Kemenkes
RS Sitanala

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND MANAGEMENT PLAN (ESMP)

Development of The Hospital Sitanala Tangerang



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GLOSSARY

AMDAL (*Analisis Mengenai Dampak Lingkungan*)	The Indonesian Environmental Impact Assessment framework, mandated under Law No. 32/2009 and PP 22/2021. Comprises KA-ANDAL, ANDAL, and RKL-RPL.
Area of Influence (AoI)	Geographic area likely to be affected by project activities, including direct, indirect, induced, and cumulative impacts.
Associated Facility	Facilities not financed directly by the Project but essential for its viability and operation.
ANDALALIN (*Analisis Dampak Lalu Lintas*)	Traffic Impact Analysis - a mandatory Indonesian regulatory instrument assessing the effects of a proposed development on surrounding road networks.
B3 / Limbah B3 (*Bahan Berbahaya dan Beracun*)	Hazardous and Toxic Materials/Wastes under Indonesian law. In hospitals: infectious waste, expired pharmaceuticals, pathological waste, chemical waste, and incinerator residues.
Chance Find Procedure	Procedure applied when previously unidentified cultural heritage or archaeological resources are encountered during construction activities.
Cultural Heritage	Tangible and intangible heritage assets possessing archaeological, historical, architectural, religious, aesthetic, or cultural significance.
Chance Find Procedure	Procedure applied when previously unidentified cultural heritage or archaeological resources are encountered during construction activities.
ESIA-ESMP	Environmental and Social Impact Assessment - Environmental and Social Management Plan. The combined safeguards instrument required by the AIIB ESF (2024).
ESF (Environmental and Social Framework)	The AIIB's overarching policy framework (2024) governing environmental and social risk management. Comprises ESS1, ESS2, and ESS3.
GRM (Grievance Redress Mechanism)	A structured process for project-affected persons to raise concerns and receive timely responses. Required under AIIB ESF and ESS1.
Healthcare Waste	Waste generated from healthcare activities, including infectious waste, pathological waste, sharps, pharmaceutical waste, chemical waste, and general waste.
IBS	Instalasi Bedah Sentral
Kemenkes (*Kementerian Kesehatan RI*)	Ministry of Health of the Republic of Indonesia - parent ministry of RSUP Dr. Sitanala Tangerang and institutional home of the TRUST

	Project Implementation Unit (PIU). Disburses AIIB loan proceeds for the redevelopment programme.
Living Document	A document management approach in which the ESIA-ESMP is issued in successive versions (v0.1, v0.5, v1.0) as data and approvals are progressively acquired. [PLACEHOLDER] entries mark gaps to be closed.
Mitigation Hierarchy	Sequential approach to impact management consisting of avoidance, minimization, mitigation, restoration, and compensation/offset where applicable.
Occupational Health and Safety (OHS)	Measures and systems established to protect workers from workplace hazards, injuries, illnesses, and accidents.
Pertek (*Persetujuan Teknis*)	Technical Approval is an Indonesian environmental permit. Pertek BMAL for wastewater and Pertek BMUE for stack emissions.
PPK-BLU (*Pola Pengelolaan Keuangan Badan Layanan Umum*)	Public Service Agency financial governance model under which government-owned hospitals (including RSUP Dr. Sitanala Tangerang as a *Direktorat Jenderal Kesehatan Lanjutan* UPT) operate, allowing autonomy in revenue retention and operational expenditure subject to performance metrics.
Rintek (*Rincian Teknis*)	Detailed Technical Document for B3 (hazardous waste) storage facilities, required under Indonesian environmental law.
Stakeholder Engagement	Ongoing process of information disclosure, consultation, participation, and communication with project stakeholders throughout the project lifecycle.
TRUST Project	The Government of Indonesia's flagship initiative - '*Pembangunan dan Pengembangan Rumah Sakit untuk Meningkatkan Akses dan Kualitas Pelayanan dalam Rangka Meningkatkan Kapasitas Rumah Sakit Pendidikan Milik Pemerintah*'. Funded by AIIB and implemented by Kementerian Kesehatan RI across eight teaching hospitals in six provinces - including RSUP Dr. Sitanala Tangerang.
Vulnerable Groups	Individuals or groups who may be disproportionately affected by project impacts due to age, disability, health condition, gender, economic status, or social marginalization.

ABBREVIATIONS

AIIB	Asian Infrastructure Investment Bank
AMDAL	*Analisis Mengenai Dampak Lingkungan* - Environmental Impact Assessment
ANDAL	*Analisis Dampak Lingkungan* - Environmental Impact Assessment Report
ANDALALIN	*Analisis Dampak Lalu Lintas* - Traffic Impact Analysis
BMAL	*Baku Mutu Air Limbah* - Wastewater Quality Standard
BMUE / BMEU	*Baku Mutu Emisi Udara* - Stack Emission Quality Standard
BPCB	*Balai Pelestarian Cagar Budaya* - Cultural Heritage Preservation Office
BPS	*Badan Pusat Statistik* - Central Statistics Agency
B3	*Bahan Berbahaya dan Beracun* - Hazardous and Toxic Materials
BLU	*Badan Layanan Umum* - Public Service Agency
BMKG	*Badan Meteorologi, Klimatologi, dan Geofisika* - Meteorological, Climatological and Geophysical Agency
BOR	Bed Occupancy Rate
CFP	Chance Find Procedure
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
DED / DEDC	Detailed Engineering Design / DED Consultant
DLH	*Dinas Lingkungan Hidup* - Environment Agency
E&S	Environmental and Social
ESF	Environmental and Social Framework (AIIB, 2024, as amended through 26 June 2024)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
ESEL	Environmental and Social Exclusion List
FS	Feasibility Study
GAP	Gender Action Plan
GBV / SEAH	Gender-Based Violence / Sexual Exploitation, Abuse, and Harassment

GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
HEPA	High-Efficiency Particulate Air
HR	Human Resources
HVAC	Heating, Ventilation and Air Conditioning
IFC	International Finance Corporation
IMB	*Izin Mendirikan Bangunan* - Building Construction Permit
IPAL	*Instalasi Pengolahan Air Limbah* - Wastewater Treatment Plant
JKN	*Jaminan Kesehatan Nasional* - National Health Insurance scheme
KA-ANDAL	*Kerangka Acuan ANDAL* - Terms of Reference for Environmental Impact Assessment
Kemenkes	*Kementerian Kesehatan Republik Indonesia* - Ministry of Health of the Republic of Indonesia
KBLI	*Klasifikasi Baku Lapangan Usaha Indonesia* - Indonesia Standard Industrial Classification
KKPR / PKKPR	*Konfirmasi / Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang* - Spatial Utilization Conformity Approval
KMK	*Keputusan Menteri Kesehatan* - Decision of the Minister of Health
LB3	*Limbah Berbahaya dan Beracun* – Hazardous Waste
ODCB	*Objek Diduga Cagar Budaya* - Object Suspected as Cultural Heritage
OHS / K3	Occupational Health and Safety / *Keselamatan dan Kesehatan Kerja*
P3K / PPPK	*Pegawai Pemerintah dengan Perjanjian Kerja* - Government employee on contract
PBG	*Persetujuan Bangunan Gedung* - Building Approval
Pertek	*Persetujuan Teknis* - Technical approval
PIU	Project Implementation Unit
PMU	Project Management Unit
PNS	*Pegawai Negeri Sipil* - Civil Servant
PPK-BLU	*Pola Pengelolaan Keuangan Badan Layanan Umum* - Public Service Agency Financial Management Scheme
PPDS	*Program Pendidikan Dokter Spesialis* - Specialist Doctor Education Programme
PPI	*Pencegahan dan Pengendalian Infeksi* - Infection Prevention and Control
RDTR	*Rencana Detail Tata Ruang* - Detailed Spatial Plan
Rintek	*Rincian Teknis* - Technical Detail Document

RKL-RPL	*Rencana Pengelolaan Lingkungan dan Rencana Pemantauan Lingkungan* - Environmental Management and Monitoring Plan
RSPPU	*Rumah Sakit Pendidikan Penyelenggara Utama* - Primary Teaching Hospital
RSST	RSUP Sitanala Tangerang
RTRW	*Rencana Tata Ruang Wilayah* - Regional Spatial Plan
SEA/SH	Sexual Exploitation, Abuse and Sexual Harassment
SEP	Stakeholder Engagement Plan
SIPA	*Surat Izin Pengambilan Air Tanah* - Groundwater Abstraction Permit
SOP / SPO	Standard Operating Procedure / *Standar Prosedur Operasional*
TACB	*Tim Ahli Cagar Budaya* - Cultural Heritage Expert Team
TB	Tuberculosis
TB / TB-RO	Multi-Drug-Resistant Tuberculosis / Tuberkulosis Resisten Obat
TPS LB3	*Tempat Penyimpanan Sementara Limbah B3* - Temporary Storage Facility for Hazardous Waste
TRUST Project	Transformation of Referral and University-affiliated Specialist Teaching Hospitals Project
TT	*Tempat Tidur* - Hospital Bed
TUK	*Tim Uji Kelayakan AMDAL* - AMDAL Assessment Commission
UKL-UPL	*Upaya Pengelolaan Lingkungan dan Upaya Pemantauan Lingkungan* - Environmental Management and Monitoring Efforts
VEC	Valued Environmental Component
WBG EHS	World Bank Group Environmental, Health and Safety Guidelines
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

FOREWORD

The transformation of Indonesia's national health system, accelerated by Law No. 17 of 2023 on Health and the Government's strategic priority to expand the four catastrophic-disease service portfolios (Cancer, Heart, Stroke, and Uronephrology - collectively KJSU) as set out in KMK No. HK.01.07/MENKES/1277/2024, presents a defining moment for The Sitanala Hospital Tangerang. Established on 28 July 1951 as Rumah Sakit Sewan - relocated from the colonial-era Leprosarium Lenteng Agung - and renamed Pusat Rehabilitasi Sitanala in 1962 (in honour of Dr. J.B. Sitanala, the first Indonesian leprosy specialist) and Rumah Sakit Kusta Dr. Sitanala in 1978 (per KMK No. 140/1978), The Sitanala Hospital has evolved into a Class B general hospital (since 2023) under the direct authority of the Ministry of Health, and is now positioned to advance toward fully Paripurna service status.

Pursuant to the Feasibility Study and to the Master Plan formalised through Ministerial Decree HK.01.07/MENKES/2000/2024 dated 24 December 2024, The Sitanala Hospital will be redeveloped to expand bed capacity from approximately 250 toward 600 beds by 2030 and to add three new flagship buildings - the Central Surgical Installation (IBS, 19,150 m²), the Integrated Oncology Center (20,650 m²), and the Neurology & Urology Center (16,150 m²) - with a combined gross floor area of approximately 55,950 m² to be constructed during the calendar year 2027(hereinafter referred to as **"The Project"**). The redevelopment is co-financed through a foreign loan of approximately USD 51.6 million (Rp 799.965 billion) extended under the TRUST Project framework with the Asian Infrastructure Investment Bank (AIIB).

This Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), hereafter collectively referred to as the "ESIA", has been prepared by PT Equator Global Internasional (EGI) on behalf of the Ministry of Health Project Implementation Unit. It identifies, predicts, evaluates, and proposes mitigation for the environmental and social impacts of the redevelopment, applying the Indonesian AMDAL framework (PP 22/2021 and applicable implementing regulations) together with AIIB's Environmental and Social Policy (ESP), Environmental and Social Standards (ESSs), and Environmental and Social Exclusion List (ESEL). For this Project, ESS1 and ESS2 are applicable; current screening indicates that ESS3 is not triggered. Where applicable national or Client requirements are more stringent than AIIB requirements, those more stringent elements shall also be met.

The preparation of this ESIA recognises the unique institutional character of The Sitanala Hospital - historically described as the largest leprosy hospital in Southeast Asia and the host of high-profile international institutional moments including the visit by Princess Diana of Wales on 4 November 1989. The compound carries living institutional memory of the leprosy rehabilitation mission and continues to serve a community of former patients and their descendants.

On behalf of The Sitanala Hospital Implementation Unit (PIU) of the Ministry of Health and the Directorate of The Sitanala Hospital Tangerang, sincere appreciation is extended to all stakeholders - the patient and family caregiver community, the workforce and resident population around the compound, the regulatory agencies of the Province of Banten and Tangerang City, the academic and clinical partner institutions, and the safeguards team of AIIB - for their continuing engagement in shaping a redeveloped The Sitanala Hospital that is environmentally responsible, socially inclusive, climate-resilient, and worthy of the institution's century-long service mandate.

