/m^3	65.4 µg/m^3	1.0
PM2.5	0.0 µg/m^3	68.17 µg/m^3	62.08 µg/m^3	1.0
PM1.0	0.0 µg/m^3	46.56 µg/m^3	45.07 µg/m^3	1.0

Reference Instrument: TNO3344	**Reference Calibration No.:** GA/231219.2.1
Calibration Date Label: YES [√] NO [ ]	**Final Inspection:** YES [√] NO [ ]

Calibration Certificate Number: SBS131932	**Date of Calibration:** 07-Oct.-2024
Temperature: 22 °C	**Valid To:** 06-Jan.-2025
Calibrated by:	**Approved by:**
Name: Mohamed Taha	Name: Mohamed Khater
Job position: Maintenance Engineer	Job position: Technical Engineer
PASSED SBS CALIBRATION TEAM	APPROVED

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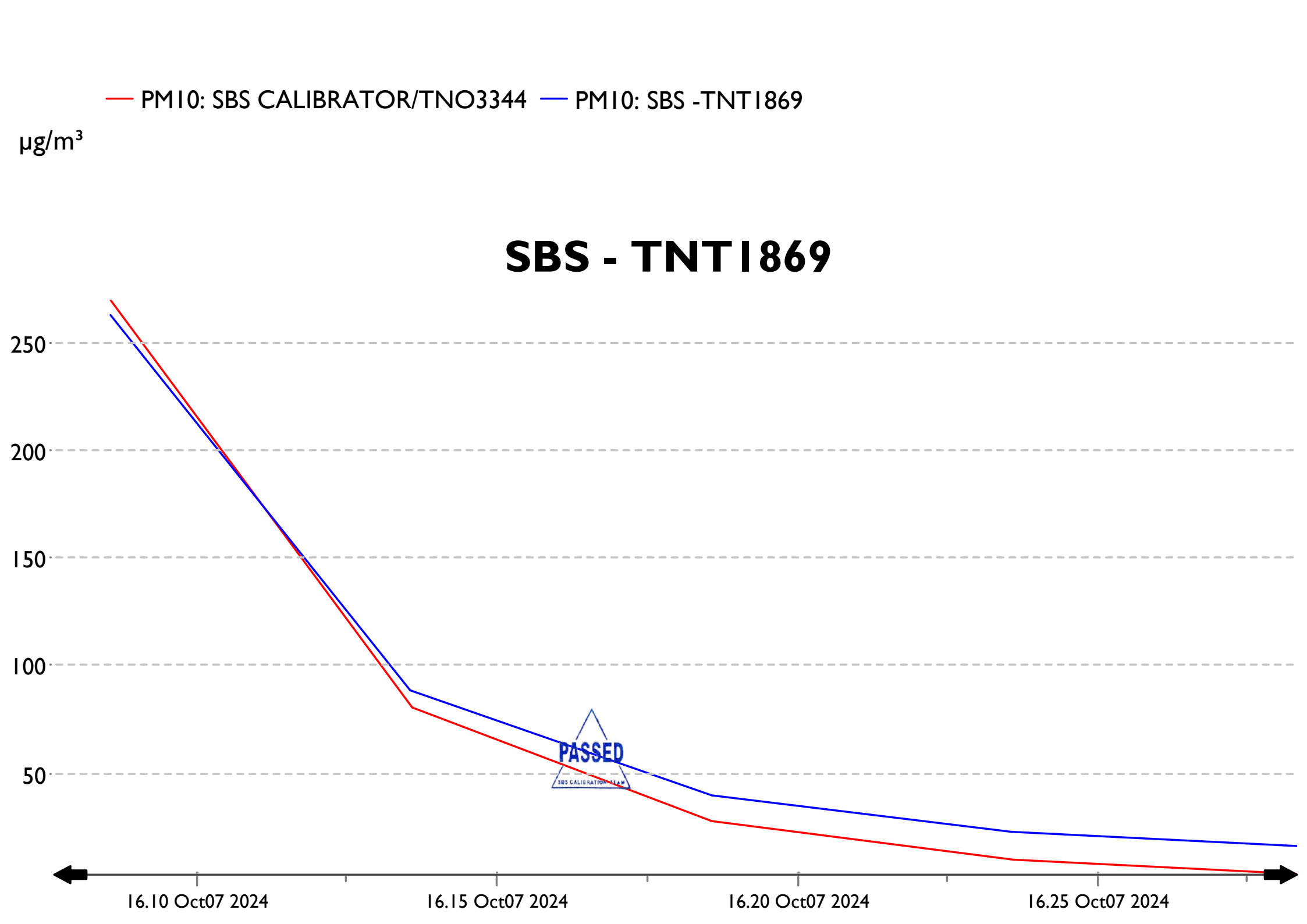
Email: info@sbs-website.com
Website: www.sbs-website.com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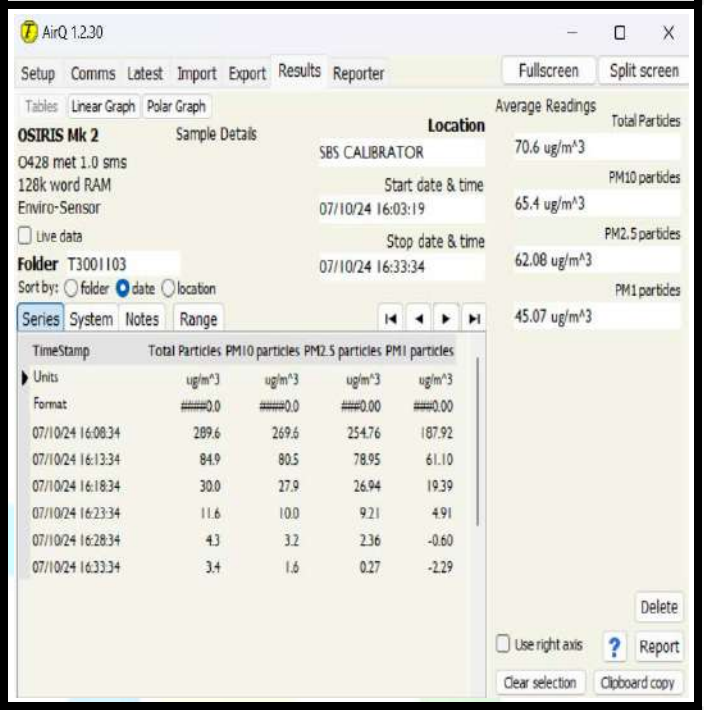
PM10: SBS -TNT1869
µg/m³
SBS - TNT1869
250
200
150
100
50
PASSED
16.10 Oct07 2024
16.15 Oct07 2024
16.20 Oct07 2024
16.25 Oct07 2024

Scientific Business Solutions

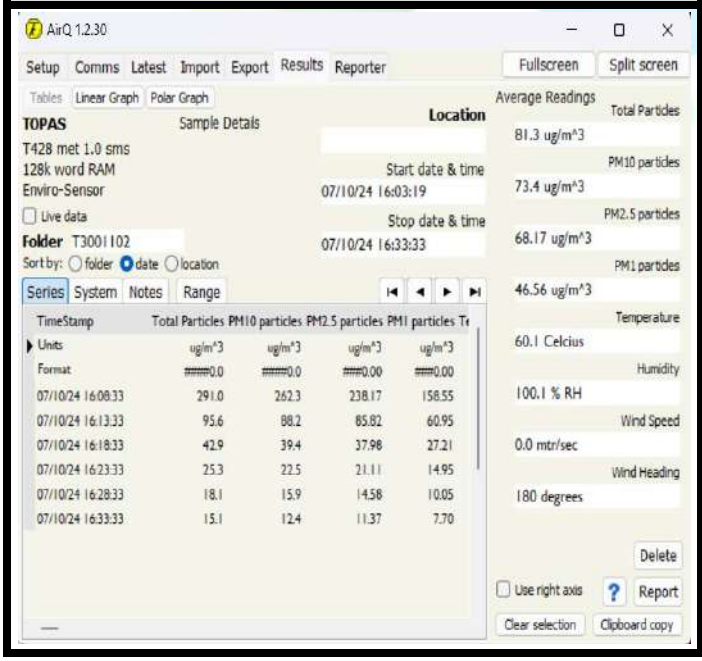
Current Result Before Calibration



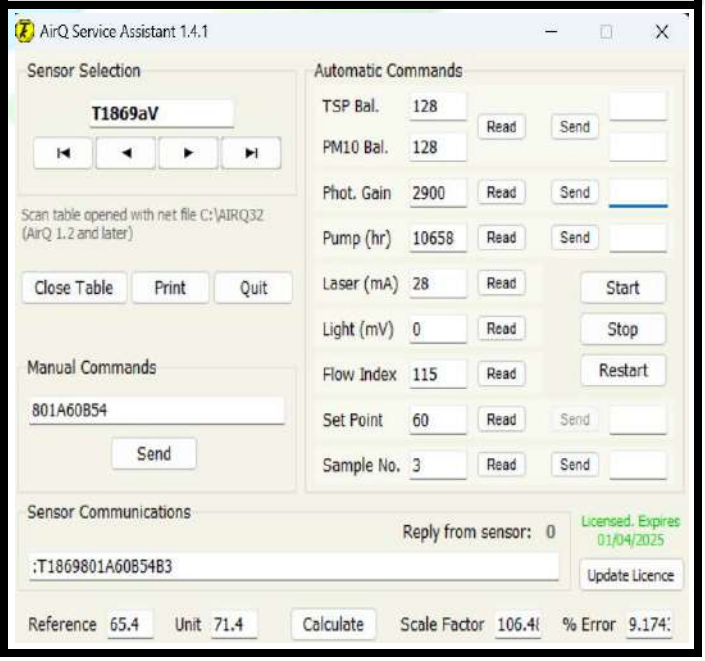
Calibrator Reading



After Calibration Results



Nephelometer Adjustment



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Fax: +971 45 507 801

Email: info@sbs-website.com
Website: www.sbs-website.com

Scientific Business Solutions

Calibration Certificate

Reference No.: SBS-CER-011

Customer & Instrument Information

Calibration No.: 04

Customer:	SBS	**Instrument Serial No:**	TNO2101
Date Supplied New:	Unknown	**SBS Internal Coding**:	SBS-075
Date of Last Calibration:	05-Jul.-2024	**Last Certificate Number:**	SBS131875

Instrument Inspection

Measured Flow Rate:	600	Cc/min		**Total Pump Usage:**	28240	Hours	
TSP MCF:	1.0	**PM10 MCF:**	1.0	**PM2.5 MCF:**	1.0	**PM1.0 MCF:**	1.0
Comments:							

Service & Recalibration

Photometer Scale:	2300		**Laser Current:**	32	mA
Flow Rate:	600	Cc/min	**Stray Light:**	0	mV

Parts Replaced

Glass Microfiber Paper Filter

Calibration Against Reference

Fraction	Zero	Reading	Reference	New MCF
TSP	0.0 µg/m^3	82.1 µg/m^3	80.4 µg/m^3	1.0
PM10	0.0 µg/m^3	75.8 µg/m^3	75.6 µg/m^3	1.0
PM2.5	0.0 µg/m^3	72.85 µg/m^3	73.16 µg/m^3	1.0
PM1.0	0.0 µg/m^3	47.95 µg/m^3	54.34 µg/m^3	1.0

Reference Instrument: TNO3344	**Reference Calibration No.:** GA/ 231219.2.1
Calibration Date Label: YES [√] NO [ ]	**Final Inspection:** YES [√] NO [ ]

Calibration Certificate Number: SBS131947	**Date of Calibration:** 10-Oct.-2024
Temperature: 22 °C	**Valid To:** 09-Jan.-2025
CALIBRATED BY:	**APPROVED BY:**
Name: Mohamed Taha	Name: Mohamed Khater
JOB POSITION: Instrument Engineer	JOB POSITION: Technical Engineer
PASSED SBS CALIBRATION TEAM	APPROVED

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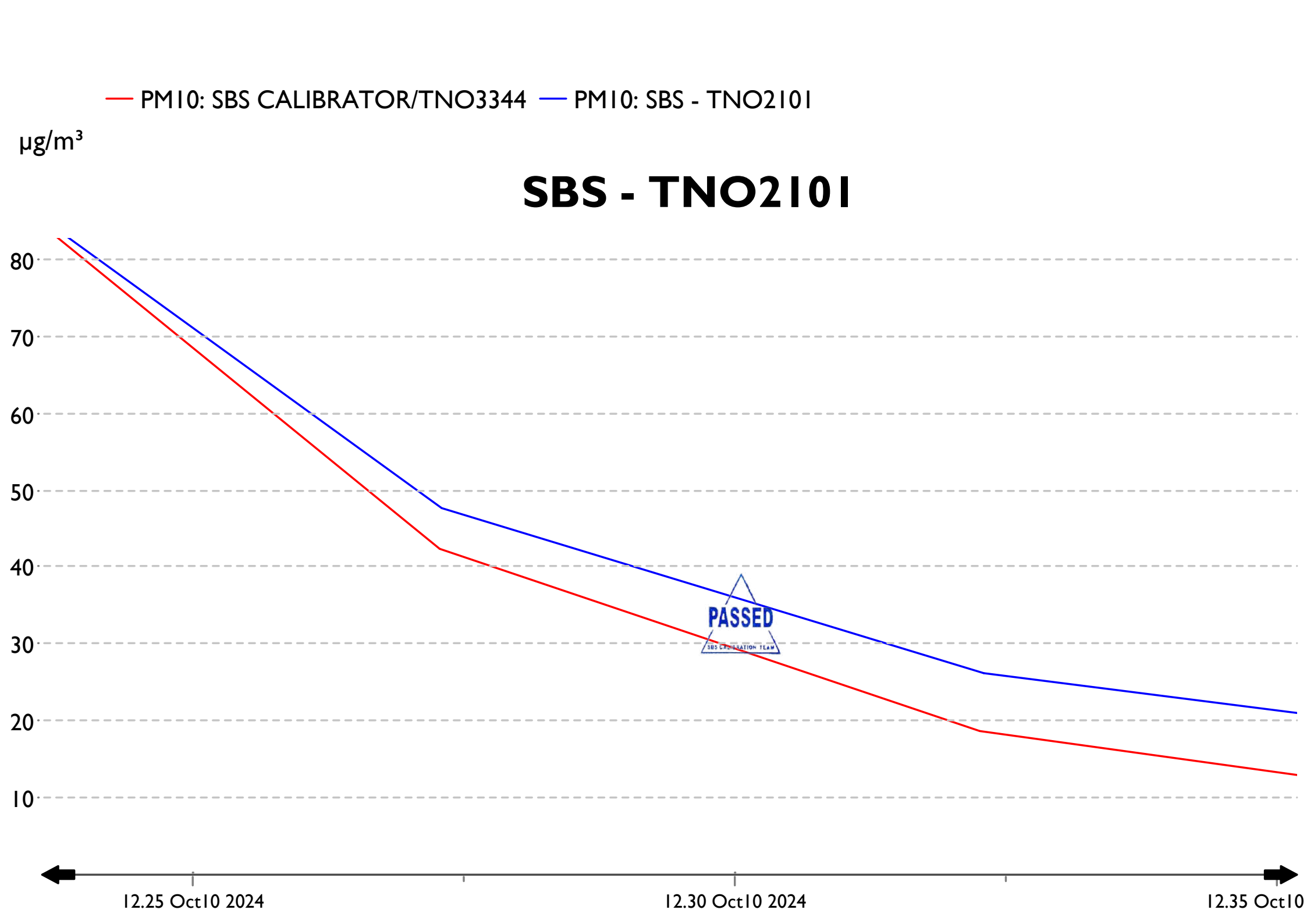
Website: www.sbs-website.com


PM10: SBS CALIBRATOR/TNO3344
PM10: SBS - TNO2101
µg/m³
SBS - TNO2101
80
70
60
50
40
30
20
10
PASSED
12.25 Oct10 2024
12.30 Oct10 2024
12.35 Oct10

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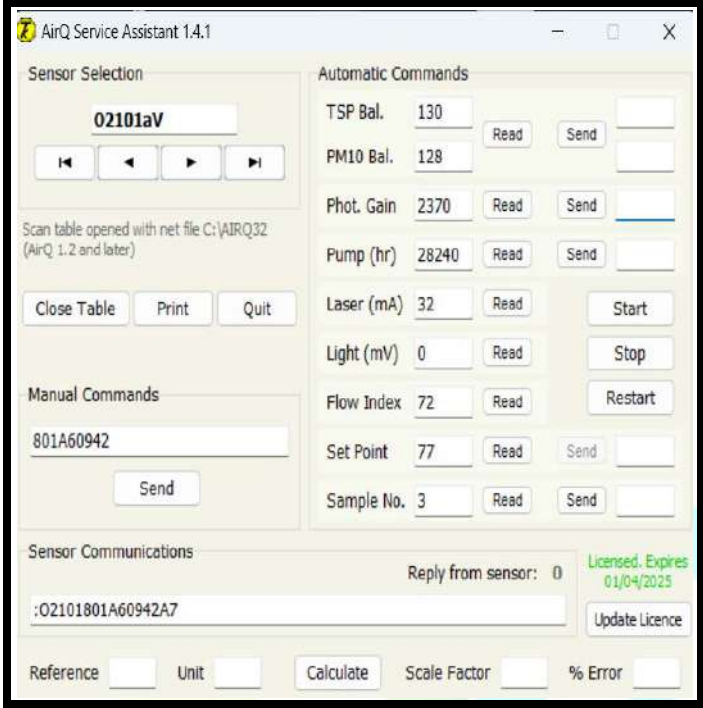
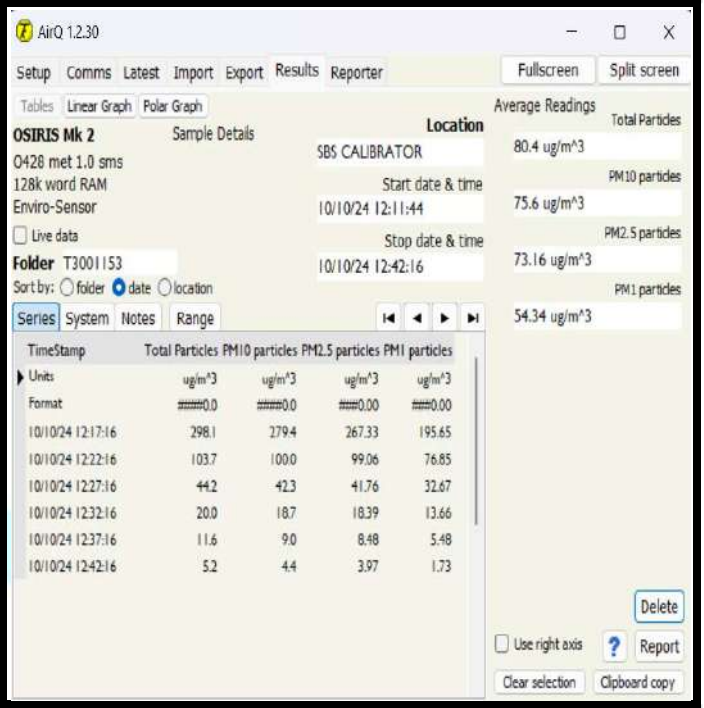
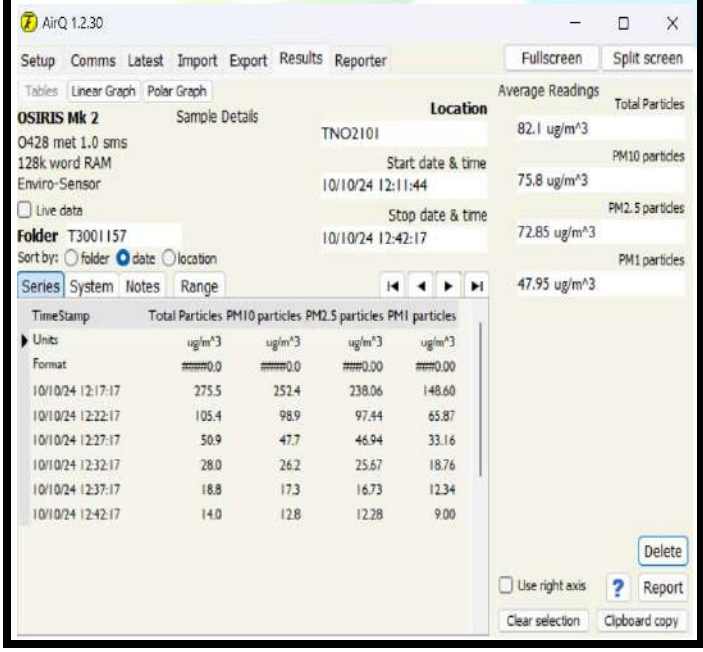
Current Result Before Calibration



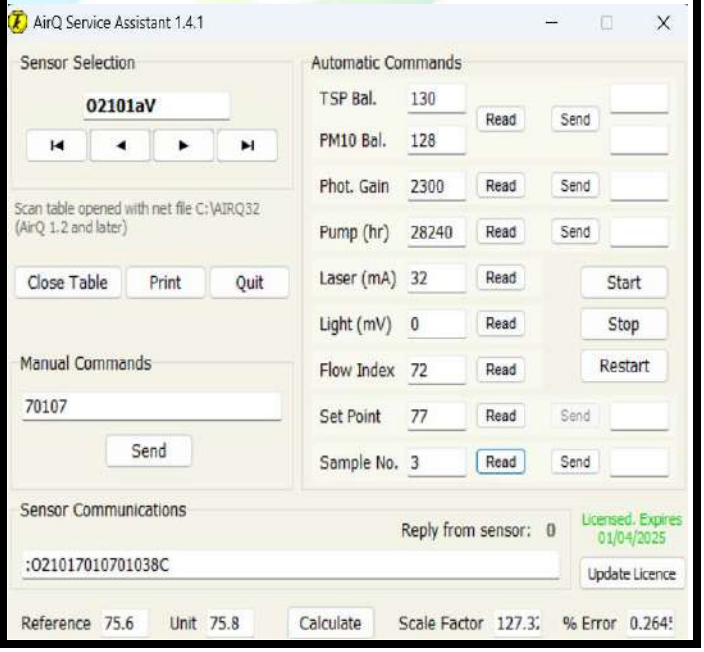
Calibrator Reading



After Calibration Results



Nephelometer Adjustment



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Website: www.sbs-website.com