Tangerang, May 2026

Project Implementation Unit Director

Directorate General of Tertiary Health Services

Ministry of Health, Republic of Indonesia

Dr. Tarsisius Glory

EXECUTIVE SUMMARY

Project background, objective and scope

RSUP Dr. Sitanala is a Ministry of Health Class B referral hospital operating within an established hospital compound. The redevelopment responds to high service demand and supports the national KJSU reform and hospital-based specialist medical education. It is a brownfield expansion: the three Phase 1 buildings are planned within the existing compound, with no new off-site greenfield land conversion.

Phase 1 will add approximately 55,950 m² of gross floor area and support the planned increase in bed capacity from about 250 beds toward 600 beds by 2030. The principal facilities are:

- Integrated Surgical Services / Central Surgical Installation (IBS), approximately 19,150 m²: operating theatres, diagnostic and laboratory services, critical care, inpatient wards, teaching and simulation facilities, and rooftop utilities.
- Integrated Oncology Center, approximately 20,650 m²: radiotherapy and LINAC bunkers, PET-CT/SPECT and nuclear medicine, RIRA isolation rooms, oncology clinics and surgery, chemotherapy day care, inpatient/isolation rooms, radiopharmacy and radioactive-waste facilities.
- Neurology and Urology Center, approximately 16,150 m²: specialist clinics and diagnostics, ESWL, hemodialysis, endoscopy and biopsy, operating and critical-care units, rehabilitation, inpatient/isolation rooms, teaching facilities and rooftop utilities.

Main project activities

Activities include design finalization and permitting; selective demolition of the former Cooperative/ULP and Prosthesis buildings; survey and controlled handling of existing materials and State-Owned Assets; internal transfer of affected hospital services, patients, staff and equipment; site fencing, temporary facilities and utilities; mobilization; land clearing and earthworks; piling/foundations; structural, architectural and MEP construction; utility and drainage connections; traffic and materials logistics; installation and commissioning of medical equipment; landscaping and reinstatement; and operation and maintenance of the expanded hospital. Construction is planned principally for 2027, while the wider master plan is phased through 2041. Hospital services must continue throughout the works.

Environmental and social risks, impacts and mitigation

AIIB has assigned the overall TRUST Project as Category B under its Environmental and Social Policy. For RSUP Dr. Sitanala, the expected adverse environmental and social risks and impacts

are generally localized, largely temporary or reversible, and manageable through site-specific mitigation, while ESS2 remains applicable to potential physical or economic displacement risks. The table below summarizes the issues most relevant to consultation and disclosure.

Phase / issue	Potential risks and impacts	Key mitigation and management measures
Pre-construction and legacy matters	Incomplete permits and final design; demolition and disposal of State-Owned Assets; legacy relocation of 26 staff households; disruption during internal transfer of patients, staff, services and medical equipment.	Complete AMDAL and technical approvals; update ESIA/ESMP as DED progresses; prepare BMN disposal SOP; implement and document the RAP/legacy corrective actions; prepare a sequenced Internal Transfer and Hospital Service Continuity Plan with special provisions for critical and vulnerable patients.
Demolition, site preparation and construction	Dust, exhaust, noise and vibration affecting wards and nearby communities; erosion, runoff and drainage blockage; construction and hazardous waste, including possible asbestos; traffic congestion and road safety; worker injury and disease; community safety and restricted access; utility interruption and healthcare-service disruption.	Use a contractor C-ESMP; fence-line air/noise/vibration monitoring; restrict working hours; dust suppression, covered trucks and wheel wash; erosion and sediment controls; licensed waste handling and asbestos survey/procedure; traffic management and safe pedestrian routes; SMK3/OHS controls, permits-to-work, PPE and emergency response; phased works and service-continuity controls.
Social, labour and cultural heritage	Labour-rights risks, discrimination, GBV/SEA/SH and retaliation; nuisance and unequal access for persons with disabilities and other vulnerable groups; impacts on the former leprosy-patient community and institutional heritage; chance finds.	Apply Labour Management Procedures and worker GRM; Codes of Conduct and confidential survivor-centred GBV/SEA/SH pathway; inclusive consultation and universal access; continuous liaison with the former leprosy-patient community; document institutional memory; implement Chance Find Procedure and coordinate with cultural-heritage authorities.
Hospital operation and expanded clinical services	Higher wastewater, infectious/medical and B3 waste volumes; air emissions; traffic and parking pressure; infection risks; occupational exposure; increased energy and water demand; radioactive materials and waste from LINAC, PET/SPECT and RIRA services.	Expand/upgrade WWTP under Pertek BMAL; expand TPS LB3 under Rintek and use licensed transport/treatment; emission controls and Pertek BMUE; update ANDALALIN; infection prevention and control; water/energy efficiency; radiation licensing and BAPETEN-compliant shielding, segregation, decay storage/tanks, monitoring and emergency procedures before nuclear-medicine operation.
Climate, disaster and cumulative risks	Extreme rainfall and localized flooding; heat stress; drought/water-supply	Climate-resilient drainage, detention/retention and rainwater

Phase / issue	Potential risks and impacts	Key mitigation and management measures
	stress; earthquake; aircraft and urban background noise; failure of power or critical utilities.	harvesting; efficient envelope/HVAC and heat-health procedures; emergency water and power continuity; seismic design for critical healthcare infrastructure; emergency preparedness and business continuity; coordinate cumulative-noise grievances with relevant authorities.
Positive impacts	Expanded access to surgical, oncology, neurology, urology, renal and critical-care services; teaching and specialist training; employment and local procurement.	Use transparent recruitment and procurement; skills development; inclusive access; monitor service outcomes and community benefits.

Environmental and Social Management Plan implementation

The Ministry of Health PIU and RSUP Dr. Sitanala retain overall accountability. Detailed requirements will be included in bidding and contract documents and implemented through the contractor's Construction ESMP. The Construction Management Consultant will supervise compliance. RSUP Dr. Sitanala should establish an Environmental and Social Management Unit comprising, at minimum, an Environmental and Social Officer, OHS focal point and GRM operator. Monitoring will cover air, noise, vibration, water and wastewater, waste, traffic, OHS, community health and safety, labour, stakeholder engagement and grievances. Material incidents and periodic environmental and social performance will be reported to the PIU and AIIB; corrective actions will be tracked to closure.

Consultation, disclosure and inclusion

The Stakeholder Engagement Plan requires timely disclosure and meaningful, inclusive consultation before and during construction and operation. Priority stakeholders include patients and caregivers; hospital staff and project workers; nearby residents and businesses; local government and health services; persons with disabilities and other vulnerable groups; households affected by earlier staff-housing arrangements; and the former leprosy-patient community. Information must be provided in accessible Bahasa Indonesia, using formats and venues suited to mobility, literacy, confidentiality and clinical-care constraints. Feedback will be recorded and used to update the ESIA, ESMP and project design where relevant For Category B subprojects, draft environmental and social documentation should be disclosed in a timely manner before financing approval in accordance with the AIIB ESP; the TRUST Project disclosure approach requires the draft ESIA, including the ESMP, to be publicly available in English together with an accessible Bahasa Indonesia executive summary. Consultation

records, key issues raised, responses, and participant information should be documented and used to update the ESIA/ESMP and Project design as relevant.

Grievance Redress Mechanism

In managing complaints related to the Project's impacts and risks, RSUP Dr. Sitanala will establish and operationalize a Project-specific GRM, building on and strengthening the hospital's existing complaint management mechanism. The mechanism is intended to ensure that project-related issues are identified and addressed before they escalate into broader social conflicts, disputes, or reputational risks, while still allowing access to judicial or administrative remedies available under Indonesian law. It is designed to uphold key principles such as accessibility, inclusiveness, transparency, confidentiality, non-retaliation, and a survivor-centred approach for sensitive cases.

RSUP Dr. Sitanala already operates an institutional patient-feedback and complaint management system in accordance with Permenkes No. 4 of 2018, including customer service units, telephone hotlines, complaint boxes, and electronic submission through the hospital website, but this baseline needs to be strengthened through a more structured and time-bound project-specific procedure with additional channels such as a dedicated hotline, WhatsApp, email, grievance forms, Community Liaison Officers, and stakeholder consultation meetings, with anonymous complaints accepted. In implementation, the project GRM follows the stages of receipt and registration, screening and classification, verification and investigation, response and resolution, closure, and monitoring, with acknowledgement within 3 working days, initial assessment within 7 working days, and investigation and response within 30 working days. Dedicated pathways are provided for internal staff and labor grievances, which may be escalated from the Employer level to the RS Sitanala GRM/PMU, the Regional Manpower Office (Disnaker), and ultimately the Industrial Relations Court, as well as for GBV and SEA/SH cases, which must be handled confidentially by trained focal points using survivor-centred procedures, including a safeguarding assessment within 24 hours. The mechanism also provides site-specific channels for the former leprosy patient community, displaced households, patients and caregivers, heritage chance finds, and aircraft-noise-related concerns. Therefore, the GRM must be communicated to all stakeholders and integrated into the ESMP and work contracts so that it can effectively manage the Project's social risks.

Any affected person, worker, patient, caregiver, visitor or other stakeholder may submit a question, suggestion or complaint free of charge, without retaliation, and anonymously if preferred. Channels include the hospital help/information desk, written forms and complaint boxes, telephone, WhatsApp, email, website, Community Liaison Officers, meetings, and referral through RT/RW or local government. Sensitive GBV/SEA/SH cases will use a confidential, survivor-centred pathway with trained focal points and a safeguarding assessment within 24 hours. Worker grievances have a separate labour pathway.

Existing institutional contact	RSUP Dr. Sitanala, Jl. Dr. Sitanala No. 99, Karang Sari, Neglasari, Tangerang City, Banten 15121
Telephone	(021) 5523059
WhatsApp / Customer Service	0811-999-7473
Email	rsupdr.sitanala@gmail.com
Website / complaint menu	https://rsup-drsitanala.go.id/ (Pengaduan / Saran / SP4N-LAPOR)
Project GRM focal point	To be formally designated and publicly disclosed by the PIU before construction. Until then, use the institutional channels above and state that the complaint concerns the RSUP Dr. Sitanala Redevelopment / TRUST Project.

Target process: acknowledge within 3 working days; screen and initially assess within 7 working days; investigate and communicate a response normally within 30 working days; record the outcome, allow escalation, and monitor closure. Urgent safety risks require immediate interim action. Use of the GRM does not restrict access to courts, regulators, the Ombudsman, SP4N-LAPOR or other lawful remedies.

The PPM is AIIB's independent accountability mechanism, separate from project management and AIIB Management and reporting to AIIB's Board. It receives submissions from people who believe they have been or are likely to be directly and materially adversely affected by an AIIB-financed project because AIIB failed to implement its Environmental and Social Policy. Its functions include Early Problem Solving, Dispute Resolution and Compliance Review. Project-affected people are generally expected to make good-faith efforts to resolve the issue through the project GRM and AIIB Management before approaching the PPM.

Two or more project-affected people may normally submit; for allegations involving gender-based violence, sexual harassment, or sexual exploitation and abuse, one requestor may submit. Submissions may be made in Bahasa Indonesia or another language of the requestors' country. The PPM does not accept anonymous submissions, but confidentiality may be requested.

Online	https://www.aiib.org/ppm (select “File Your Submission”)
Email	ppm@aiib.org
Telephone for filing assistance	+86-10-8358-0111
Postal address	PPM Secretariat, Complaints-resolution, Evaluation and Integrity Unit (CEIU), AIIB Headquarters, Tower A, Asia Financial Center, No. 1 Tianchen East Road, Chaoyang District, Beijing 100101, China

AIIB Project-affected People’s Mechanism (PPM)

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RINGKASAN EKSEKUTIF

Latar belakang, tujuan, dan ruang lingkup proyek

RSUP Dr. Sitanala merupakan rumah sakit rujukan Kelas B milik Kementerian Kesehatan yang beroperasi di dalam kompleks rumah sakit yang telah ada. Pembangunan kembali dilakukan untuk memenuhi kebutuhan layanan yang tinggi serta mendukung reformasi KJSU nasional dan pendidikan dokter spesialis berbasis rumah sakit. Proyek merupakan pengembangan brownfield: tiga gedung Tahap 1 dibangun di dalam kompleks eksisting tanpa konversi lahan greenfield baru di luar tapak.