Scientific Business Solutions

Calibration Certificate

Reference No.: SBS-CER-011

Customer & instrument Information

Calibration No.: 04

Customer:	SBS	**Instrument Serial No:**	TNT1559
Date Supplied New:	04-Jun-2015	**Service Contract No:**	SBS
Date of Last Calibration:	28-Jun.-2024	**Last Certificate Number:**	SBS131851

Instrument Inspection

Measured Flow Rate:	600	Cc/min		**Total Pump Usage:**	40459	Hours	
TSP MCF:	1.0	**PM10 MCF:**	1.0	**PM2.5 MCF:**	1.0	**PM1.0 MCF:**	1.0
Comments:							

Service & Recalibration

Photometer Scale:	3500		**Laser Current:**	28	mA
Flow Rate:	600	Cc/min	**Stray Light:**	0	mV

Parts Replaced

Glass Microfiber Paper

Calibration Against Reference

Fraction	Zero	Reading	Reference	New MCF
TSP	00.0 µg/m^3	44.6 µg/m^3	45.1 µg/m^3	1.0
PM10	00.0 µg/m^3	44.1 µg/m^3	37.9 µg/m^3	1.0
PM2.5	00.0 µg/m^3	37.76 µg/m^3	31.71 µg/m^3	1.0
PM1.0	00.0 µg/m^3	2.63 µg/m^3	12.32 µg/m^3	1.0

Reference Instrument: TNO3344	**Reference Calibration No.:** GA/ 231219.2.1
Calibration Date Label: YES [√] NO [ ]	**Final Inspection:** YES [√] NO [ ]

Recommendation

Calibration Certificate Number: SBS131920	**Date of Calibration:** 03-Oct.-2024
Temperature: 22 °C	**Valid To:** 02-Jan.-2025
Calibrated by:	**Approved by:**
Name: Mohamed Taha	Name: Mohamed Khater
Job position: Maintenance Engineer	Job position: Technical Engineer
PASSED SBS CALIBRATION TEAM	APPROVED

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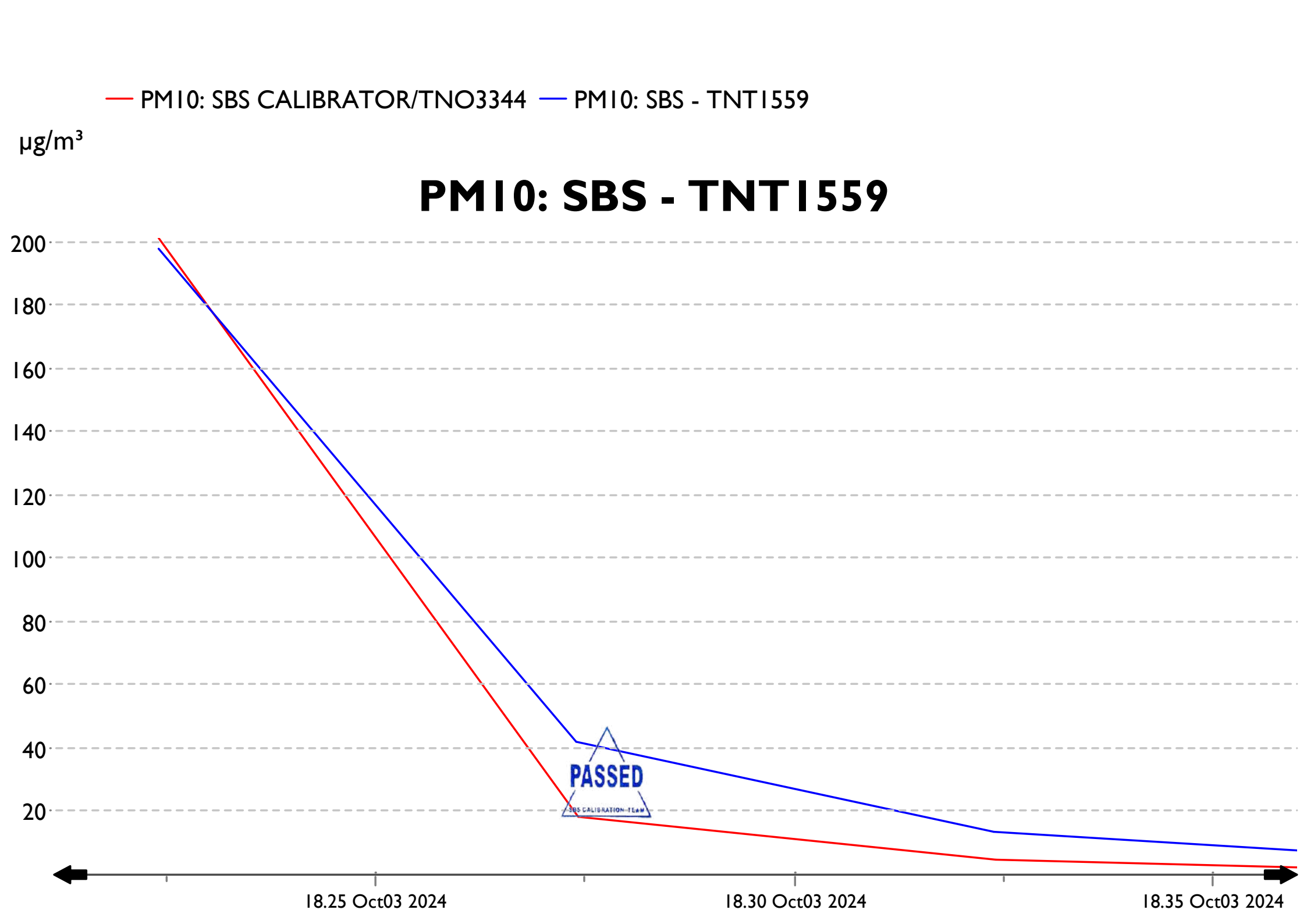
PM10: SBS CALIBRATOR/TNO3344
PM10: SBS - TNT1559
µg/m³
PM10: SBS - TNT1559
200
180
160
140
120
100
80
60
40
20
PASSED
18.25 Oct03 2024
18.30 Oct03 2024
18.35 Oct03 2024

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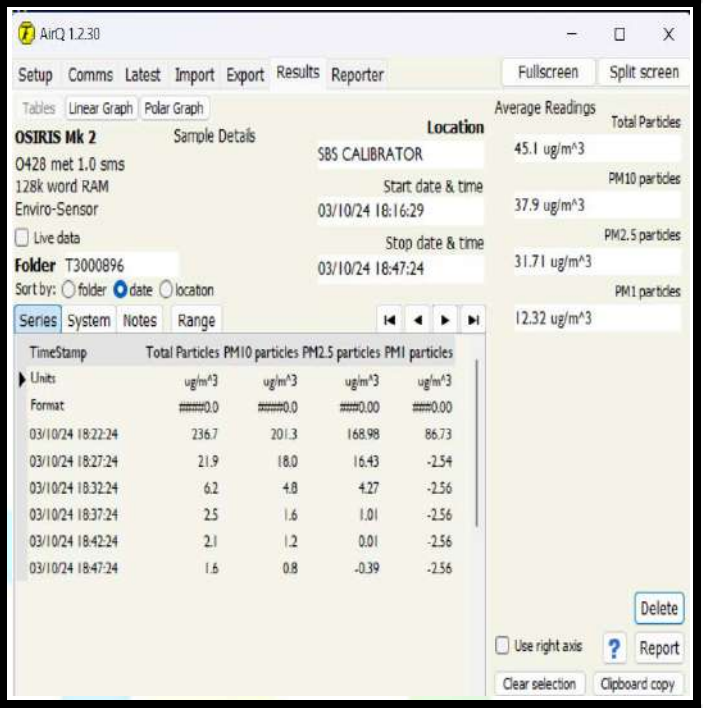
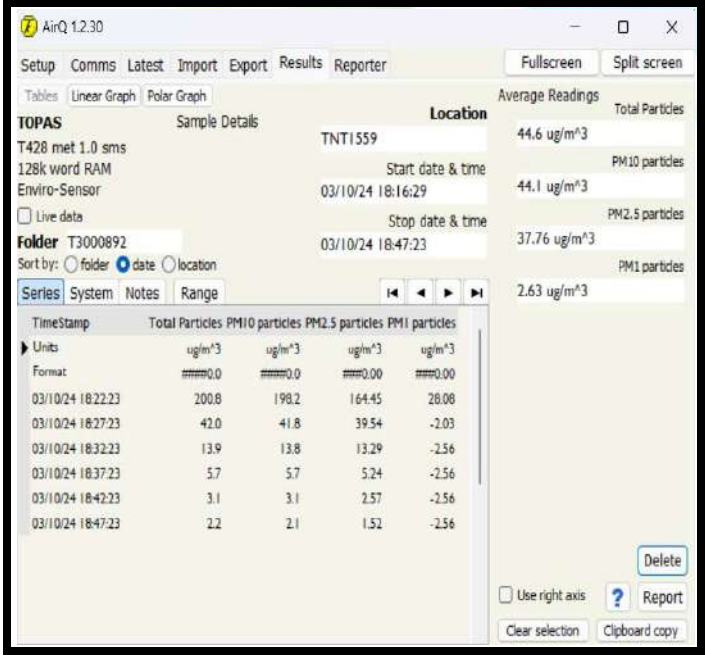
Current Result Before Calibration



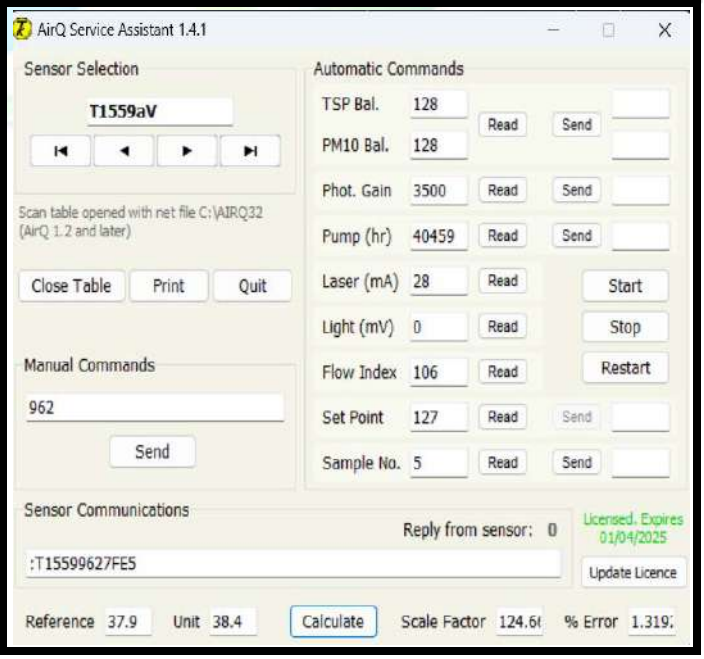
Calibrator Reading



After Calibration Results



Nephelometer Adjustment



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Website: www.sbs-website.com

Scientific Business Solutions

Calibration Certificate

Reference No.: SBS-CER-011

Customer & Instrument Information

Calibration No.:04

Customer:	SBS	**Instrument Serial No:**	TNT1586
Date Supplied New:	08-Jun-2015	**SBS Internal Coding:**	SBS-031
Date of Last Calibration:	28-Jun.-2024	**Last Certificate Number:**	SBS131864

Instrument Inspection

Measured Flow Rate:	600	Cc/min		**Total Pump Usage:**	18654	Hours	
TSP MCF:	1.0	PM10 MCF:	1.0	PM2.5 MCF:	1.0	PM1.0 MCF:	1.0
Comments:							

Service & Recalibration

Photometer Scale:	3550		**Laser Current:**	30	mA
Flow Rate:	600	Cc/min	**Stray Light:**	0	mV

Parts Replaced

Glass Microfibres Paper Filter

Calibration Against Reference

Fraction	Zero	Reading	Reference	New MCF
TSP	0.0 µg/m^3	38.9 µg/m^3.	45.1 µg/m^3	1.0
PM10	0.0 µg/m^3	38.4 µg/m^3	37.9 µg/m^3	1.0
PM2.5	0.0 µg/m^3	31.92 µg/m^3	31.71 µg/m^3	1.0
PM1.0	0.0 µg/m^3	1.02 µg/m^3	12.32 µg/m^3	1.0

Reference Instrument: TNO3344	**Reference Calibration No.:** GA/231219.2.1
Calibration Date Label: YES [√] NO [ ]	**Final Inspection**: YES [√] NO [ ]

Recommendation

Calibration Certificate Number: SBS131919	**Date of Calibration:** 03-Oct.-2024
Temperature: 22 ºC	**Valid To:** 02-Jan.-2025
Calibrated by:	**Approved by:**
Name: Mohamed Taha	Name: Mohamed Khater
Job position: Instrument Engineer	Job position: Technical Engineer
PASSED SBS CALIBRATION TEAM	APPROVED

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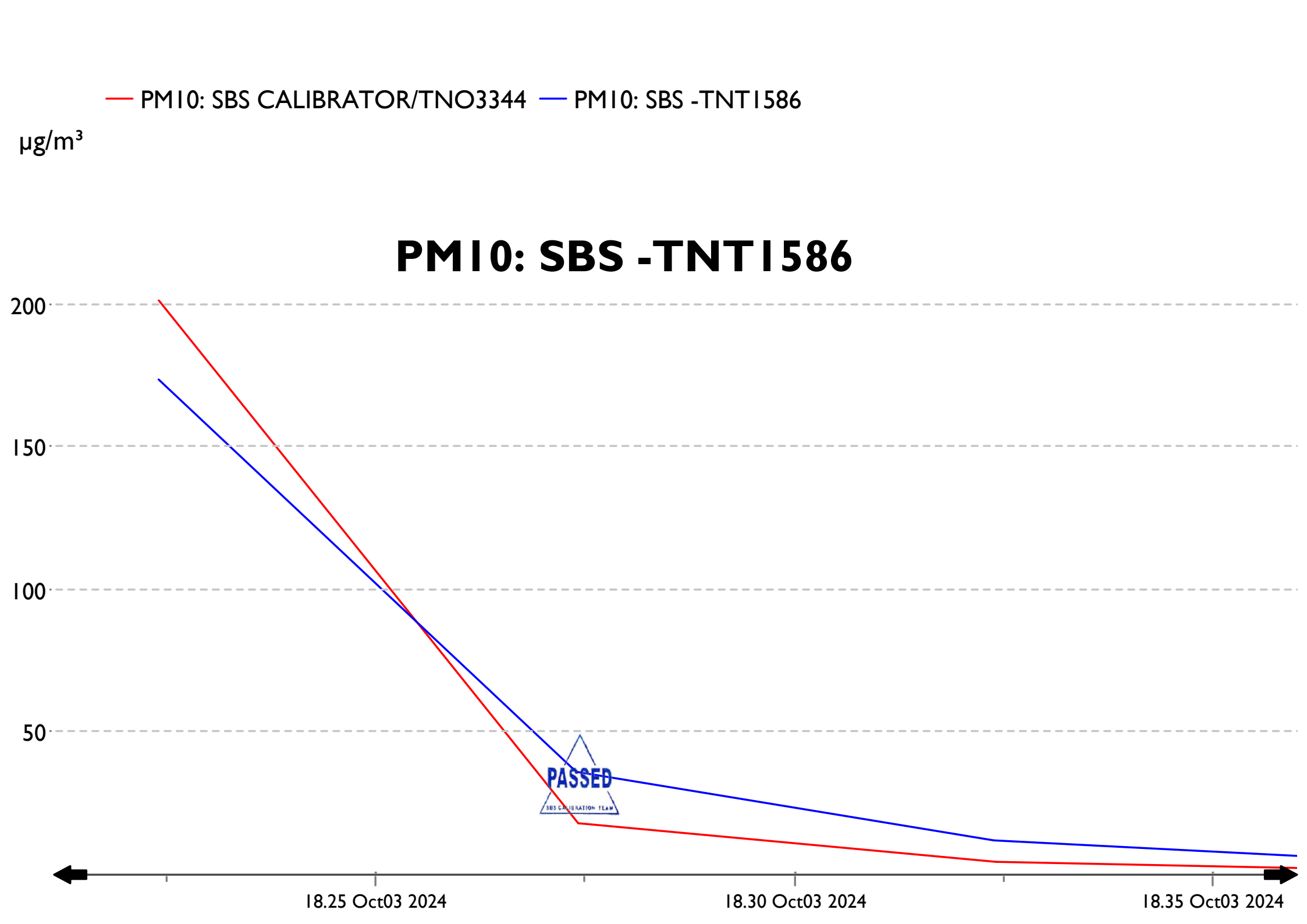
Website: www.sbs-website.com


PM10: SBS CALIBRATOR/TNO3344
PM10: SBS -TNT1586
µg/m³
PM10: SBS -TNT1586
200
150
100
50
PASSED
18.25 Oct03 2024
18.30 Oct03 2024
18.35 Oct03 2024

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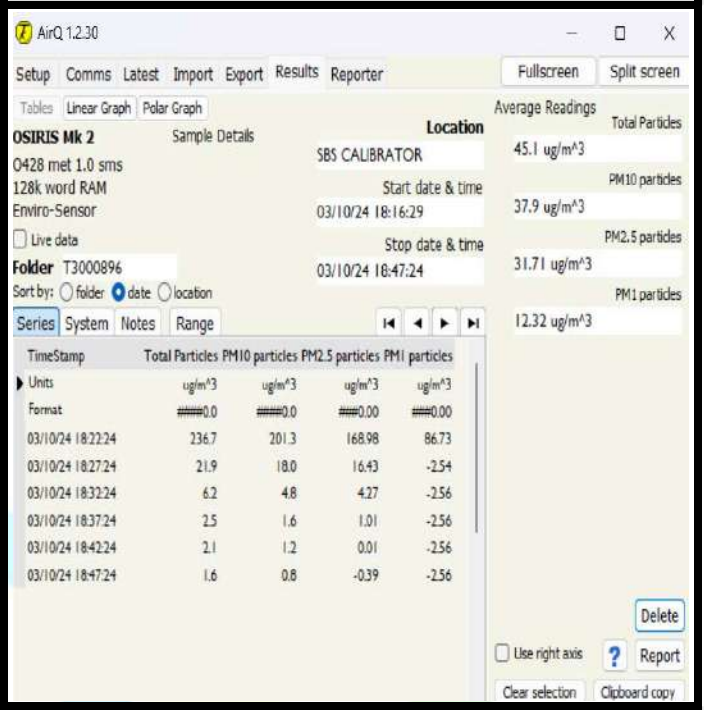
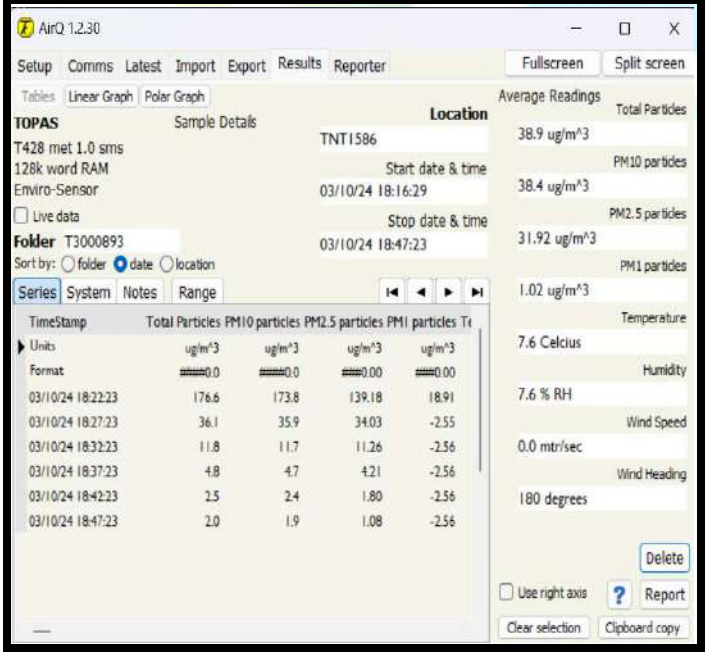
Current Result Before Calibration



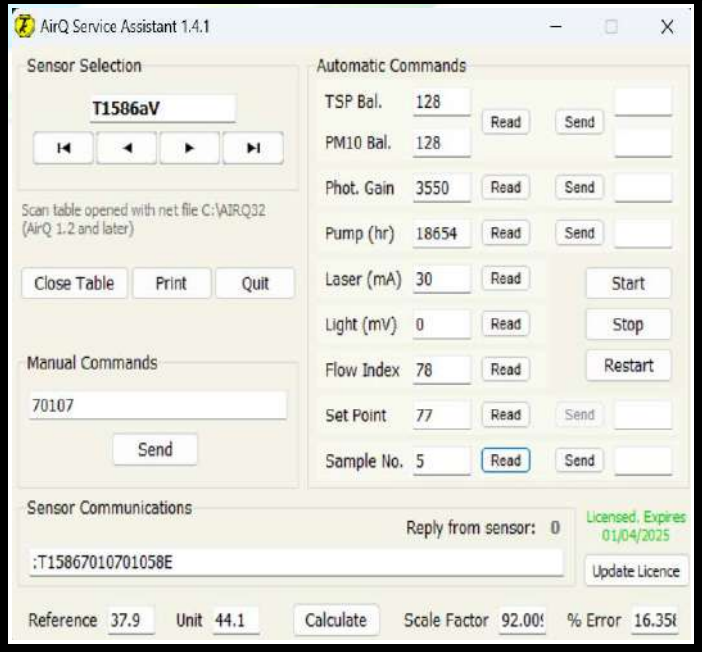
Calibrator Reading



After Calibration Results



Nephelometer Adjustment



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Website: www.sbs-website.com