Tahap 1 akan menambah sekitar 55.950 m² luas lantai bruto dan mendukung peningkatan kapasitas dari sekitar 250 tempat tidur menuju 600 tempat tidur pada tahun 2030. Fasilitas utama meliputi:

- Gedung Instalasi Bedah Sentral (IBS), sekitar 19.150 m²: kamar operasi, diagnostik/laboratorium, perawatan kritis, ruang rawat inap, pendidikan/simulasi, dan utilitas atap.
- Pusat Onkologi Terpadu, sekitar 20.650 m²: radioterapi dan bunker LINAC, PET-CT/SPECT dan kedokteran nuklir, ruang isolasi RIRA, klinik dan bedah onkologi, kemoterapi, rawat inap/isolasi, radiofarmasi, serta fasilitas limbah radioaktif.
- Pusat Neurologi dan Urologi, sekitar 16.150 m²: klinik spesialis/diagnostik, ESWL, hemodialisis, endoskopi/biopsi, kamar operasi dan perawatan kritis, rehabilitasi, rawat inap/isolasi, pendidikan, dan utilitas atap.

Kegiatan utama proyek

Kegiatan mencakup finalisasi desain dan perizinan; pembongkaran selektif bekas Gedung Koperasi/ULP dan Gedung Protese; survei dan penanganan terkendali material serta Barang Milik Negara; pemindahan internal layanan, pasien, staf, dan peralatan; pagar tapak, fasilitas/utilitas sementara; mobilisasi; pembersihan lahan dan pekerjaan tanah; pemancangan/fondasi; struktur, arsitektur dan MEP; sambungan utilitas/drainase; logistik lalu lintas dan material; instalasi serta commissioning peralatan medis; lanskap/pemulihan; dan operasi serta pemeliharaan rumah sakit yang diperluas. Konstruksi utama direncanakan pada tahun 2027, sedangkan master plan yang lebih luas bertahap sampai 2041. Pelayanan rumah sakit harus tetap berjalan selama pekerjaan.

Risiko, dampak, dan mitigasi lingkungan dan sosial

AIIB telah menetapkan keseluruhan TRUST Project sebagai Kategori B berdasarkan Environmental and Social Policy. Untuk RSUP Dr. Sitanala, dampak lingkungan dan sosial yang merugikan diperkirakan umumnya bersifat lokal, sebagian besar sementara atau dapat dipulihkan, dan dapat dikelola melalui mitigasi spesifik lokasi, sementara ESS2 tetap berlaku

terhadap potensi dampak perpindahan fisik maupun ekonomi. Ringkasan berikut memuat isu utama untuk konsultasi dan pengungkapan informasi.

Tahap / isu	Risiko dan dampak potensial	Tindakan mitigasi dan pengelolaan utama
Prakonstruksi dan isu terdahulu	Perizinan dan desain akhir belum lengkap; pembongkaran dan penghapusan BMN; riwayat relokasi 26 rumah tangga pegawai; gangguan saat pemindahan internal pasien, staf, layanan, dan peralatan medis.	Selesaikan AMDAL dan persetujuan teknis; mutakhirkan ESIA/ESMP mengikuti DED; susun SOP penghapusan BMN; laksanakan dan dokumentasikan RAP/tindakan korektif; susun Rencana Pemindahan Internal dan Keberlanjutan Pelayanan Rumah Sakit secara bertahap, termasuk perlindungan pasien kritis dan rentan.
Pembongkaran, penyiapan lahan, dan konstruksi	Debu, emisi, kebisingan, dan getaran pada ruang rawat dan masyarakat; erosi, limpasan, dan penyumbatan drainase; limbah konstruksi/B3 termasuk potensi asbes; kemacetan dan keselamatan jalan; kecelakaan/penyakit kerja; keselamatan masyarakat, pembatasan akses, gangguan utilitas dan layanan kesehatan.	Terapkan C-ESMP kontraktor; pantau udara/kebisingan/getaran di batas tapak; batasi jam kerja; penyiraman, penutup truk, dan wheel wash; kendali erosi/sedimen; pengelolaan limbah berizin dan survei/prosedur asbes; manajemen lalu lintas dan jalur pejalan kaki; SMK3, izin kerja, APD, tanggap darurat; pekerjaan bertahap dan kendali keberlanjutan layanan.
Sosial, tenaga kerja, dan warisan budaya	Risiko hak pekerja, diskriminasi, GBV/SEA/SH dan pembalasan; gangguan dan ketidaksetaraan akses kelompok rentan/disabilitas; dampak pada komunitas eks-pasien kusta dan warisan institusi; temuan tak terduga.	Terapkan Prosedur Pengelolaan Tenaga Kerja dan GRM pekerja; Kode Etik serta jalur GBV/SEA/SH rahasia dan berpusat pada penyintas; konsultasi inklusif dan akses universal; komunikasi berkelanjutan dengan komunitas eks-pasien kusta; dokumentasi memori institusi; Prosedur Penemuan Tak Terduga dan koordinasi dengan otoritas budaya.
Operasi rumah sakit dan layanan klinis yang diperluas	Peningkatan air limbah, limbah medis/infeksius dan B3; emisi udara; lalu lintas/parkir; infeksi dan pajanan kerja; kebutuhan energi/air; bahan dan limbah radioaktif dari LINAC, PET/SPECT, dan RIRA.	Tingkatkan IPAL melalui Pertek BMAL; perluas TPS LB3 melalui Rintek dan gunakan pengangkut/pengolah berizin; kendali emisi dan Pertek BMUE; perbarui ANDALALIN; pencegahan infeksi; efisiensi air/energi; perizinan radiasi dan sistem sesuai BAPETEN untuk pelindung, segregasi, penyimpanan/tangki peluruhan, pemantauan, dan tanggap darurat sebelum layanan kedokteran nuklir beroperasi.
Iklim, bencana, dan dampak kumulatif	Hujan ekstrem/banjir lokal; panas; kekeringan/tekanan pasokan air; gempa; kebisingan pesawat dan perkotaan; kegagalan listrik atau utilitas kritis.	Drainase tahan iklim, detensi/retensi, dan pemanenan air hujan; selubung/HVAC efisien dan prosedur kesehatan akibat panas; kontinuitas air/listrik darurat; desain seismik; kesiapsiagaan dan keberlanjutan usaha; koordinasi keluhan kebisingan kumulatif dengan instansi terkait.
Dampak positif	Peningkatan akses layanan bedah, onkologi, neurologi, urologi, ginjal, dan perawatan kritis; pendidikan spesialis; pekerjaan dan pengadaan lokal.	Rekrutmen dan pengadaan transparan; pengembangan keterampilan; akses inklusif; pantau hasil layanan dan manfaat bagi masyarakat.

Pelaksanaan Rencana Pengelolaan Lingkungan dan Sosial

PIU Kementerian Kesehatan dan RSUP Dr. Sitanala memegang tanggung jawab keseluruhan. Persyaratan rinci dimasukkan ke dokumen tender/kontrak dan dilaksanakan melalui C-ESMP kontraktor; Konsultan Manajemen Konstruksi mengawasi kepatuhan. RSUP Dr. Sitanala perlu membentuk Unit Pengelolaan Lingkungan dan Sosial yang sekurang-kurangnya terdiri atas Petugas Lingkungan dan Sosial, focal point K3, dan operator GRM. Pemantauan meliputi udara, kebisingan, getaran, air/air limbah, limbah, lalu lintas, K3, kesehatan dan keselamatan masyarakat, tenaga kerja, pelibatan pemangku kepentingan, dan keluhan. Insiden material dan kinerja berkala dilaporkan kepada PIU dan AIIB; tindakan korektif dipantau sampai selesai.

Konsultasi, pengungkapan informasi, dan inklusi

Rencana Pelibatan Pemangku Kepentingan mensyaratkan pengungkapan informasi tepat waktu dan konsultasi bermakna serta inklusif sebelum dan selama konstruksi maupun operasi. Pemangku kepentingan prioritas meliputi pasien/pendamping; staf dan pekerja proyek; warga/usaha sekitar; pemerintah dan layanan kesehatan; penyandang disabilitas dan kelompok rentan; rumah tangga yang terdampak pengaturan rumah dinas sebelumnya; serta komunitas eks-pasien kusta. Informasi harus tersedia dalam Bahasa Indonesia yang mudah diakses, dengan format dan lokasi yang mempertimbangkan mobilitas, literasi, kerahasiaan, dan kondisi klinis. Masukan dicatat dan digunakan untuk memperbarui ESIA, ESMP, dan desain jika relevan. Untuk subproyek Kategori B, dokumen lingkungan dan sosial rancangan perlu diungkapkan secara tepat waktu sebelum persetujuan pembiayaan sesuai ESP AIIB; untuk TRUST Project, rancangan ESIA termasuk ESMP perlu tersedia untuk publik dalam Bahasa Inggris dengan Ringkasan Eksekutif Bahasa Indonesia yang mudah diakses. Catatan konsultasi, isu utama, tanggapan, serta informasi peserta perlu didokumentasikan dan digunakan untuk memutakhirkan ESIA/ESMP dan desain Proyek bila relevan.

Mekanisme Penanganan Keluhan Tingkat Proyek (GRM)

Dalam mengelola pengaduan terkait dampak dan risiko Proyek, RSUP Dr. Sitanala telah membentuk Mekanisme Penanganan Pengaduan (Grievance Redress Mechanism/GRM) untuk menyediakan sarana yang aman, mudah diakses, transparan, dan berbatas waktu bagi masyarakat terdampak, pekerja proyek, pasien, pengunjung, serta pemangku kepentingan lainnya dalam menyampaikan, mencatat, menyelidiki, dan menyelesaikan pengaduan yang timbul selama tahap konstruksi maupun operasional. Mekanisme ini bertujuan memastikan bahwa permasalahan terkait Proyek dapat diidentifikasi dan ditangani sebelum berkembang menjadi konflik sosial, perselisihan, atau risiko reputasi yang lebih luas, tanpa mengurangi hak para pihak untuk menempuh upaya hukum atau administratif yang tersedia berdasarkan peraturan perundang-undangan Indonesia. GRM dirancang dengan menjunjung prinsip-prinsip utama, antara lain kemudahan akses, inklusivitas, transparansi, kerahasiaan, perlindungan dari tindakan pembalasan, serta pendekatan yang berpusat pada penyintas dalam penanganan kasus-kasus sensitif.

RSUP Dr. Sitanala telah mengoperasikan sistem kelembagaan untuk mengelola umpan balik dan pengaduan pasien sesuai dengan Peraturan Menteri Kesehatan Nomor 4 Tahun 2018. Sistem tersebut mencakup unit layanan pelanggan, layanan pengaduan melalui telepon, kotak pengaduan, dan penyampaian secara elektronik melalui situs web rumah sakit. Namun, sistem yang telah tersedia tersebut perlu diperkuat melalui prosedur khusus Proyek yang lebih terstruktur dan berbatas waktu. Penguatan tersebut mencakup penyediaan saluran tambahan berupa layanan telepon khusus, WhatsApp, surat elektronik, formulir pengaduan, Petugas Penghubung Masyarakat (Community Liaison Officer/CLO), serta pertemuan konsultasi dengan pemangku kepentingan. Pengaduan yang disampaikan secara anonim juga harus diterima dan ditindaklanjuti.

Dalam pelaksanaannya, GRM Proyek mencakup tahapan penerimaan dan pencatatan, penyaringan dan pengklasifikasian, verifikasi dan penyelidikan, pemberian tanggapan dan penyelesaian, penutupan kasus, serta pemantauan. Tanda terima atau konfirmasi penerimaan pengaduan diberikan paling lambat dalam tiga hari kerja, penilaian awal dilakukan paling lambat dalam tujuh hari kerja, sedangkan penyelidikan dan pemberian tanggapan diselesaikan paling lambat dalam 30 hari kerja.

Jalur penanganan khusus disediakan untuk pengaduan internal pegawai dan ketenagakerjaan. Pengaduan tersebut dapat dieskalasikan dari tingkat pemberi kerja kepada GRM/PMU RS Sitanala, kemudian kepada Dinas Tenaga Kerja setempat, dan pada tahap akhir kepada Pengadilan Hubungan Industrial. Jalur penanganan khusus juga disediakan untuk kasus Kekerasan Berbasis Gender (Gender-Based Violence/GBV) serta Eksploitasi dan Kekerasan Seksual/Pelecehan Seksual (Sexual Exploitation and Abuse/Sexual Harassment/SEA/SH). Kasus-kasus tersebut wajib ditangani secara rahasia oleh petugas penghubung yang telah memperoleh pelatihan, dengan menerapkan prosedur yang berpusat pada penyintas, termasuk pelaksanaan penilaian perlindungan dalam waktu 24 jam.