CALIBRATION CERTIFICATE

CERTIFICATE NO. : GA/231219.2.1

DATE OF ISSUE	19/12/2023
CUSTOMER NAME	Scientific Business Solution FZE
Address	Fujairah Free Zone. D7 P.O Box : 50555 UAE
UUT DETAILS	
Name	Environmental Partical Monitor
Make	Turnkey Instruments
Model No.	OSIRIS
Range	As per specification
Resolution	As per specification
Serial No.	TNO 3344
ID Mark	SBS-OSR-003
Receipt Date	18/12/2023
Calibration Carried Out	Lab
Visual Inspection	Ok
REFERENCE EQUIPMENT DETAIL	
Name	Master Instrument
Serial No.	X20716 // T13AE
Certificate No.	SSES-01-05016433 // ETPL/N/221021/03
Calibration on	03/02/2023 // 21/10/2022
Validity	02/02/2024 // 20/10/2024
ENVIRONMENTAL CONDITIONS	
Temperature	$20^0C \pm 2^0C$ (Actual Temperature - 20.5^0C)
Humidity	50% RH ± 10% RH (Actual Humidity - 48.5% RH)

CALIBRATION METHOD

The above mention instrument was calibrated according to our W.I No- 20-2 (as per ISO 21501-4)

The unit under test (UUT) was calibrated by using Standard Refrence Instrument.

P.O.Box : 125349, Dubai - U.A.E., Tel.: 04 - 341 3680, Fax: 04 - 341 3690, Al Quoz Industrial Area 4

E-mail : omcl@emirates.net.ae / sbem@emirates.net.ae

www.sanbookomega.com

CALIBRATION CERTIFICATE

CERTIFICATE NO. : GA/231219.2.1

CALIBRATION RESULTS

Flow*

UUT Reading (lpm)*	Std. Reaading (lpm)*
2.8	2.8

Sl. No.	Channel	Standard Reading		Instrument Reading		Deviation		Expanded Uncertainty in %	Coverage Factor K
1	* PM 1.0	11.3	ug/m3	11.8	ug/m3	0.5	ug/m3	3.3	1.96
2	PM 2.5	42.2	ug/m3	43.1	ug/m3	0.9	ug/m3	3.5	1.96
3	PM 10	96.2	ug/m3	97.5	ug/m3	1.3	ug/m3	3.6	1.96
4	TSP	118.4	ug/m3	119.9	ug/m3	1.5	ug/m3	3.8	1.96

Note :- * Not in Accreditation Scope.

DATE OF CALIBRATION: 19/12/2023 **RECOMMENDED DUE DATE:** 18/12/2024

Calibrated By
Anshul Tiwari
(Lab Engineer)

Verified By
Saroop Singh
(Technical Manager)

Approved By
(MD/GM/TM)

OMEGA MEASURING & CALIBRATION LABORATORY

TRACEABILITY

The traceability used in calibration is traceable to national / International standards which realize the physical units of measurements (SI).

1- For k=1.96
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=1.96, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with international practice.

2- For k≠1.96
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor for which a t-distribution corresponds to a coverage probability at approximately 95%. The uncertainty evaluation has been carried out in accordance with international practice.

3- The above results are valid at the time of and under the stated conditions of measurement.

4-The result of calibration refers only to the particular item(s) submitted for calibration.

5- The certificate shall not be reproduce, except in full, without the written permission of the laboratory.

6- Recommended due date as per agreed by customer request.

7- No Adjustment were made prior to calibration.

The reported expanded uncertainty of measurement is statedas the standard uncertainty of measurement multiplied by the coverage factor k=1.96, which for a normal distribution corresponds to a coverage probability of approximately 95%

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Noise Measurement Data Sheet

Project Name	**Environmental Impact Assessment (EIA) for Dubai strategic sewerage tunnels & link sewer.**	**Date of Survey**	**November 18 – 04 Dec 2024**
Project ID	**ED 24.74**	**Duration of Survey**	**Day Survey**
Noise Meter	**NA 28 Rion**	**Campaign Time**	**Day Survey**
Observer	**PATRICK AGUILAR**	**Monitoring Area**	**Dubai UAE**

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
NLM-01	18-Nov	10.27	Near Kharafi Site Office, Dubai, Car, Bus, Truck.	1.5	85.9	2783782.14 m N	342631.85 m E	43.3	52.9	46.2	59.1	53.5	49.5	44.9	50.3
NLM-02	18-Nov	11.20	Dewa Warqah Station, Nouakchott St. Cars.	1.8	89.8	2785288.63 m N	341364.35 m E	58.9	68.2	62.5	71.1	69.0	66.0	61.4	66.1
NLM-03	18-Nov	12.20	Al Warqah Street. Cars, Bus, Motorbike	1.2	91.1	2785708.31 m N	339509.46 m E	59.6	64.7	61.4	71.4	65.7	62.9	61.1	63.3
NLM-04	18-Nov	11.52	Near Sheik Mohammed Bid Zayed Rd. Car, Bus, Motorbike.	2.1	90.2	2786157.38 m N	338797.70 m E	57.8	63.8	60.0	66.9	64.3	62.1	59.2	62.3
NLM-05	18-Nov	09.50	Near Sheik Mohammed Bid Zayed Rd. Car, Bus, Motorbike.	0.9	87.8	2789047.23 m N	338810.23 m E	54.4	57.4	56.1	59.0	57.6	56.7	56.0	54.7
NLM-06	19-Nov	13.40	Near Sheik Mohammed Bid Zayed Rd. Car.	0.9	89.7	2792103.96 m N	339383.97 m E	57.0	62.6	58.9	66.5	63.1	60.4	58.5	60.9
NLM-07	19-Nov	11.14	Ras Al Khor Road, Near Dragon Mart. Car, Bus, Motorbike	1.1	90.2	2785420.35 m N	340863.83 m E	64.4	74.7	66.6	79.6	75.6	70.8	66.0	71.8
NLM-08	19-Nov	11.50	Beirut Street 1 C Dubai, Car, Bus, Motorbike, Trucks.	0.9	94.8	2796670.66 m N	338482.20 m E	64.4	74.7	66.6	79.6	75.6	70.8	66.0	71.8
NLM-09	19-Nov	11.25	25a Street 2 Dubai Car, Bus, Motorbike	1.5	89.2	2797757.35 m N	335563.30 m E	54.2	63.6	57.2	69.1	64.6	60.5	56.6	61.1
NLM-10	20-Nov	09.15	16th Street Dubai, Car, Bus, Motorbike	0.7	87.1	2797012.63 m N	330906.76 m E	44.0	64.3	46.5	83.9	70.3	51.0	45.9	64.6
NLM-11	20-Nov	10.05	19b Street 43 Dubai, Car, Bus, Motorbike	1.1	82.5	2796171.93 m N	331128.47 m E	54.5	68.5	56.7	86.0	70.8	61.8	56.3	65.6
NLM-12	20-Nov	12.56	201st rod Dubai, Near Nad Shamma Park, Car, Bus, Motorbike.	0.9	89.7	2790478.20 m N	336540.94 m E	54.3	66.0	56.2	71.2	67.4	58.5	55.8	51.8

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
NLM-13	21-Nov	10:53	21st Street 1 Dubai, Car, Bus.	2.2	82.8	2794532.85 m N	332277.15 m E	56.8	64.7	58.2	93.7	66.2	60.2	57.9	65.4
NLM-14	21-Nov	12:26	Near Dubai Munacipality Sewage Pumping, Cars.	0.8	94.7	2795854.11 m N	338344.01 m E	47.2	52.4	49.3	58.4	53.1	50.7	48.7	51.0
NLM-15	21-Nov	09:08	Near Sheik Mohammed Bid Zayed Rd. Car.	1.5	88.5	2795028.01 m N	339652.62 m E	58.6	62.6	59.9	71.4	63.2	60.9	59.7	61.2
Bur Dubai															
P1 NLM-01	21-Nov	13:25	Sewarage Treatment Plant, Jebel Ali.	1.7	89.4	2755625.65 m N	322218.38 m E	43.3	50.2	44.5	55.0	51.2	46.7	44.2	47.6
P1 NLM-02	21-Nov	12:30	Sewarage Treatment Plant, Jebel Ali.	0.6	88.7	2756210.92 m N	321934.65 m E	48.1	51.4	49.3	55.1	51.8	50.5	48.9	50.6
P1 NLM-03	21-Nov	14:04	Sewarage Treatment Plant, Jebel Ali.	2.1	89.2	2756881.39 m N	322105.54 m E	43.6	47.1	45.1	61.4	47.6	46.0	44.8	46.5
P1 NLM-04	22-Nov	12:52	Sewarage Treatment Plant, Jebel Ali.	1.5	88.9	2756662.63 m N	320919.28 m E	39.3	48.5	40.9	65.3	50.9	42.4	40.5	46.5
P1 NLM-05	22-Nov	11:59	Dubai South. Car, Bus,	1.8	88.1	2758749.86 m N	321183.89 m E	55.3	64.2	57.5	67.3	65.1	60.8	57.0	61.5
P1 NLM-06	22-Nov	11:30	Dubai South. Car, Bus,	2.1	87.3	2760443.15 m N	321807.20 m E	51.0	58.1	53.4	65.3	58.7	55.7	52.9	56.1
P1 NLM-07	25-Nov	14:41	Emirates Road. Cars, Bus and Trucks.	2.3	90.1	2765303.97 m N	323445.46 m E	71.0	84.7	74.2	90.8	86.3	78.3	73.3	81.0
P1 NLM-08	25-Nov	15:18	Al Qudra Road, Car, Busses and Motorbike.	2.8	88.5	2768582.21 m N	326370.11 m E	62.7	76.2	68.6	80.2	76.9	73.4	66.8	73.8
P1 NLM-09	25-Nov	16:00	Al Qudra Road, Car, Busses and Motorbike.	3.1	87.5	2770655.31 m N	323873.13 m E	56.7	64.9	59.2	68.9	66.8	61.1	58.2	62.3
P1 NLM-10	26-Nov	12:47	Umm Suqeim Street, Car, Bus, Motorbike	1.4	89.8	2772865.73 m N	323513.17 m E	60.2	66.2	62.1	69.4	67.2	63.5	61.7	64.1
P1 NLM-11	26-Nov	16:22	Sheik Mhm. Bin Zayed Rd. Cars, Motorbike	1.8	85.6	2775647.16 m N	330872.80 m E	62.3	66.0	64.0	64.3	75.5	66.3	65.2	64.1
P1 NLM-12	26-Nov	13:25	Near Farms.	2.1	90.3	2777213.71 m N	325294.70 m E	48.8	51.5	49.8	59.8	52.1	50.6	49.7	50.8
P1 NLM-13	26-Nov	13:52	Across Dubai Hills	1.8	90.1	2781038.44 m N	326158.41 m E	53.0	59.1	54.5	68.3	61.1	55.8	54.1	57.2
P1 NLM-14	27-Nov	15:30	Across Main Road. Car, Bus, Motorbike	1.4	89.1	2783265.65 m N	324873.05 m E	61.4	70.2	63.0	84.3	73.1	65.7	62.6	68.7
P1 NLM-15	27-Nov	12:45	Across Al Meydan Street, Near Ghadeer Pond	1.6	88.8	2784507.17 m N	325363.47 m E	51.0	55.3	52.6	68.3	55.9	53.8	52.4	54.2
P1 NLM-16	27-Nov	16:35	Ras Al Khor Road, Car.	1.9	84.2	2786442.19 m N	329277.45 m E	51.0	57.0	52.9	75.3	59.3	53.8	52.7	55.8