Mekanisme ini juga menyediakan saluran khusus sesuai karakteristik lokasi dan kelompok terdampak, termasuk komunitas mantan pasien kusta, rumah tangga yang direlokasi, pasien dan pendamping pasien, temuan benda atau situs yang diduga memiliki nilai warisan budaya, serta pengaduan terkait kebisingan pesawat udara. Oleh karena itu, GRM harus disosialisasikan kepada seluruh pemangku kepentingan serta diintegrasikan ke dalam Rencana Pengelolaan Lingkungan dan Sosial (Environmental and Social Management Plan/ESMP) dan kontrak pekerjaan agar dapat mengelola risiko sosial Proyek secara efektif.

Setiap orang terdampak, pekerja, pasien, pendamping, pengunjung, atau pemangku kepentingan lain dapat menyampaikan pertanyaan, saran, atau keluhan tanpa biaya, tanpa pembalasan, dan secara anonim bila dikehendaki. Saluran mencakup meja informasi/pengaduan, formulir dan kotak pengaduan, telepon, WhatsApp, email, situs web, Community Liaison Officer, pertemuan, dan rujukan melalui RT/RW atau pemerintah setempat. Kasus sensitif GBV/SEA/SH ditangani melalui jalur rahasia yang berpusat pada penyintas oleh petugas terlatih, dengan penilaian perlindungan dalam 24 jam. Keluhan pekerja menggunakan jalur ketenagakerjaan tersendiri.

Kontak institusi yang tersedia	RSUP Dr. Sitanala, Jl. Dr. Sitanala No. 99, Karang Sari, Neglasari, Kota Tangerang, Banten 15121
Telepon	(021) 5523059
WhatsApp / Layanan Pelanggan	0811-999-7473
Email	rsupdr.sitanala@gmail.com
Situs web / menu pengaduan	https://rsup-drsitanala.go.id/ (Pengaduan / Saran / SP4N-LAPOR)
Focal point GRM Proyek	Harus ditetapkan secara resmi dan diumumkan oleh PIU sebelum konstruksi. Sampai saat itu, gunakan kontak institusi di atas dan nyatakan bahwa keluhan terkait Pembangunan Kembali RSUP Dr. Sitanala / Proyek TRUST.

Target proses: tanda terima dalam 3 hari kerja; penyaringan dan penilaian awal dalam 7 hari kerja; investigasi dan penyampaian tanggapan pada umumnya dalam 30 hari kerja; hasil dicatat, tersedia eskalasi, dan penutupan dipantau. Risiko keselamatan mendesak memerlukan tindakan sementara segera. GRM tidak membatasi akses ke pengadilan, regulator, Ombudsman, SP4N-LAPOR, atau upaya hukum lainnya.

Mekanisme Masyarakat Terdampak Proyek AIIB (PPM)

PPM adalah mekanisme akuntabilitas independen AIIB, terpisah dari pengelola proyek dan Manajemen AIIB serta bertanggung jawab langsung kepada Dewan AIIB. PPM menerima pengajuan dari masyarakat yang meyakini telah atau kemungkinan akan mengalami dampak lingkungan atau sosial langsung dan material dari proyek yang dibiayai AIIB karena AIIB gagal menerapkan Kebijakan Lingkungan dan Sosialnya. Fungsinya meliputi Penyelesaian Masalah Dini, Penyelesaian Sengketa, dan Tinjauan Kepatuhan. Sebelum menghubungi PPM, masyarakat terdampak pada umumnya diharapkan telah melakukan upaya dengan itikad baik melalui GRM Proyek dan Manajemen AIIB.

Pada umumnya, pengajuan dilakukan oleh dua atau lebih masyarakat terdampak. Untuk dugaan kekerasan berbasis gender, pelecehan seksual, atau eksploitasi dan kekerasan seksual, satu pemohon dapat mengajukan. Pengajuan dapat disampaikan dalam Bahasa Indonesia atau bahasa lain di negara pemohon. PPM tidak menerima pengajuan anonim, tetapi pemohon dapat meminta kerahasiaan identitas.

Daring	https://www.aiib.org/ppm (pilih “File Your Submission”)
Email	ppm@aiib.org
Telepon bantuan pengajuan	+86-10-8358-0111
Alamat pos	Sekretariat PPM, Complaints-resolution, Evaluation and Integrity Unit (CEIU), AIIB Headquarters, Tower A, Asia Financial Center, No. 1 Tianchen East Road, Chaoyang District, Beijing 100101, China

1 INTRODUCTION

The Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP), referred to herein as the "ESIA" for The Project, aims to evaluate the potential environmental and social impacts associated with the expansion and modernization of The Sitanala Hospital. This assessment aligns with national environmental regulations and international best practices to ensure sustainable development and mitigate potential risks. As part of a broader initiative to improve healthcare infrastructure, AMDAL (*Analisis Mengenai Dampak Lingkungan*) assessments for The Sitanala Hospital are also being prepared for The Sitanala Hospitals which currently in Stage 1, which is pre-preparation stage for AMDAL.

Currently, the preparation of the Terms of References (KA-ANDAL) document, the ESIA document are in progress. In parallel, the preparation of the wastewater technical approval (*Persetujuan Teknis Pembuangan Air Limbah – Pertek Air Limbah*), air emission technical approval (*Persetujuan Teknis Pembuangan Emisi – Pertek Emisi*), and Traffic Impact Analysis (*Persetujuan Teknis ANDALALIN - Pertek ANDALALIN*) are in progress as well. The Project has already had the pre-Detailed Engineering Design (pre-DED) and masterplan based on the Minister of Health Decree (*Keputusan Menteri Kesehatan - KMK*) No. HK.01.07/MENKES/2000/2024. The Masterplan of Sitanala Hospital Development.

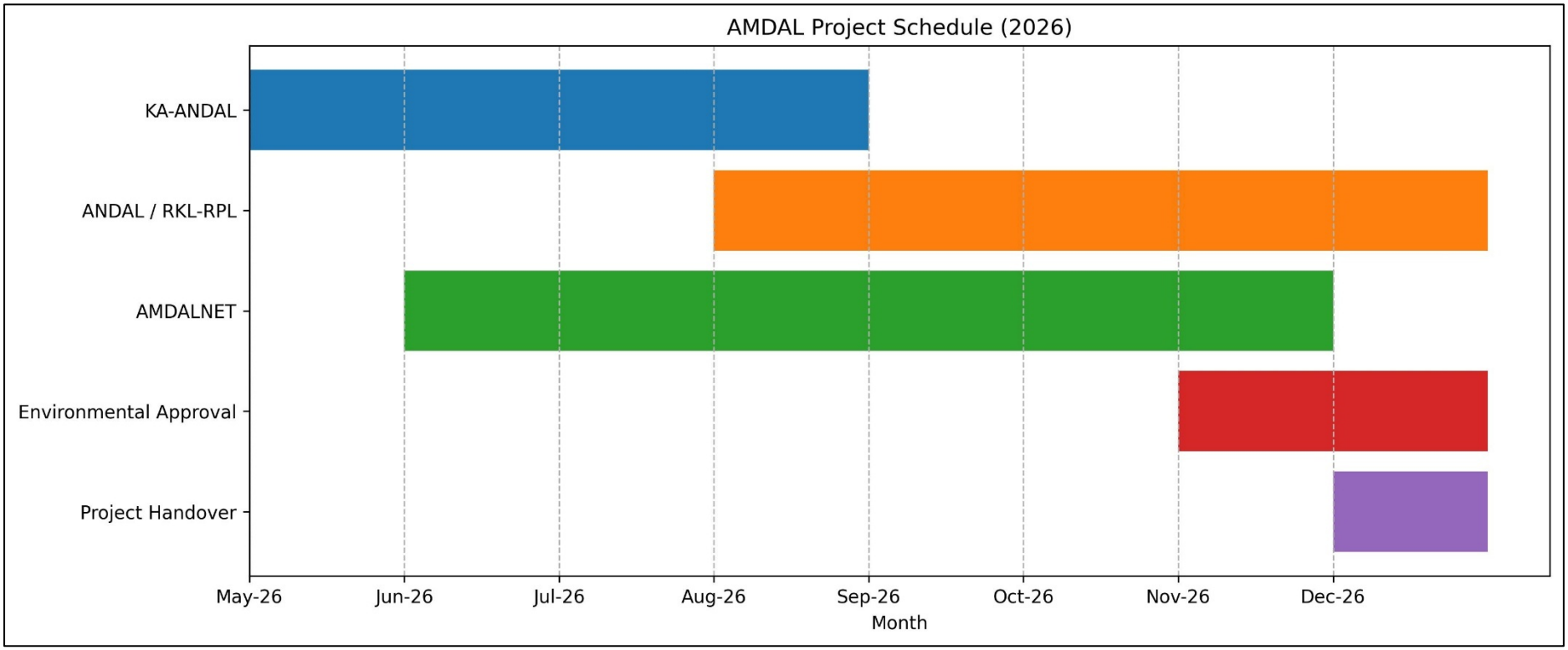


Figure 1 AMDAL Timeline for The Project

1.2 Project Overview & Rationale

1.2.1 Project Overview

This ESIA and ESMP are prepared for The Projectwithin the framework of the Transformative Healthcare Services Modernisation (TRUST) Project, a national programme of the Ministry of Health of the Republic of Indonesia, co-financed by the Asian Infrastructure Investment Bank (AIIB).

The project's clinical infrastructure through the construction of three new specialty buildings i.e., the Central Surgical Installation (*Instalasi Bedah Sentral-IBS*), the Integrated Oncology Center, and the Neurology & Urology Center with a combined gross floor area of approximately 55,950 m². The works are scheduled for the calendar year 2027 and are formalised in KMK No. HK.01.07/MENKES/2000/2024. The Masterplan of Sitanala Hospital Development on 24 December 2024.

1.2.2 Locations and Land Status

The Project located at Jl. Dr. Sitanala No. 99, Karang Sari Village, Neglasari District, Tangerang City, Banten Province, postcode 15121. The boundaries of The Sitanala Hospital site are described as follows:

1. North : Residential areas in RW 01 and RW 03, Karangsari Village, Neglasari District;
2. East : Pembangunan IV Road and residential area in RW 12, Karangsari Village, Neglasari District;
3. South : Residential area in RW 02, Karangsari Village, Neglasari District;
4. West : Dr. Sitanala Main Road.

The land status of Sitanala Hospital is under Right-to-Use Certificate (*Sertifikat Hak Pakai*) No. 1, with a total area of 533,190 m². The land status is in accordance with the approved Site Plan No. 656/113-PRT/DPMPTSP/2018, dated 13 December 2018, issued by the Tangerang City Investment and One-Stop Integrated Services Agency (*Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu-DPMPTSP*) of Tangerang City.

1.2.3 Project Alternative

5. Alternative 1: Alternative Location

The Project forms part of The Sitanala Hospital's long-term master plan, with Phase 1 comprising the development of the Central Surgical Building, Integrated Cancer Center, and Urology and Neurology Building. The selected project site is located within the existing hospital complex and has been designated specifically for healthcare expansion under the approved master plan.

Several factors were considered in evaluating the potential for an alternative location. Relocating the proposed facilities outside the existing hospital area would reduce operational efficiency and compromise the intended integration between existing and future medical services. The effectiveness of specialized healthcare delivery depends on close physical connectivity between departments, diagnostic facilities, emergency services, inpatient units, and supporting infrastructure.

The selected site offers significant advantages, including:

6. Integration with existing hospital facilities and specialty care services;
7. Improved patient accessibility and internal circulation;
8. Enhanced coordination among medical departments and emergency response functions;
9. Efficient utilization of existing utilities and supporting infrastructure, including roads, drainage systems, water supply, electricity networks, and medical support services;
10. Reduced capital expenditure associated with new infrastructure development; and
11. Improved continuity and quality of healthcare services.

From an environmental and social perspective, development within the existing hospital complex minimizes the need for additional land acquisition, physical or economic displacement, and conversion of undeveloped land. It also avoids potential impacts on environmentally sensitive areas and reduces disruption to surrounding communities. Consequently, no alternative location was identified that would provide equivalent operational, environmental, social, and economic benefits.

Therefore, the selected project site is considered the most feasible and preferred option for achieving the objectives of The Sitanala Hospital expansion.

12. Alternative 2: Do-Nothing Alternative

Under the Do-Nothing Alternative, the proposed Phase 1 development would not proceed, and the existing hospital facilities would continue operating without the planned expansion. While this option would avoid the temporary environmental and social impacts associated with construction activities, it would not address the growing demand for specialized healthcare services within The Sitanala Hospital's service area.