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
P1 NML-17	28-Nov	15:33	Ras Al Khor Road, Car, Bus, Motorbike	1.8	85.1	2786116.03 m N	327305.95 m E	63.1	67.5	64.6	75.0	68.0	65.8	64.2	66.1
P1 NLM-18	28-Nov	12:07	Sheik Mhm. Bin Zayed Rd. Cars, Motorbike	2.2	86.3	2772150.96 m N	321073.60 m E	56.9	62.7	60.5	71.6	63.0	61.6	60.1	61.6
P1 NLM-19	28-Nov	11:14	Near Al Fay Roda Car, Bus, Motorbike	1.8	86.7	2770685.94 m N	318457.24 m E	52.9	57.2	54.2	68.2	58.1	55.3	53.9	55.8
P1 NLM-20	04-Dec	11:00	Near Expo Road. Cars, Bus.	0.9	83.6	2761687.22 m N	317995.23 m E	55.6	60.1	57.1	62.9	60.6	58.4	56.7	58.6
P1 NLM-21	04-Dec	10:33	Near Expo Road. Cars, Bus.	0.8	83.8	2762545.14 m N	314965.78 m E	55.7	63.9	58.4	68.2	65.2	60.6	57.9	61.5
P1 NLM-22	04-Dec	09:05	Near Tristar. Cars.	0.6	83.6	2761174.84 m N	311417.33 m E	53.6	57.2	54.7	64.5	58.3	55.6	54.4	56.3
P1 NLM-23	04-Dec	08:30	Near IKEA Supply ME. Cars.	1.1	82.6	2757713.50 m N	308364.44 m E	53.5	56.0	54.4	58.5	56.3	55.1	54.2	55.2
P1 NLM-24	04-Dec	11:37	Contruction Area, Tilal Al Ghaf Harmony - 3	2.4	85.6	2767830.23 m N	319685.61 m E	42.3	52.7	45.0	65.7	54.3	48.0	44.3	49.5
P1 NLM-25	04-Dec	14:53	Al Khail Road, Car, Bus, Motorbike	1.8	86.1	2785163.31 m N	325885.23 m E	61.9	66.0	63.6	77.3	66.6	64.6	63.3	65.0

Noise Measurement Data Sheet

Project Name	**ED 24.74**	**Date of Survey**	**November 18 – 04 Dec 2024**
Project ID	**Environmental Impact Assessment (EIA) for Dubai strategic sewerage tunnels & link sewer.**	**Duration of Survey**	**Night Survey**
Noise Meter	**NA 28 Rion**	**Campaign Time**	**Night Survey**
Observer	**PATRICK AGUILAR**	**Monitoring Area**	**Dubai UAE**

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
NLM-01	18-Nov	19:03	Near Kharafi Site Office, Dubai, Car, Bus, Truck.	4.4	75.6	2783782.14 m N	342631.85 m E	47.7	54.7	49.8	57.1	55.4	52.5	48.9	52.8
NLM-02	18-Nov	19:38	Dewa Warqah Station, Nouakchott St. Cars.	3.6	76.1	2785288.63 m N	341364.35 m E	63.0	67.6	64.7	69.2	68.1	66.1	64.2	66.3
NLM-03	18-Nov	20:01	Al Warqah Street. Cars, Bus, Motorbike	5.1	75.6	2785708.31 m N	339509.46 m E	63.0	69.2	65.5	72.4	69.6	67.5	64.8	67.7
NLM-04	18-Nov	20:38	Near Sheik Mohammed Bid Zayed Rd. Car, Bus, Motorbike.	4.3	75.8	2786157.38 m N	338797.70 m E	63.1	66.5	64.7	70.9	66.8	65.5	64.5	65.7
NLM-05	18-Nov	21:59	Near Sheik Mohammed Bid Zayed Rd. Car, Bus, Motorbike.	4.1	75.7	2789047.23 m N	338810.23 m E	55.6	58.3	56.5	62.7	58.6	57.3	56.2	57.5
NLM-06	19-Nov	23:45	Near Sheik Mohammed Bid Zayed Rd. Car.	2.8	75.6	2792103.96 m N	339383.97 m E	64.1	68.2	65.0	71.3	69.0	66.0	64.8	66.6
NLM-07	19-Nov	19:58	Ras Al Khor Road, Near Dragon Mart. Car, Bus, Motorbike	3.8	75.9	2785420.35 m N	340863.83 m E	56.9	62.3	58.5	65.5	62.7	60.7	58.0	60.8
NLM-08	19-Nov	01:30	Beirut Street 1 C Dubai, Car, Bus, Motorbike, Trucks.	3.5	75.7	2796670.66 m N	338482.20 m E	62.4	70.5	65.2	74.5	71.3	67.5	64.4	68.2
NLM-09	19-Nov	03:45	25a Street 2 Dubai Car, Bus, Motorbike	5.3	75.1	2797757.35 m N	335563.30 m E	58.7	65.5	60.0	66.4	65.7	63.0	59.5	63.4
NLM-10	20-Nov	23:40	16th Street Dubai, Car, Bus, Motorbike	5.3	75.2	2797012.63 m N	330906.76 m E	47.6	67.3	49.2	81.7	72.9	52.1	48.8	65.1
NLM-11	20-Nov	22:25	19b Street 43 Dubai, Car, Bus, Motorbike	4.1	76.1	2796171.93 m N	331128.47 m E	56.8	67.7	59.1	74.2	69.5	62.5	58.5	64.5
NLM-12	20-Nov	20:30	201st rod Dubai, Near Nad Shamma Park, Car, Bus, Motorbike.	5.8	75.5	2790478.20 m N	336540.94 m E	56.9	62.3	58.5	65.5	62.7	60.7	58.0	60.8

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
NLM-13	21-Nov	20:51	21st Street 1 Dubai, Car, Bus.	3.3	76.5	2794532.85 m N	332277.15 m E	56.0	62.4	56.6	67.3	63.5	58.0	56.4	59.6
NLM-14	21-Nov	22:15	Near Dubai Munacipality Sewage Pumping, Cars.	5.3	75.1	2795854.11 m N	338344.01 m E	48.3	51.4	49.5	63.7	51.8	50.3	49.3	50.6
NLM-15	21-Nov	23:10	Near Sheik Mohammed Bid Zayed Rd. Car.	5.1	75.6	2795028.01 m N	339652.62 m E	55.9	59.9	56.9	72.5	61.2	58.2	56.6	58.7
Bur Dubai															
P1 NLM-01	21-Nov	21:21	Sewarage Treatment Plant, Jebel Ali.	1.3	77.7	2755625.65 m N	322218.38 m E	49.7	53.5	50.6	57.0	54.3	52.4	50.3	52.4
P1 NLM-02	21-Nov	22:16	Sewarage Treatment Plant, Jebel Ali.	1.4	78.1	2756210.92 m N	321934.65 m E	46.0	48.0	46.9	49.5	48.2	47.5	46.7	47.5
P1 NLM-03	21-Nov	22:41	Sewarage Treatment Plant, Jebel Ali.	3.2	77.8	2756881.39 m N	322105.54 m E	53.5	55.9	54.3	56.6	56.0	55.0	54.1	55.1
P1 NLM-04	22-Nov	21:40	Sewarage Treatment Plant, Jebel Ali.	1.2	77.7	2756662.63 m N	320919.28 m E	53.3	57.9	54.8	60.6	58.4	56.2	54.6	56.4
P1 NLM-05	22-Nov	23:01	Dubai South. Car, Bus,	1.6	79.1	2758749.86 m N	321183.89 m E	59.1	70.2	62.8	73.1	71.1	66.4	61.4	67.1
P1 NLM-06	22-Nov	23:32	Dubai South. Car, Bus,	1.9	78.6	2760443.15 m N	321807.20 m E	56.6	62.8	58.8	65.6	63.4	60.4	58.3	60.8
P1 NLM-07	25-Nov	21:56	Emirates Road. Cars, Bus and Trucks.	5.5	78.1	2765303.97 m N	323445.46 m E	64.7	70.1	67.0	72.8	70.6	68.4	66.7	68.7
P1 NLM-08	25-Nov	19:55	Al Qudra Road, Car, Busses and Motorbike.	1.1	78.6	2768582.21 m N	326370.11 m E	62.3	73.2	73.2	68.1	79.7	73.9	70.8	67.3
P1 NLM-09	25-Nov	19:28	Al Qudra Road, Car, Busses and Motorbike.	2.3	78.9	2770655.31 m N	323873.13 m E	52.7	67.5	56.1	80.1	68.5	62.0	55.2	64.4
P1 NLM-10	26-Nov	20:42	Umm Suqeim Street, Car, Bus, Motorbike	0.9	79.1	2772865.73 m N	323513.17 m E	61.0	66.9	63.4	76.1	67.5	65.2	62.9	65.5
P1 NLM-11	26-Nov	19:01	Sheik Mhm. Bin Zayed Rd. Cars, Motorbike	2.5	78.7	2775647.16 m N	330872.80 m E	60.2	63.9	62.0	80.3	64.2	63.0	61.7	63.1
P1 NLM-12	26-Nov	21:15	Near Farms.	1.5	79.0	2777213.71 m N	325294.70 m E	48.7	52.8	50.2	73.3	53.8	51.2	50.0	51.9
P1 NLM-13	26-Nov	22:13	Across Dubai Hills	2.5	74.8	2781038.44 m N	326158.41 m E	49.1	50.9	49.8	57.1	51.1	50.4	49.7	50.4
P1 NLM-14	27-Nov	21:45	Across Main Road. Car, Bus, Motorbike	1.8	75.1	2783265.65 m N	324873.05 m E	61.4	69.3	62.6	81.8	70.3	64.9	62.2	67.1