Without the construction of the Central Surgical Building, Integrated Cancer Center, and Urology and Neurology Building, The Sitanala Hospital would face constraints in expanding its surgical capacity, cancer treatment services, and specialized neurological and urological care. Existing facilities may become increasingly congested, potentially resulting in longer waiting times, reduced operational efficiency, and limitations in accommodating future patient demand.

The Do-Nothing Alternative would also prevent the realization of anticipated social benefits associated with the project, including improved access to advanced healthcare services, enhanced patient care outcomes, increased healthcare capacity, and additional employment opportunities during both construction and operation phases.

Furthermore, failure to implement the planned expansion could limit The Sitanala Hospital's ability to fulfill its long-term strategic objectives and its role as a regional referral healthcare center. As healthcare demand continues to increase, the absence of additional facilities may place greater pressure on existing infrastructure and reduce the overall quality and resilience of healthcare services.

Although the Do-Nothing Alternative would avoid project-related construction impacts, it would not provide the long-term healthcare, social, and economic benefits anticipated from the proposed development. Therefore, this alternative is not considered a preferred option.

1.2.4 Project Rationale

This Project is a vertical general hospital operating under the direct authority of the Ministry of Health and has undergone gradual institutional development since it was first established as Rumah Sakit Sewan on 28 July 1951. Over the course of its development, the institution was subsequently transformed into Pusat Rehabilitasi Sitanala in 1962 and later designated as RS Kusta Dr. Sitanala through Minister Decree of Heath (*Keputusan Menteri Kesehatan – KMK*) No. 140/1978 in 1978. In line with the increasing demand for healthcare services and the expansion of its service mandate, The Sitanala Hospital was upgraded to a Class C Hospital in 2019 and subsequently to a Class B Hospital in 2023. This progression reflects the increasingly important role of The Sitanala Hospital within the national healthcare service and referral system.

Currently, Sitanala Hospital occupies an area of approximately 142,000 m² with an existing built-up area of around 31,025 m² comprising sixteen building categories as outlined in the Master Plan. Existing healthcare facilities include approximately 250 inpatient beds, 31 Emergency Department (*Instalasi Gawat Darurat - IGD*) beds, and various intensive care facilities such as Intensive Care Unit (ICU), Isolation Intensive Care Unit **(**ICU), Intensive Cardiovascular Care Unit (ICVCU), Pediatric Intensive Care Unit (PICU), Neonatal Intensive Care Unit (NICU), Perinatology Unit / Perinatology Ward (PERINA), and High Care Unit (HCU). These services are supported by a total workforce of 605 personnel consisting of 417 healthcare professionals across nine professional categories and 188 non-health support personnel across four categories based on the 2023 *Laporan Akuntabilitas Kinerja Instansi Pemerintah* (LAKIP) data. In addition to general healthcare services, The Sitanala Hospital has also developed several featured services including Traumatology, Medical Check-Up, Central Surgery, Executive Polyclinic, Integrated Pulmonary Services, and Integrated Dental Services.

In recent years, The Sitanala Hospital has experienced a very significant increase in healthcare demand, particularly in the post-pandemic period. This is reflected in the Bed Occupancy Rate (BOR), which reached 91% in 2024, increasing sharply from only 16% in 2020. The high level of facility utilisation is also demonstrated by a Bed Turnover (BTO) value of 71 and a Turnover Interval (TOI) of approximately one day, indicating that The Sitanala Hospital's service capacity has reached a highly saturated condition and is approaching its operational limit. Furthermore, the volume of surgical procedures increased drastically by approximately 10.25 times during the 2020–2024 period. These conditions indicate that The Sitanala Hospital's existing facilities and service capacity are no longer sufficient to accommodate the continuously growing demand for healthcare services.

Within this context, Sitanala Hospital aims to advance toward Paripurna-level services while strengthening its role as a regional referral and healthcare education centre. Therefore, hospital redevelopment has become an urgent necessity to respond to the increasing service demand, support the expansion of specialised healthcare and medical education services, and improve the overall quality and capacity of hospital infrastructure. The need for hospital redevelopment is also aligned with national healthcare policy directions, particularly the *Klinik Jasa Spesialis Utama (KJSU)* reform programme under KMK HK.01.07/MENKES/1277/2024, which emphasises the strengthening of Cancer, Cardiology, Stroke, and Uronephrology services within government hospitals.

In response to these needs, Sitanala Hospital Master Plan proposes a phased increase in capacity to approximately 450 beds by 2026 and 600 beds by 2030, including around 125 intensive care beds consisting of PICU, Medical Intensive Care Unit (MICU), and NICU configurations. This development will be supported through the construction of three new buildings as well as the upgrading of various

supporting utilities and infrastructure, including sky-bridge integration, centralised energy systems, clean water supply systems, wastewater treatment facilities, and Hazardous Material (*Bahan Berbahaya dan Beracun - B3*) management systems. Overall, The Sitanala Hospital redevelopment is directed toward the implementation of a Smart and Green Hospital concept aligned with the Government's agenda for modern, sustainable, and climate-resilient healthcare infrastructure development.

1.3 Project Objective

The objectives of the Project, derived from the Feasibility Study and the Master Plan, are set out below:

13. Establish the Sitanala Hospital as a national centre of excellence in Central Surgery, Oncology, Neurology, and Urology, capable of preventing the outflow of Indonesian patients to overseas treatment.

14. Support The Sitanala Hospital-Based Specialist Doctor Education Programme (*Program Pendidikan Doktor Spesialis-PPDS*) hosted at The Sitanala Hospital, ensuring that newly-trained specialists graduate with current-generation medical equipment and infrastructure exposure.

15. Establish The Sitanala Hospital as a leading regional center in Asia for cardiovascular and uronephrology services, education, and research.

16. Develop an integrated healthcare campus with sky-bridge connectivity and advanced integrated Information Technology (IT) systems as a step towards automatitation, designed in accordance with Smart and Green Hospital principles. .

17. Deliver a unified service experience that reduces patient waiting time, integrates specialty consultations, and improves clinical outcomes through the Multidisciplinary Team (MDT) approach.

1.4 Project Activities and Expected Results

The redevelopment programme comprises the following activities and expected results:

18. Construction of the new IBS with gross floor area 19,150 m². This building serves as the primary facility for surgical procedures and post-operative care within the hospital complex. It comprises two inpatient floors (Levels 6–7) with a combined capacity of 45 rooms and 114 beds, supported by an Intensive Care Unit (ICU) accommodating 20 beds and an Intermediate Care Unit (IRNA) with 36 beds on Level 5. Level 4 houses eight dedicated operating theatres, while Level 3 consolidates diagnostic services including radiology, clinical laboratory, blood bank, and Central Sterile Supply Department (CSSD). Emergency services, including the Emergency Installation and pharmacy, and reverse osmosis are located on Level 1. The building is further equipped with a rooftop helipad on Level 8 to facilitate air medical evacuation..

19. Construction of the new Integrated Oncology Center with gross floor area 20,650 m². As the largest building within the complex, the Oncology Building is purpose-built to deliver comprehensive cancer care services, spanning from early detection through to palliative treatment. The facility provides two dedicated inpatient floors (Levels 6–7)

with a total capacity of 48 rooms and 96 beds, including a Maternal and Child Health (KIA) unit on Level 7. The building is distinguished by its full-spectrum oncology infrastructure, encompassing chemotherapy services, radiotherapy, and a Linear Accelerator (LINAC) facility located in the basement for advanced radiation therapy. Level 3 accommodates early detection services, outpatient oncology clinics, and a dedicated palliative care unit..

20. Construction of the new Neurology & Urology Center with gross floor area 16,150 m². The Neurology/Urology Building is the most specialized facility within the complex, providing targeted services for neurological and urological conditions. The building offers three tiers of inpatient care: an Executive Inpatient Unit on Level 6 (16 rooms, 35 beds), a general inpatient ward on Level 5 (68 beds), and a combined ICU and High Care Unit (HCU) on Level 4 (24 beds), which also integrates a Stroke Center and Medical Rehabilitation services. Level 3 is equipped with a Cardiac Catheterization Laboratory (Cathlab) and Extracorporeal Shock Wave Lithotripsy (ESWL) facilities for urological treatment. Level 2 provides a range of specialized neurological outpatient services, including a Neurology One-Day Care (ODC) unit, Brain Competency and Medical Education (Brain CME) center, and Neuro Restoration clinic. Level 1 accommodates the main lobby, reverse osmosis, outpatient polyclinic, and radiology services, serving as the primary point of entry for patients and visitors. The basement level provides supporting infrastructure, including parking facilities for the public and ambulances, Central Sterile Supply Department (CSSD), laundry, and nutrition installation services.

1.5 Purpose of ESIA/ESMP

The ESIA-ESMP is prepared to satisfy three converging purposes:

21. Compliance with AIIB's Environmental and Social Framework (ESF), as amended through 26 June 2024, including the Environmental and Social Policy, the Environmental and Social Exclusion List, and the applicable Environmental and Social Standards. For the TRUST Project, ESS1 and ESS2 apply; current screening indicates ESS3 is not triggered for RSUP Dr. Sitanala.

22. Provision of an integrated, harmonised ESMP that is fully traceable to the RKL-RPL deliverable under AMDAL, that incorporates Climate Risk Assessment and Green House Gas (GHG) inventory in line with ESF expectations, and that operationalises a Smart and Green Hospital design philosophy.

23. In addition, this is also to comply with the in country environmental and social legislation namely: Government Regulation No. 22 of 2021 on Environmental Protection and Management Implementation (*Peraturan Pemerintah No 22 Tahun 2021-PP 22/2021*) and Minister of Environment Regulation No. 4 of 2021 on the List of Activities Requiring AMDAL, UKL-UPL, or SPPL *(Peraturan Menteri Lingkungan Hidup No. 4 Tahun 2021 – PermenLHK 4/2021*) as the technical basis for the parallel preparation of Tor Impact Assessment (*Kerangka Acuan Analisis Dampak Lingkungan Hidup - KA-ANDAL*), Environmental Impact Assessment (*Analisis Dampak Lingkungan Hidup-ANDAL*), and ESMP (*Rencana Pengelolaan Lingkungan Hidup Rencana*

Pemantauan Lingkungan Hidup-RKL-RPL), and ultimately the Environmental Approval (*Persetujuan Lingkungan*).

1.6 Methodology For Preparing ESIA

The preparation of the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) follow a structured methodology that includes the following key steps:

1.6.1 Scoping Visit and Initial Screening

24. Identification of project components and potential environmental and social risks.
25. Observe the current environmental and social impacts management practices.
26. Consultation with stakeholders to define the scope of the assessment.
27. Review of legal and regulatory requirements at the national and international levels.

1.6.2 Baseline Data Collection

For this ESIA study, the environmental baseline data were collected from the secondary data, i.e., the monitoring report from 2022 until 2025 period. Whereas, the social data were collected both from primary and secondary data.

28. Environmental Data:

- Air and water quality assessments through sampling and laboratory analysis.
- Noise and vibration monitoring using decibel meters.
- Climate and meteorological data analysis from government agencies.

- Social Data:

  - Social Data: A socio-economic survey was conducted at the household level among communities affected in the vicinity of the Project site, covering Karang Sari Village which accounted for 65 surveyed households spread across RT 001–003/RW 001, RT 001–002/RW 002, RT 001–005/RW 003, RT 001/RW 012, and RT 001–002/RW 013 and Mekar Sari Village comprising 5 surveyed households located in RT 004/RW 001, including persons with disabilities due to leprosy (former leprosy patients), who were identified as a vulnerable group. The survey collected information on socio-economic and health conditions, community perceptions, and gender aspects through a structured questionnaire. The Survey was conducted among household located within a 500-meter radius of the project site. The survey employed a structured questionnaire covering household characteristics, socio-economic conditions, health status, livelihoods, perceptions of the Project, and gender aspects. A copy of the questionnaire is provided in Appendix. In addition, information on the proposed hospital expansion was disseminated through meetings with the Heads of Neighborhood Associations (RT and RW) and the Village Head (Lurah). These activities served as an initial stakeholder engagement process to communicate the scope and

objectives of the proposed development, provide relevant project information, and receive feedback from local administrative representatives.

- Stakeholder interviews and focus group discussions.
- Land use and demographic studies using census data

1.6.3 Impact Assessment

29. Identification of potential positive and negative impacts on the environment and communities (patients, visitors, neighbours).
30. Qualitative impact evaluation using risk assessment matrices.

1.6.4 Mitigation and Management Measures

31. Development of mitigation strategies to minimize adverse impacts.
32. Preparation of an Environmental and Social Management Plan (ESMP) with clear implementation timelines and responsibilities.
33. Cost estimation for mitigation measures and monitoring programs.