Location ID	Date	Time	Location & Source of Noise	Meteorological Condition		Coordinates (WGS84 Zone 39N)		Measured Noise Level dB(A)							
				Wind Speed (mph)	Ambient Temp. %	Nothing	Easting	LA min	LA 10	LA 90	LA max	LA 05	LA 50	LA 95	LA EQ
P1 NLM-15	27-Nov	20:32	Across Al Meydan Street, Near Ghadeer Pond	0.9	74.9	2784507.17 m N	325363.47 m E	59.2	61.3	59.9	66.1	61.5	60.5	59.7	60.6
P1 NLM-16	27-Nov	22:22	Ras Al Khor Road, Car.	4.1	79.1	2786442.19 m N	329277.45 m E	52.1	57.4	53.7	62.8	57.9	55.3	53.3	55.7
P1 NML-17	28-Nov	20:45	Ras Al Khor Road, Car, Bus, Motorbike	0.9	74.1	2786116.03 m N	327305.95 m E	64.0	67.8	65.9	70.1	68.2	66.7	65.6	66.9
P1 NLM-18	28-Nov	22:07	Sheik Mhm. Bin Zayed Rd. Cars, Motorbike	1.9	74.9	2772150.96 m N	321073.60 m E	56.4	59.0	57.5	66.5	59.5	58.1	57.3	58.3
P1 NLM-19	28-Nov	19:11	Near Al Fay Roda Car, Bus, Motorbike	2.5	75.6	2770685.94 m N	318457.24 m E	56.9	55.2	57.6	56.2	65.1	57.8	56.9	56.9
P1 NLM-20	04-Dec	20:28	Near Expo Road. Cars, Bus.	1.5	79.8	2761687.22 m N	317995.23 m E	56.4	63.3	59.2	67.7	64.0	61.5	58.6	61.8
P1 NLM-21	04-Dec	23:58	Near Expo Road. Cars, Bus.	2.0	79.6	2762545.14 m N	314965.78 m E	57.0	67.5	58.2	79.2	72.5	60.5	57.8	65.1
P1 NML-22	04-Dec	21:22	Near Tristar. Cars.	2.7	80.9	2761174.84 m N	311417.33 m E	51.9	55.3	52.7	65.0	58.6	54.0	52.5	55.1
P1 NLM-23	04-Dec	20:03	Near IKEA Supply ME. Cars.	2.3	80.7	2757713.50 m N	308364.44 m E	51.3	58.8	53.3	64.3	59.6	55.8	52.6	56.4
P1 NLM-24	04-Dec	21:52	Contruction Area, Tilal Al Ghaf Harmony - 3	1.2	75.1	2767830.23 m N	319685.61 m E	45.8	49.6	47.0	64.2	50.1	48.1	46.7	48.5
P1 NLM-25	04-Dec	23:10	Al Khail Road, Car, Bus, Motorbike	1.8	74.7	2785163.31 m N	325885.23 m E	60.6	64.2	62.0	69.1	66.2	62.6	61.6	63.1

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2404993
Sample No: S2404993
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 04
Sampling Location : 24°58'28.7" N, 55°14'24.0" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.7°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**8.5**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**4960.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.0**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**2530**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**Nil**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1140**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**1585**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**12.10**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**5.80**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**590**	mg/L	2	Sulfa Ver Method
Turbidity *	**2.6**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**2.74**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**420.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.021**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**133.92**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**27.28**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**790.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.003**	mg/L	0.005	USEPA 604
Benzene	**15**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**17000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



LIWELYN MERJILLA VILLAPANDO
Laboratory Manager
For CORE Laboratory

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LB-TEST-051

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TESTING | INVESTIGATION | ASSURING

TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2404994
Sample No: S2404994
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 05
Sampling Location : 24°59'40.6" N, 55°15'08.4" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.8°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**7.7**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**10670.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**5420**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**Nil**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**2340**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**3567**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**12.20**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**6.00**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1600**	mg/L	2	Sulfa Ver Method
Turbidity *	**2.8**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**3.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**1012.10**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.019**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**256.08**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**52.28**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**1810.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.003**	mg/L	0.005	USEPA 604
Benzene	**12**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**10000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
TESTING | INVESTIGATION | ASSURING

TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2404995
Sample No: S2404995
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 06
Sampling Location : 25°00'45.3" N, 55°16'18.7" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.4°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**9.3**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**12690.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.9**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**6540**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**Nil**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**2918**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**4162**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**12.40**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**6.20**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1700**	mg/L	2	Sulfa Ver Method
Turbidity *	**2.4**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**3.12**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**1120.80**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.017**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**317.25**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**65.99**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**1950.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.004**	mg/L	0.005	USEPA 604
Benzene	**14**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**5000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

LIWELYN MERJILLA VILLAPANDO
Laboratory Manager
For CORE Laboratory

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405006
Sample No: S2405006
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 07
Sampling Location : 25°01'52.8" N, 55°15'51.9" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.3°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**6.4**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**5580.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**2960**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**3**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1188**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**1982**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.10**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.50**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**850**	mg/L	2	Sulfa Ver Method
Turbidity *	**15.3**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.99**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**518.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.042**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**151.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.130**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**32.80**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**539.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.006**	mg/L	0.005	USEPA 604
Benzene	**28**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.006**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.009**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**100**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405007
Sample No: S2405007
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 08
Sampling Location : 25°03'37.6" N, 55°15'01.1" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.9°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**6.7**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**5050.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**2540**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1138**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2180**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**0.76**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.40**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**875**	mg/L	2	Sulfa Ver Method
Turbidity *	**43.3**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.02**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**704.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.026**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**120.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.120**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**28.20**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**568.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.015**	mg/L	0.005	USEPA 604
Benzene	**45**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.006**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.008**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**50**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405008
Sample No: S2405008
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 09
Sampling Location : 25°03'15.9" N, 55°13'35.4" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.5°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**4.6**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**3890.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**2020**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**470**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**1883**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**0.40**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.20**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**925**	mg/L	2	Sulfa Ver Method
Turbidity *	**84.1**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.63**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**571.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.019**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**75.30**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**17.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**310.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.007**	mg/L	0.005	USEPA 604
Benzene	**23**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.007**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.010**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**1300**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
TESTING | INVESTIGATION | ASSURING

TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405009
Sample No: S2405009
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 11
Sampling Location : 25°07'00.8" N, 55°16'40.9" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.6°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**4.2**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**632.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.7**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**320**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**99**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**151**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.01**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.70**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**6**	mg/L	2	Sulfa Ver Method
Turbidity *	**8.0**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**0.03**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**0.15**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.28**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**49.50**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.025**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**6.48**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.014**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**2.71**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**57.30**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.008**	mg/L	0.005	USEPA 604
Benzene	**34**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.003**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.006**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**23000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



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Laboratory Manager
For CORE Laboratory

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405010
Sample No: S2405010
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 12
Sampling Location : 25°08'07.4" N, 55°16'30.6" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.3°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**7.6**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**5830.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**8.1**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**2950**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**1**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1282**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**1982**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.18**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.62**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**675**	mg/L	2	Sulfa Ver Method
Turbidity *	**8.5**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**0.02**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**0.20**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.22**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**585.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.020**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**120.10**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.008**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**26.82**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**750.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.005**	mg/L	0.005	USEPA 604
Benzene	**20**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.003**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**28000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405011
Sample No: S2405011
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 13
Sampling Location : 25°09'18.3" N, 55°15'44.4" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.4°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**4.1**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**626.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.7**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**320**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**3**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**104**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**155**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**0.44**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.20**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**17**	mg/L	2	Sulfa Ver Method
Turbidity *	**6.2**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**0.25**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.14**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**47.60**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.014**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**8.06**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**2.99**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**54.30**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.008**	mg/L	0.005	USEPA 604
Benzene	**36**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.004**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.007**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**29000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**120**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405012
Sample No: S2405012
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 14
Sampling Location : 25°10'57.8" N, 55°18'14.3" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.7°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**7.7**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**1538.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.6**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**770**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**322**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**416**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**8.90**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**4.40**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**170**	mg/L	2	Sulfa Ver Method
Turbidity *	**2.5**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**2.50**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**130.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.017**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**23.10**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.004**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**8.46**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**180.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.010**	mg/L	0.005	USEPA 604
Benzene	**31**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.003**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.005**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**1500**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
TESTING | INVESTIGATION | ASSURING

TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405013
Sample No: S2405013
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 16
Sampling Location : 24°57'36.9" N, 55°11'41.4" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.8°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**8.4**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**13950.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.4**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**7250**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**1**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**3208**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**3369**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.10**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.50**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**2100**	mg/L	2	Sulfa Ver Method
Turbidity *	**6.7**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.74**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**944.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.022**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**238.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**83.50**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**1530.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.004**	mg/L	0.005	USEPA 604
Benzene	**15**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.003**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**5000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405014
Sample No: S2405014
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 17
Sampling Location : 24°58'17.5" N, 55°08'57.7"E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.3°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**8.2**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**6110.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**3240**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**1**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1237**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2180**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**10.70**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**9.25**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1600**	mg/L	2	Sulfa Ver Method
Turbidity *	**10.6**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**0.07**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.99**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**576.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.068**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**171.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**42.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**763.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.009**	mg/L	0.005	USEPA 604
Benzene	**32**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.003**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.006**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**7200**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**620**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



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For CORE Laboratory

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405015
Sample No: S2405015
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 19
Sampling Location : 24°55'15.5" N, 55°06'09.8" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.4°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**5.4**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**16400.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.1**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**8200**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**3959**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2973**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.10**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.84**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1500**	mg/L	2	Sulfa Ver Method
Turbidity *	**3.8**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.47**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**787.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.089**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**242.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.393**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**80.30**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**2660.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.020**	mg/L	0.005	USEPA 604
Benzene	**54**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.008**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.012**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**2250**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**1240**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405016
Sample No: S2405016
Sampling Report No: NA
Date of Analysis: 10-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 20
Sampling Location : 25°02'27.2" N, 55°11'56.3" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 10-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 10-12-2024 / 19:30
Sample Temperature on Receipt : 21.6°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT Θ	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**6.7**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**409.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**8.1**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**210**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**74**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**111**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.40**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.90**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**45**	mg/L	2	Sulfa Ver Method
Turbidity *	**7.1**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.01**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**31.50**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.055**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**7.80**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.010**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**2.12**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**50.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.007**	mg/L	0.005	USEPA 604
Benzene	**30**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**0.005**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**0.008**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**150**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



LIWELYN MERJILLA VILLAPANDO
Laboratory Manager
For CORE Laboratory

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 25-12-2024
Report No: R2405017
Sample No: S2405017
Sampling Report No: NA
Date of Analysis: 11-12-2024 - 24-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 15
Sampling Location : 25°10'30.3" N, 55°16'30.2" E

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 11-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 11-12-2024 / 12:00
Sample Temperature on Receipt : 21.5°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : HK/DC (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**4.3**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**8770.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**4480**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**Nil**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**1980**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2378**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.20**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.70**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1750**	mg/L	2	Sulfa Ver Method
Turbidity *	**3.9**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**2.01**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**625.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**0.031**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**197.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.028**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**90.60**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**1190.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.005**	mg/L	0.005	USEPA 604
Benzene	**26**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**150**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**35**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 30-12-2024
Report No: R2405018
Sample No: S2405018
Sampling Report No: NA
Date of Analysis: 18-12-2024 - 30-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 02
Sampling Location : Dome, JSTP

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 18-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 18-12-2024 / 12:00
Sample Temperature on Receipt : 23.0°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : AL/AK (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**4.3**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**12760.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.3**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**6380**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**3712**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2477**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**0.66**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.50**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1075**	mg/L	2	Sulfa Ver Method
Turbidity *	**0.3**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**1.09**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**533.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**< 0.011**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**284.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.064**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**42.40**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**1960.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.005**	mg/L	0.005	USEPA 604
Benzene	**37**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**35000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

CORE LABORATORY
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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 30-12-2024
Report No: R2405019
Sample No: S2405019
Sampling Report No: NA
Date of Analysis: 18-12-2024 - 30-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 03
Sampling Location : Dome, JSTP

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 18-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 18-12-2024 / 12:00
Sample Temperature on Receipt : 22.3°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : AL/AK (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**5.0**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**14160.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.2**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**7100**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**4100**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**3171**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**0.78**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.38**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1300**	mg/L	2	Sulfa Ver Method
Turbidity *	**0.3**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**0.97**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**484.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**< 0.011**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**524.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**0.052**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**38.20**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**2100.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.006**	mg/L	0.005	USEPA 604
Benzene	**30**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**38000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.