1.6.5 Public Consultation and Stakeholder Engagement

34. Regular consultations with affected communities, government agencies, and Non-Government Organization (NGO).
35. Disclosure of findings through public meetings, reports, and digital platforms.
36. Incorporation of stakeholder feedback into project planning.

1.6.6 Monitoring and Reporting

37. Establishment of environmental and social monitoring plan.
38. Periodic reporting on the implementation of the environmental and social mitigation measures.

1.6.7 Screening for Associated Facilities

Under AIIB's ESF, Associated Facilities (AF) are activities that are not included in the description of The Sitanala Hospital set out in the Legal Agreements governing The Sitanala Hospital, but which, following consultation with the Client, the Bank determines are: (a) directly and materially related to The Sitanala Hospital; (b) carried out, or planned to be carried out, contemporaneously with The Sitanala Hospital; and (c) necessary for The Sitanala Hospital to be viable and would not be carried out if The Sitanala Hospital did not exist.

To the extent the Client controls or has influence over the Associated Facilities: (i) the Client is required to comply with the requirements of the Environmental and Social Policy (ESP) and applicable ESSs with respect to such facilities, to the extent of its control or influence; or (ii) if the Associated Facilities are financed by another Multilateral Development Bank (MDB), bilateral development organization or development finance institution, the Bank may rely on the requirements of such other development partner in place of all or some of the requirements set out in the ESP and ESSs, provided that, in the

Bank's judgment, such requirements do not materially deviate from what would otherwise be required under the ESP and ESSs.

If the Client does not control or have influence over the Associated Facilities, the environmental and social assessment identifies the environmental and social risks and impacts that those facilities may present to the Project, together with potential mitigation measures within the Client's control. The Client is required to demonstrate, to AIIB's satisfaction, the extent to which it does not exercise control or influence, including relevant legal, regulatory, and institutional factors. The screening outcomes are tabulated in Table 1 and the expanded assessment is presented in Table 2. In addition, consistent with the TRUST Project's agreed environmental and social approach, this hospital ESIA must assess all buildings and facilities under the RSUP Dr. Sitanala master plan that are relevant to the redevelopment—including demolition/construction financed from Government budget or other sources—so that cumulative and interface risks are assessed holistically, irrespective of whether each activity meets the Associated Facility definition.

Table 1 The screening outcomes

Activities funded by others: Committed Investments by other Financiers (these only refer to specific investments that may be linked With The Project)	Financial Sources	Considered Associated Facilities/AF when all three criteria are met: Directly and materially related to The Project[1]	Carried out, or planned to be carried out, contemporaneously with The Project[2]	Necessary for The Project to be viable and would not be carried out if The Project did not exist[3]	Conclusion
PDAM water supply	Government	No. It is a public infrastructure that serving many customers. This facility is not directly and materially related to the project.	Yes. The Sitanala Hospital will use the PDAM water as a main water supply for the future development and groundwater as a backup.	Yes. This facility will be needed to support hospital operations.	Not AF
SIPA wells	Government	Yes. Groundwater wells developed under a SIPA permit are directly related to the hospital if they provide the project's operational water demand. Their purpose is directly linked to hospital services.	Yes. The wells would normally be operated during the project operation to ensure adequate water supply.	Yes. This facility will be needed to support hospital operations.	AF

[1] Is the AF serving a variety of needs other than the project itself? Is the AF specifically developed solely for the purpose of serving the needs of the project?

[2] is the AF planned/built/operated during the project's preparation/ implementation/operation stage? Example of contemporaneous: AF constructed shortly before the project is operational, but construction of the AF and the construction of the project was not done in parallel. "Contemporaneous" does not necessarily mean "simultaneous," or coinciding precisely. Determination of a "contemporaneous" relationship requires the use of good professional judgement. The relevant period will depend on the circumstances, but would generally be considered to start at the time of the project identification mission by the Bank.

[3] Would the AF be built in the absence of the project? What is the dependency of the AF on the project and vice versa? If the AF did not exist, could the project still operate and function as designed?

Activities funded by others: Committed Investments by other Financiers (these only refer to specific investments that may be linked With The Project)	Financial Sources	Considered Associated Facilities/AF when all three criteria are met: Directly and materially related to The Project[1]	Carried out, or planned to be carried out, contemporaneously with The Project[2]	Necessary for The Project to be viable and would not be carried out if The Project did not exist[3]	Conclusion
Hospital-Based PPDS academic partner institutions	Government	No. This building is not related to the construction purpose.	Yes. This activity will be carried out to support hospital operations.	Yes. This facility will be needed to support hospital operations.	Not AF
ULP and Protese building	Government	Yes. This building will be demolished to build a new building (Oncology, Neuro-Urology Building)	Yes. This activity will be carried out for the project development.	Yes. The demolition activitiy for these facility is needed to build a new building.	AF
Housing complex of former leprosy patients living in the surrounding area of The Sitanala Hospital compound.	Government	No. This facility will no longer be a means of settlement for former leprosy patients.	No. This facility will no longer be used as a residential facility for former lepers.	No. The Sitanala Hospital's operations will not depend on this facility or vice versa.	Not AF
Temporary hazardous waste storage (*Tempat Penyimpanan Sementara LImbah Bahan Berbahaya dan Beracun – TPS LB3*)	Government	Yes. The hazardous waste from the future activities of the project will be stored in this facility.	Yes. The project will use this facility to manage the hazardous waste.	Yes. This facility is needed for project operational.	AF
Temporary Storage for Domestic Waste (*Tempat Penyimpanan Sementara Limbah Domestik – TPS Limbah Domestik*)	Government	Yes. The domestic waste from the future activities of the project will be stored in this facility.	Yes. The project will use this facility to manage the domestic waste.	Yes. This facility is needed for project operational.	AF

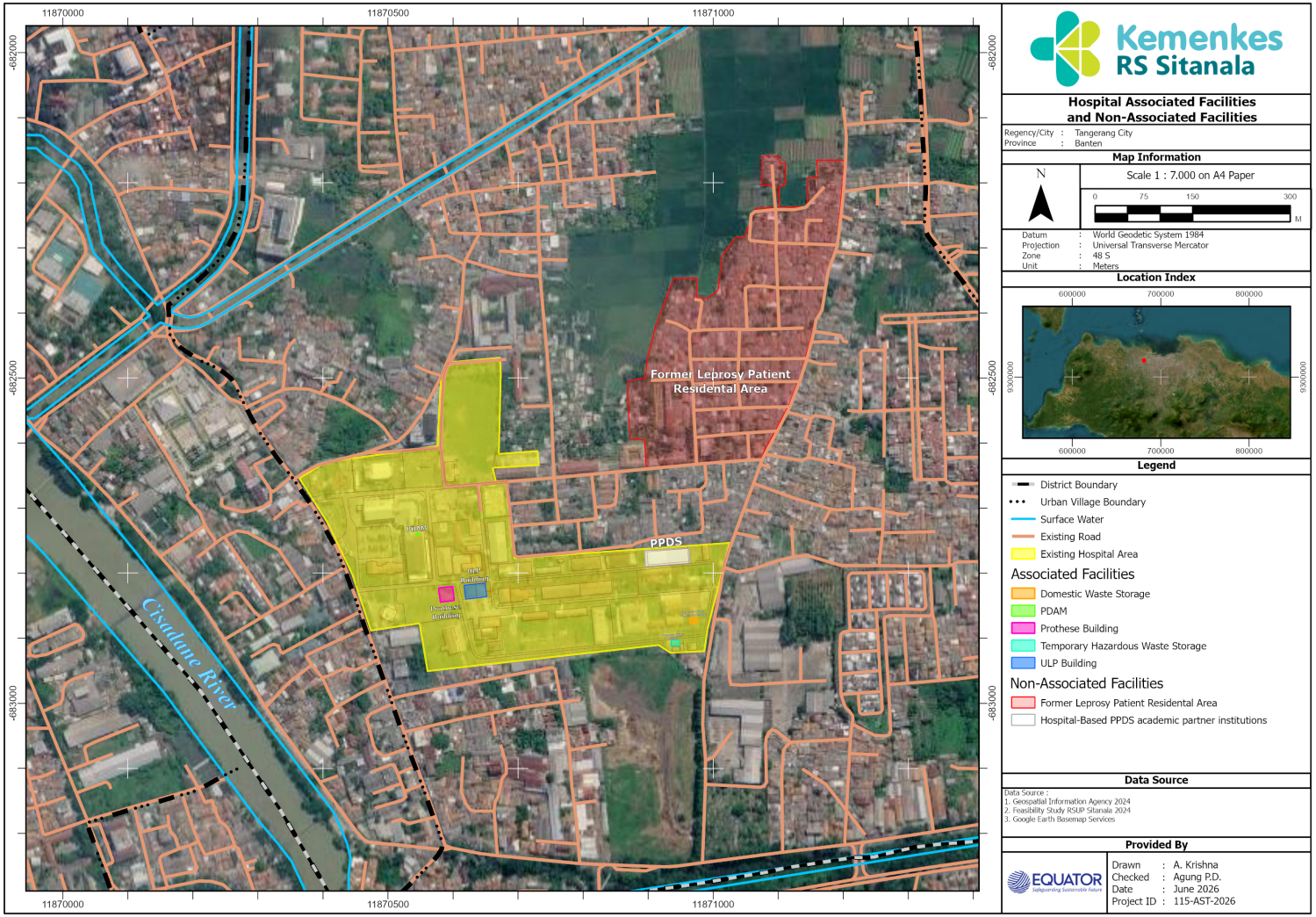


Figure 2 Project Boundary with Associated Facilities

Table 2 Expanded Assessment of Confirmed Associated Facilities (AFs) in Accordance with AIIB ESS1

Confirmed Associated Facility	Existing Infrastructure	Required Upgrade / Project Interface	Financing / Implementation Responsibility	Hospital Dependence	Key E&S Risks	Hospital Control / Influence	ESMP Mitigation Measures	Monitoring	Institutional Responsibility
SIPA Wells (Groundwater Supply)	Existing licensed groundwater abstraction wells (SIPA) supplying part of the hospital's operational water demand. PDAM remains the primary source; groundwater serves as backup.	No upgrade required.	Government (RSUP Dr. Sitanala).	**High**. Reliable backup water for critical services.	Groundwater depletion, water quality deterioration, excessive abstraction, OHS risks.	**High**.	▪ Maintain SIPA permits; ▪ install flow meters; ▪ monitor abstraction; ▪ periodic water quality testing; ▪ water conservation; contingency planning.	▪ Monthly abstraction; ▪ quarterly water quality; ▪ annual groundwater level; ▪ compliance records.	▪ RSUP Dr. Sitanala Facility Management Unit; ▪ Environmental Unit; ▪ Groundwater Authority
ULP and Prosthesis Building (Demolition)	Existing buildings occupying footprint of proposed Oncology and Neurology-Urology Centers.	This facilities will be demolished.	Government (RSUP Dr. Sitanala).	**High**. Demolition is prerequisite for new buildings.	Dust, noise, demolition waste, asbestos, worker injury, service disruption.	**High**.	▪ Hazardous material survey; asbestos management; ▪ isolate work area; ▪ dust/noise control; ▪ waste segregation; ▪ traffic management.	▪ Daily dust/noise; ▪ waste records; ▪ HSE inspections; ▪ incident reports.	▪ PMU; ▪ Contractor; Supervision Consultant; ▪ Hospital OHS Unit

Confirmed Associated Facility	Existing Infrastructure	Required Upgrade / Project Interface	Financing / Implementation Responsibility	Hospital Dependence	Key E&S Risks	Hospital Control / Influence	ESMP Mitigation Measures	Monitoring	Institutional Responsibility
Temporary Hazardous Waste Storage (TPS Limbah B3)	Existing licensed hazardous waste storage serving hospital operations.	No upgrade required.	Government (RSUP Dr. Sitanala).	High. Supports expanded healthcare waste management.	Infection, spills, fire, chemical exposure, non-compliance.	**High**.	▪ Segregation; secondary containment; inspections; ▪ spill kits; ▪ PPE; manifests; ▪ licensed transport.	▪ Daily inspections; ▪ inventory; manifests; ▪ audits.	▪ Hospital Environmental Unit; ▪ Waste Management Unit; ▪ Licensed Contractor
Temporary Domestic Waste Storage (TPS Limbah Domestik)	Existing domestic waste storage before municipal collection.	No upgrade required.	Government (RSUP Dr. Sitanala).	High. Required for routine non-medical waste.	Odor, pests, leachate, litter, improper segregation.	**High**.	▪ Separate waste streams; ▪ covered containers; ▪ housekeeping; ▪ vector control; ▪ PPE; ▪ awareness.	▪ Daily inspections; ▪ collection records; ▪ complaints log.	▪ Hospital Environmental Unit; ▪ Housekeeping Unit; ▪ Municipal Waste Service

2 PROJECT DESCRIPTION

2.1 Project Type and Scope

The Sitanala Hospital is classified as a brownfield healthcare-facility expansion within the existing hospital operational compound. No greenfield land conversion is required; all new construction occurs within the 142,000 m² existing land area. The Project scope, traceable to the Feasibility Study and the Master Plan, comprises three primary components:

39. The Integrated Surgical Services Building (IBS) is one of the three primary facilities to be developed under Phase 1 of the Project. The building comprises eight operational floors and a rooftop service level and is designed using an earthquake-resistant reinforced concrete structural system in accordance with applicable Indonesian healthcare facility and seismic design standards. The building will accommodate integrated surgical, diagnostic, critical care, inpatient, and medical education services. The ground floor will provide public reception and clinical support facilities, while the second floor will accommodate diagnostic imaging, laboratory, and outpatient services. The third floor will serve as the Integrated Surgical Centre comprising seven operating theatres with associated perioperative support facilities. The fourth floor will accommodate critical care services, including the Intensive Care Unit (ICU), Pediatric Intensive Care Unit (PICU), Medium Care Unit (MCU), Burn Care Unit, and Perinatology Unit. The fifth to seventh floors will provide inpatient ward facilities comprising approximately 156 inpatient beds, while the eighth floor will accommodate medical education, clinical simulation, and teaching support facilities. The rooftop level will house mechanical, electrical, plumbing (MEP), and other building utility systems. The IBS Building is intended to strengthen surgical capacity, critical care services, inpatient treatment, diagnostic support, and healthcare workforce development, supporting the long-term development of RSUP Dr. Sitanala as a tertiary referral and teaching hospital.

40. The Neurology and Urology Center Building is one of the three primary healthcare facilities to be developed under Phase 1 of the Project. The building comprises seven operational floors and a rooftop service level and is designed using an earthquake-resistant reinforced concrete structural system in accordance with applicable Indonesian healthcare facility and seismic design standards. The building will provide integrated neurology, urology, renal care, rehabilitation, critical care, inpatient, and medical education services. The ground floor will accommodate outpatient clinics, pathology and laboratory services, pharmacy facilities, and supporting public services. The second floor will provide specialist outpatient clinics and diagnostic services, including an Extracorporeal Shock Wave Lithotripsy (ESWL) unit. The third floor will serve as the renal and procedural care centre, comprising 30 hemodialysis stations, two endoscopy rooms, one biopsy room, isolation dialysis rooms, and associated patient support facilities. The fourth floor will accommodate critical care and surgical services, including two operating theatres, Intensive Care Units comprising 2 High Care Unit (HCU) beds, 4 Low Care Unit (LCU) beds, and 3 Stroke Care Unit (SCU) beds,

together with pre- and post-operative recovery areas and a cardiac catheterization laboratory. The fifth floor will provide neurological diagnostic, rehabilitation, neuro-restoration, and pediatric neurodevelopment services. The sixth and seventh floors will accommodate inpatient services comprising 25 inpatient rooms (50 beds) and 5 isolation rooms (5 beds), supported by treatment rooms, rehabilitation facilities, nurse stations, and ward support services. The seventh floor also incorporates clinical simulation, skills laboratories, and medical education facilities to support the hospital's teaching function. The rooftop level will accommodate mechanical, electrical, plumbing (MEP), and other building utility systems required for hospital operations. The Neurology and Urology Center Building is intended to strengthen specialized neurological, urological, renal, rehabilitation, surgical, critical care, and inpatient services while supporting the long-term development of RSUP Dr. Sitanala as a tertiary referral and teaching hospital.

41. The Oncology Center Building is one of the three primary healthcare facilities to be developed under Phase 1 of the Project. The building comprises six operational floors and a rooftop service level and is designed using an earthquake-resistant reinforced concrete structural system in accordance with applicable Indonesian healthcare facility and seismic design standards. The building will provide integrated oncology services encompassing cancer diagnosis, radiotherapy, chemotherapy, surgical oncology, inpatient care, and specialized nuclear medicine services. The ground floor will accommodate radiotherapy facilities comprising two LINAC treatment bunkers, nuclear medicine services including one PET-CT room, one SPECT room, outpatient consultation clinics, and supporting radiopharmacy and radioactive waste management facilities. The second floor will provide diagnostic imaging and nuclear medicine services, including six diagnostic imaging rooms (CT Scan, MRI, Mammography, X-Ray, Fluoroscopy, and Ultrasound), two SPECT rooms, four Radioactive Iodine Therapy (RIRA) isolation rooms (4 beds), uptake rooms, and injection rooms. The third floor will accommodate outpatient oncology clinics and supporting clinical services. The fourth floor will serve as the surgical oncology centre comprising three operating theatres, 2 pre-operative beds, 3 post-operative recovery beds, and 12 Low Care Unit (LCU) beds. The fifth floor will provide chemotherapy day-care services comprising 24 chemotherapy treatment chairs and four specialized treatment rooms (RIIM) together with supporting pharmacy and patient care facilities. The sixth floor will accommodate inpatient oncology services comprising 22 inpatient rooms (44 beds) and 3 isolation rooms (3 beds), supported by nurse stations, treatment rooms, and ward support facilities. The rooftop level will accommodate mechanical, electrical, plumbing (MEP), and other building utility systems required for hospital operations. The Oncology Center Building is intended to strengthen comprehensive cancer diagnosis, radiotherapy, chemotherapy, surgical oncology, inpatient treatment, and nuclear medicine services, supporting the long-term development of RSUP Dr. Sitanala as a tertiary referral and teaching hospital.

The Sitanala Hospital is supported by a fifth cross-cutting component Project Management operationalised through The Sitanala Hospital Implementation Unit (PIU) of the Ministry of Health, supported by a Detailed Engineering Design Consultant (DEDC), a Construction Management Consultant (CMC), and an Equipment Consultant (EQC).

2.1.1. Initiator and Parties Involved

The initiator and the parties involved in The Project are summarised in Table 3.

Table 3 The initiator and the parties involved in The Sitanala Hospital

Role	Entity
Project Owner / Initiator	Ministry of Health of the Republic of Indonesia (Kementerian Kesehatan Republik Indonesia)
Implementing Directorate	Directorate General of Health Services / Directorate of Advanced Health Services (Direktorat Jenderal Pelayanan Kesehatan / Direktorat Pelayanan Kesehatan Lanjutan)
Beneficiary / Operator	Sitanala Hospital Tangerang (vertical hospital under the Ministry of Health)
Funder	Asian Infrastructure Investment Bank (AIIB) - foreign loan
Financing Instrument	Project Loan (*Pinjaman Kegiatan*); approximately IDR 799.965 billion / USD 51.6 million
Environmental Impact Assessment Authority (AMDAL Review Commission)	Environmental Agency of Banten Province / AMDAL Review Commission (DLH Provinsi Banten / Komisi Penilai AMDAL)
Environmental Approval Permit-Issuing Authority	Authorized Official of the Environmental Agency of Banten Province (DLH Provinsi Banten)
Technical Authorities (Water & Air Pollution Control / Hazardous Waste Management)	Directorate of Water Pollution Control, Air Pollution Control, and Hazardous Waste Management, Ministry of Environment and Forestry (KLH)
Traffic Impact Assessment (ANDALALIN) Authority	Transportation Agency of Banten Province / City of Tangerang (Dinas Perhubungan Provinsi Banten / Kota Tangerang)
AMDAL & ESIA Consultant	PT Equator Global Internasional (PT EGI)
Detailed Engineering Design Consultant (DEDC)	To be confirmed
Construction Management Consultant (CMC)	To be confirmed

Role	Entity
Construction Contractor(s)	To be confirmed

2.1.2. Site Capacity Analysis

The existing built-up footprint distribution (per Master Plan) is summarised in Table 4.

Table 4 The existing built-up footprint distribution (per Master Plan)

No.	Building Category	Floor Area (m²)
1	Main Building (Gedung Utama)	1,994
2	Storage / Warehouse	620
3	Workshop / Hangar	320
4	Installation Building	342
5	Laboratory Building	500
6	Healthcare Buildings (clinical blocks)	19,644
7	Religious Building (Place of Worship)	799
8	Meeting Building	80
9	Education Building	369
10	Sports Building	720
11	Garage / Pool	232
12	Animal Husbandry / Fish Pond	272
13	Other Work Buildings	429
14	Public Facilities	600
15	Staff Housing (Rumah Dinas)	4,170
16	Medical Check-Up Building	850
	Total existing footprint	**31,025**

The Sitanala Hospital will add 55,950 m² of new gross floor area distributed across three buildings (IBS 19,150 m² + Oncology 20,650 m² + Neurology-Urology 16,150 m²), bringing The Sitanala Hospital total built area to approximately 86,975 m² within the spatial-planning of the Master Plan.

Considering the total site area of approximately 533,428 m² (53.34 ha), the existing building coverage occupies only about 5.8% of the site. Following the planned expansion, the total built-up area would occupy approximately 16.3% of the site area. Therefore, substantial land remains available for internal circulation, green open spaces, utility infrastructure, stormwater management systems, parking areas, and future development needs.

From a capacity perspective, the available land area appears adequate to accommodate the planned expansion while maintaining compliance with spatial planning requirements and preserving sufficient open space within The Sitanala Hospital campus. The relatively low overall site coverage suggests that the proposed development can be integrated without creating excessive site congestion, provided that supporting infrastructure such as parking facilities, traffic circulation, drainage systems, utility networks, and environmental management measures are upgraded accordingly.

Overall, the site possesses sufficient development capacity to support the proposed hospital expansion program, enabling increased healthcare service provision while maintaining functional operational areas and environmental buffers across The Sitanala Hospital complex.

2.2 Demolition Plan, Internal Transfer Plan and State-Owned Asset Disposal

2.2.1 Demolition Plan

The Project will involve phased demolition of several existing buildings within the Sitanala Hospital complex to accommodate the proposed redevelopment. In Phase 1, demolition will be limited to the former Cooperative Enterprise / ULP Building and the Protese Building to enable construction of the Integrated Cancer Care Center, the Neurology and Urology Center, and associated parking facilities. The Central Surgical Installation Building will be developed on a greenfield site and therefore does not require demolition. The demolition of staff housing units previously occupied by 26 employees was already completed in 2024, with replacement accommodation arrangements provided through individual land plots under annual lease agreements.

In Phase 2, demolition will be undertaken to support the development of inpatient and specialized service facilities. The Planning Department Building, ESWL Building, Yudhistira Inpatient Ward, and Archive Building will be demolished to allow construction of the Exclusive Inpatient and Maternal & Child Health Building. In addition, the Security Post Building, former Nutrition Unit Building, and former Laundry Unit Building will be demolished to facilitate construction of the Integrated Pulmonary and Leprosy Center.

In Phase 3, the Adhiyatma Building and the National Program Building will be demolished to support the development of the Emergency Department and BPJS Outpatient Clinic Building. This phase will also include construction of the Outpatient Services Building, Private Outpatient Clinic Building, and pedestrian link bridge infrastructure to improve patient flow and connectivity.

In Phase 4, the former IPSRS Building will be demolished to allow construction of the multi-storey Parking Building. Several existing ward buildings, including Flamboyan Ward, Seruni Ward, former Ward XI, the COVID-19 Emergency Unit / Tanjung Kemuning Ward, former Tatar Dormitory, DKI Ward, and Kenanga Ward, will also be demolished to facilitate construction of the Bereavement Center.

In Phase 5, demolition will be limited to the Sports Hall, which will be cleared to enable construction of the Multipurpose Hall. The Hotel / Apartment Building will be constructed on the existing football field site and no demolition activity is specified for this component.

2.2.2 Internal Transfer Plan

As part of the phased redevelopment of Sitanala Hospital, several existing services, patients, and staff may need to be internally transferred from affected buildings or service areas to alternative locations

within the hospital complex. These internal transfers will be necessary to maintain continuity of healthcare services during demolition, construction, and facility upgrading activities.

At this stage, the detailed internal transfer plan has not yet been finalized. Sitanala Hospital will be required to prepare a comprehensive Internal Transfer Plan prior to the implementation of any internal transfer activities involving patients, medical services, hospital operations, equipment, and staff. The plan should clearly define the scope, schedule, sequence, responsibilities, and communication arrangements for each transfer activity.