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LB-TEST-051

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TEST REPORT

Client Name: SCIENCE BUSINESS SOLUTIONS LLC FZC
Nature Of Business: Consulting
Client Address: .
P O Box 50555,Fujairah,United Arab Emirates
Client Ref:

Date: 30-12-2024
Report No: R2405020
Sample No: S2405020
Sampling Report No: NA
Date of Analysis: 18-12-2024 - 30-12-2024

Sample Details

Sample Type : Ground Water
Source Of Sample : Ground Water
Sampling Point : JSTP 10
Sampling Location : Dome, JSTP

On-Site Details

PH/Temperature : Not Applicable
Appearance : Mild Turbid Liquid
Preservation : Yes

Sampling Details

Apparatus : Not Given
Quantity / Size : Plastic (1*1.5 L)
Sampling Date/Time : 18-12-2024 / 00:00
Sample Transport Condition : Not Applicable
Receiving Date/Time : 18-12-2024 / 12:00
Sample Temperature on Receipt : 21.9°C

Method : Not Given
Collected By : Client Rep.
Delivered By : Client Rep.

Received By : AL/AK (Core Lab Rep.)
Sample Condition: OK

Analysis Results

Parameters	RESULT ⊖	Unit	LOQ	Test Method
Temperature @ Site *	**NA**	°C	-	APHA AWWA 2550 B
Dissolved Oxygen *	**6.7**	mg/L	0.1	APHA AWWA 4500-O H/G
Electrical Conductivity @ 25 °C *	**15420.0**	µS/cm	0.1	APHA AWWA 2510 B
pH @ 25 °C *	**7.9**	-	-	APHA AWWA 4500 H+ B
Total Dissolved Solids @ 180 °C *	**7710**	mg/L	-	APHA AWWA 2540 C
Biochemical Oxygen Demand @ 5 Days	**< 5**	mg/L	5	ASTM D 888
Oil & Grease (Emulsified)*	**2**	mg/L	-	APHA AWWA 5520 B
Oil & Grease (Free) *	**Nil**	%	-	Gravimetric / IP-13
Chloride as Cl- *	**3712**	mg/L	10	APHA AWWA 4500 Cl B
Total Hardness as CaCO3 *	**2378**	mg/L	2	APHA AWWA 2340 C
Total Nitrogen (TN) *	**1.47**	mg/L	0.10	ASTM D 5176
Colour	**< 15**	Pt-Co Unit	15	Platinum-Cobalt Method
Cyanide as CN *	**< 0.002**	mg/L	0.002	Pyridine Pyrazalone Method
Free Chlorine as Cl2 *	**< 0.02**	mg/L	0.02	USEPA DPD Method
Nitrate-Nitrogen as NO3-N *	**0.90**	mg/L	0.01	Cadmium Reduction Method
Phosphate - Phosphorus as PO4 *	**< 0.02**	mg/L	0.02	USEPA PhosVer 3
Sulfide as S2- *	**< 0.5**	mg/L	0.5	USEPA Methylene Blue Method
Total Sulfate as SO4 *	**1675**	mg/L	2	Sulfa Ver Method
Turbidity *	**0.2**	NTU	0.1	USEPA 180.1
Aluminum as Al *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Arsenic as As *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Barium as Ba	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Beryllium as Be	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Boron as B *	**2.87**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Cadmium as Cd *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Calcium as Ca	**492.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Chromium as Cr	**< 1**	µg/L	1	APHA AWWA 3030 E / 3120 B
Cobalt as Co *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Copper as Cu *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Iron as Fe *	**< 0.011**	mg/L	0.011	APHA AWWA 3030 E / 3120 B
Lead as Pb *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Magnesium as Mg	**291.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Manganese as Mn *	**< 0.002**	mg/L	0.002	APHA AWWA 3030 E / 3120 B
Mercury as Hg *	**< 0.001**	mg/L	0.001	APHA AWWA 3030 E / 3120 B
Molybdenum as Mo *	**< 0.01**	mg/L	0.01	APHA AWWA 3030 E / 3120 B
Potassium as K *	**51.90**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Sodium as Na *	**3110.00**	mg/L	0.10	APHA AWWA 3030 E / 3120 B
Zinc as Zn *	**< 0.006**	mg/L	0.006	APHA AWWA 3030 E / 3120 B
Pesticide (Organochlorine)	**< 0.01**	mg/L	0.01	USEPA 8081
Phenols	**0.005**	mg/L	0.005	USEPA 604
Benzene	**34**	µg/L	1	USEPA 8260
7 1,2-Dichloroethane	**< 0.001**	mg/L	0.001	USEPA 8260
9 Dichloromethane	**< 0.001**	mg/L	0.001	USEPA 8260
Total Bacterial Count *	**30000**	CFU/ml	1	APHA AWWA 9215 B
Escherichia coli *	**ND**	CFU/100ml	1	APHA AWWA 9222 B & H
Total Coliform *	**ND**	CFU/100ml	1	APHA AWWA 9222 B

Analysis Comments

Test Variation: None
Remarks: 1) * This Test is Accredited by Emirates International Accreditation Centre (EIAC). Θ Laboratory established Measurement of Uncertainty (MU) https://drive.google.com/file/d/15Xx-k2MXF02lcbjRZK1MidS7RQwHVqi6/view?usp=sharing
2) ND - Not Detected (<LOQ), MPN - Most Probable Number, CFU - Colony Forming Unit.

Results relates only to the items tested.



LIWELYN MERJILLA VILLAPANDO
Laboratory Manager
For CORE Laboratory

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Annex 3

6129000E 6138000E 6147000E 6156000E 6165000E

2898000N 2889000N 2880000N 2871000N

MS-1/RS
CS-1
MS-3
MS-31, MS-31 (CS/RS)
MS-34 (CS/RS)
CS-2A/RS
CS-3A/RS
CS-3/RS
CS-9
CS-4
CS-10
CS-5

N

5 0 5 10 km

Legend:

- Shaft Locations
- Proposed Tunnel
- 1km radius

Administrative boundaries

- country
- dependency
- region
- county
- localadmin
- locality
- macrohood
- neighborhood
- Buildings
- Buildings parts

Highways

- federal
- primary
- secondary
- tertiary
- residential_highways
- service
- construction_highways
- road
- crossing
- pedestrian

Land use

- agriculture
- airport
- campground
- cemetery
- construction
- developed
- education
- entertainment
- golf
- horticulture
- landfill
- managed
- medical
- military
- park
- protected
- recreation
- residential
- resource_extraction
- structure
- transportation
- religious
- winter sports

Natural features

- forest
- grass
- land
- physical
- reef
- rock
- sand
- shrub
- tree
- wetland

Source: OpenStreetMap and Overture Maps Foundation NextGIS

LAND USE AND SOCIAL RECEPTOR MAP

DS 215 – DUBAI STRATEGIC SEWERAGE TUNNEL PROJECT - DEIRA (DSST-DR)

Date: 25/04/2025 CRS Identifier: EPSG:3857 Scale: 153490.616074 CRS Name: WGS 84 / Pseudo-Mercator

P:\02 - Project Delivery\2024\ED24.74 PARSONS EIA Study\Deliverables\GIS-Maps\Social\Social Receptor and Land Use Map.qgs

Dome PARSONS Dubai Municipality

Annex 4

Severity	Response of Society/Community	Impact on Reputation	Example
Disastrous	High profile community outrage and possible involvement of international Non-Governmental Organizations. Potential loss of the entire business opportunity.	Prolonged international impact and public attention. Effect will last for years and can continue to spread internationally and affect other industry players.	Involuntary resettlement.
Catastrophic	High profile community outrage/ repeated complaints and possible involvement of national authorities or VIPs with potentially severe delays in project delivery or production.	Serious international impact and public attention - extensive adverse coverage in the international media with potentially severe impact on licenses.	Labor camp; immigrant labor conditions; resettlement of homes; discrimination of minorities (vulnerable groups); damaging national cultural heritage.
Major	Serious community concerns and complaints and possible involvement of local entities or VIPs with potentially significant delays in project delivery or interruption of production.	Significant national impact and public concern - extensive adverse attention in the national media. Effect could last a few months and likely to spread to close industry partners.	Resettlement of livelihood; damaging local/regional cultural heritage; VIP interference.
Serious	Considerable community and local stakeholder concerns and potential community complaints with potentially some project or production delays. Local entity involvement.	Considerable impact - adverse attention in local media / municipal government / local groups.	Road congestion; smells, noise, light, dust affecting populated area; waste in camel grazing land; influx of laborers in shopping areas
Minor	Some community concerns raised requiring minor resources to resolve.	Limited impact - some local media / political attention. Effect will last a few days only.	Temporary smells, noise, light, dust affecting populated area; inappropriate behavior of an employee.
Notable	No possible community focus.	Slight impact - no public concern.	Use of infrastructure.

	Rare	Unlikely	Possible	Likely	Very likely	Almost certain
Disastrous						
Catastrophic						
Major						
Serious						
Minor						
Notable						

Risk Level	Minimum Required Action - summary (for full description see ADNOC Corporate Risk Matrix)	Management sign-off authority
High	Report immediately upon identification. Must be reduced as soon as possible to ALARP. Risk quantification shall be carried out.	Director or GC CEO
High - Medium	Should be reduced as soon as possible to ALARP. Risk quantification shall be carried out.	Unit Mgr/SVP
Medium	Monitor and improve effectiveness of current controls. Risk quantification should be carried out.	Dept. Mgr/VP
Low	Monitor and improve effectiveness of current controls.	Line Manager