The Internal Transfer Plan should ensure that hospital services remain operational and that patient safety, service quality, and staff welfare are maintained throughout the transition period. The plan should identify the existing services and units to be transferred, the proposed receiving locations, required temporary arrangements, supporting infrastructure, access routes, emergency response arrangements, and measures to minimize disruption to patients, visitors, healthcare workers, and other hospital users.

The plan should also include specific provisions for vulnerable patients, including children, elderly patients, persons with disabilities, patients with limited mobility, and patients requiring continuous medical care. Adequate coordination among hospital management, medical departments, nursing units, facility management, contractors, and relevant stakeholders will be essential to ensure that internal transfers are conducted safely and efficiently.

Prior to implementation, Sitanala Hospital should communicate the transfer schedule and arrangements to affected staff, patients, visitors, and relevant departments. The transfer process should be monitored and documented, including any issues encountered and corrective actions taken. This will help ensure that the internal transfer process is properly managed and does not result in significant disruption to hospital operations or healthcare service delivery.

2.2.3 State-owned Assets Disposal

As part of the phased redevelopment of Sitanala Hospital, several existing buildings, facilities, equipment, and other assets may need to be removed, demolished, relocated, or disposed of to allow the construction of new healthcare and supporting facilities. Since Sitanala Hospital is a government-owned hospital, assets affected by the Project may include State-Owned Assets or *Barang Milik Negara* (BMN). Therefore, the management, removal, write-off, transfer, demolition, and disposal of such assets must be carried out in accordance with the applicable Indonesian regulations on state asset management.

At this stage, Sitanala Hospital has not yet established a specific Standard Operating Procedure (SOP) for the disposal or write-off of State-Owned Assets. Prior to any demolition, dismantling, disposal, transfer, or physical removal of BMN-related assets, the Hospital will be required to prepare and implement a dedicated SOP for State-Owned Assets Disposal. This SOP should be aligned with the prevailing regulatory requirements for the management, utilization, write-off, transfer, and disposal of BMN.

The SOP should clearly define the asset identification process, inventory verification, asset valuation, internal approval mechanism, coordination with relevant government authorities, documentation requirements, and disposal methods. It should also specify the roles and responsibilities of the

Hospital's asset management unit, finance and administration units, technical departments, contractors, and other relevant parties involved in the disposal process.

The SOP should ensure that no State-Owned Assets are demolished, removed, sold, transferred, reused, or disposed of without proper administrative approval and documentation. All affected assets should be recorded and classified before disposal, including buildings, fixed installations, equipment, furniture, utilities, and other supporting facilities. Where demolition works involve existing BMN buildings or structures, the disposal process should be completed prior to physical demolition to ensure compliance with government asset management procedures.

In addition, the SOP should include provisions for environmental, health, and safety management during asset dismantling and disposal. Any materials generated from demolition or dismantling activities should be managed in accordance with applicable waste management requirements, including procedures for reusable materials, general construction waste, hazardous materials, and any materials requiring special handling.

The implementation of the SOP should be documented through asset inventory records, approval letters, disposal records, handover documentation, photographs, and final reporting. This will help ensure accountability, transparency, regulatory compliance, and proper governance in the management of State-Owned Assets affected by the Project.

2.3 Project Construction Phases

The proposed hospital development will be implemented in five phases over the period of 2025–2041. This phased approach is intended to ensure the progressive expansion of healthcare services, supporting facilities, and operational capacity in line with future service demands and the long-term master plan of The Sitanala Hospital.

42. Phase 1 (2025–2027)

Phase 1 is planned to commence between 2025 and 2027 and is intended to support the development of The Sitanala Hospital's priority and specialized medical services. During this phase, three major healthcare facilities will be constructed with a total gross floor area of approximately 55,950 m². These facilities include the Central Surgical Building (IBS) with an area of 19,150 m², the Integrated Cancer Center with an area of 20,650 m², and the Urology and Neurology Building with an area of 16,150 m². This phase is expected to significantly enhance The Sitanala Hospital's capacity to provide specialized and advanced medical treatment services. The following activities will be undertaken during Phase 1 of the Project:

- Construction of the Central Surgical Installation (IBS) Building on a designated green field site;
- Demolition of 26 staff housing units to facilitate the construction of the Integrated Cancer Care Center. This has been conducted in 2024;

- Demolition of the former Cooperative Enterprise (Koperasi) building (ULP Building) and Protese Building to facilitate the construction of the Oncology, Neurology and Urology Building, and parking lot;
- Construction of the Integrated Cancer Care Center; and
- Construction of the Neurology and Urology Center.

43. Phase 2 (2028–2031)

Phase 2 is scheduled for implementation between 2028 and 2031 and focuses on expanding inpatient care and specialized healthcare services. The total development area for this phase is approximately 38,616 m². Planned facilities include the Executive Inpatient and Maternal and Child Health (MCH) Building covering 29,255 m², the Integrated Pulmonary and Leprosy Building covering 8,611 m², and an inter-building connecting bridge with an area of 750 m². The objective of this phase is to strengthen inpatient service capacity while enhancing healthcare services for maternal and child health, respiratory diseases, and leprosy treatment. The following activities will be undertaken during Phase 2 of the Project:

- Relocation of the Yudhistira inpatient ward and Urology Outpatient Clinic services to the Neurology and Urology Center Building;
- Demolition of the Planning Department Building (former Melati Ward), the ESWL Building (former Central Pharmacy Unit), the Yudhistira Inpatient Ward Building (former Tulip Ward), and the Archive Building to facilitate the construction of the Exclusive Inpatient and Maternal & Child Health (MCH) Building;
- Construction of the Exclusive Inpatient and Maternal & Child Health (MCH) Building;
- Demolition of the Security Post Building (former Mortuary Unit), the former Nutrition Unit Building, and the former Laundry Unit Building to facilitate the construction of the Integrated Pulmonary and Leprosy Center;
- Construction of the Integrated Pulmonary and Leprosy Center; and
- Construction of pedestrian link bridges connecting the Integrated Pulmonary and Leprosy Center, the Neurology and Urology Center, and the Exclusive Inpatient and Maternal & Child Health (MCH) Building.

44. Phase 3 (2031–2034)

Phase 3 is planned for the period 2031–2034 and aims to improve emergency and outpatient healthcare services. The total building area to be developed during this phase is approximately 43,394 m². Planned facilities include the Emergency Department (ED) and BPJS Outpatient Clinic Building with an area of 6,532 m², the Outpatient Services Building covering 28,826 m², the Private Specialist Clinic

Building covering 6,532 m², and additional connecting bridge infrastructure. This phase is intended to improve accessibility, patient flow, and service capacity for both national health insurance (BPJS) beneficiaries and private patients. The following activities will be undertaken during Phase 3 of the Project:

- Demolition of the Adhiyatma Building;
- Construction of the Emergency Department (ED) and BPJS Outpatient Clinic Building;
- Construction of the Outpatient Services Building;
- Relocation of Medical Rehabilitation services to the Exclusive Inpatient and Maternal & Child Health (MCH) Building;
- Demolition of the National Program Building (former Pulmonary Clinic/former Front Operating Theatre) to facilitate the construction of the Emergency Department (ED) and BPJS Outpatient Clinic Building;
- Construction of the Private Outpatient Clinic Building; and
- Construction of a pedestrian link bridge connecting the Integrated Cancer Care Center with the Outpatient Services Building and the Exclusive Inpatient and Maternal & Child Health (MCH) Building.

45. Phase 4 (2035–2038)

Phase 4 is scheduled to be implemented between 2035 and 2038 and focuses on the provision of supporting and ancillary facilities. The total development area for this phase is approximately 18,593 m². Planned facilities include a multi-storey parking building with an area of 11,250 m², a funeral home facility covering 3,990 m², and an inter-building connecting bridge with an area of 25 m². The development of these facilities is intended to improve overall hospital functionality, accessibility, and convenience for patients, visitors, and staff. The following activities will be undertaken during Phase 4 of the Project:

- Demolition of the former IPSRS (Hospital Facilities Maintenance Unit) Building to facilitate the construction of the Parking Building;
- Construction of the Parking Building;
- Demolition of the Flamboyan Ward, Seruni Ward, former Ward XI, COVID-19 Emergency Unit (Tanjung Kemuning Ward), former Tatar Dormitory, DKI Ward, and Kenanga Ward (former Ward 12) to facilitate the construction of the Bereavement Center;
- Construction of the Bereavement Center; and
- Construction of a pedestrian link bridge connecting the Parking Building and the Central Surgical Installation (IBS) Building.

46. Phase 5 (2038–2041)

Phase 5 represents the final stage of the long-term development plan and is scheduled for implementation between 2038 and 2041. This phase is intended to support complementary and mixed-use functions within The Sitanala Hospital complex. The planned facilities include a hotel/apartment building with an area of 6,760 m² and a multipurpose building covering 3,990 m². These facilities are expected to provide accommodation for patients' families, visitors, healthcare professionals, and other stakeholders, while also supporting educational, training, conference, and community-related activities. The following activities will be undertaken during Phase 5 of the Project:

- Construction of a Hotel/Apartment Building on the existing football field site;
- Demolition of the Sports Hall to facilitate the construction of a Multipurpose Hall; and
- Construction of the Multipurpose Hall.

The ESIA study focuses on Phase 1 of the proposed development, which comprises the construction of three buildings: the Central Surgical Building, the Integrated Cancer Center, and the Urology and Neurology Building. The project activities are assessed across four development phases, namely the pre-construction, construction, operation, and post-operation phases. The details of each project phase have been developed based on available information from the project master plan, relevant literature and reference studies, as well as comparisons with similar healthcare development projects.

2.3.1 Pre-construction Phase

The pre-construction phase is a critical stage in the development of the project, aimed at ensuring that all legal, technical, environmental, safety, and operational requirements are properly prepared before the commencement of main construction activities. This phase includes a series of administrative processes, technical assessments, site preparation works, utility isolation, temporary facility mobilization, and demolition activities necessary to support safe and efficient project implementation.

47. Licensing, Administration & Socialization Items (Legality)

- Management of Building Approval (Persetujuan Bangunan Gedung -PBG) to replace Izin Mendirikan Bangunan (IMB).
- Processing Building Demolition Permit from the City Planning/PUPR Service.
- Preparation and ratification of Environmental Documents (AMDAL / UKL-UPL / SPPL).
- Processing of Traffic Impact Analysis Permits (Traffic Impact Analysis) for the mobilization of heavy equipment and debris trucks.
- Road Permit / Dispensation Recommendation from the Transportation Service and Police for truck routes.
- Formal outreach to local residents, RT, RW and local sub-districts.

- Payment of regional levies, unloading guarantees (if any), and environmental coordination costs.
- Project Insurance Management (Construction All Risk / CAR and Workers' Social Security).

48. Technical Study Items & Initial Survey Process (Surveying & Assessment)

- Demolition Structural Assessment (Analysis of technical methods for the sequence of demolition of Protese Building, ULP Building and parking lot)Pre-Condition Survey (Audit, photos and videos of the physical condition/cracks of neighboring houses before the project begins).
- Initial topographic survey (Measurement of existing land boundary coordinates and land elevation/contour map).
- Installation of the main Benchmark (BM) as a reference point for the elevation of the new building.
- Advanced soil investigation (Soil Investigation): Sondir Test (Cone Penetration Test) and Deep Boring (if not already carried out during planning)
- Engineering design of the new hospital.

49. Environmental Security & Protection Items (Site Safety & Protection)

- Installation of Project Safety Fence around the site (wave zinc/bondek min. 2.4 meters high) complete with the main project gate (Project Gate).
- Installation of protective scaffolding layered with safety mesh (Safety Mesh/Net) to prevent debris and dust from falling into neighboring areas.
- Installation of K3 Signage (Safety signs, speed limit signs, demolition area warnings, and PPE mandatory areas).
- Installation of emergency lighting around the project fence for night security.
- Construction of a temporary drainage channel (temporary ditch) around the site to prevent rainwater from pooling onto residents' land.
- Construction of a silt trap before project water is channeled into city channels.

50. Existing Utility Isolation Items (Utility Isolation)

- Official termination of existing PLN electricity supply and dismantling of old kwh meters.
- Official termination of the existing PDAM clean water network and sealing of the main distribution pipe.
- Termination of telecommunications cable networks (Telkom, fiber optic internet) that cross the site.

- Termination of city gas pipelines (if the area has underground gas installations).
- Securing/closing existing drilled wells so that they are not contaminated by debris or collapsed by heavy equipment.

51. Temporary Facilities & Barracks Mobilization Items (Temporary Facilities / Sanitation)

- Creation of a Relationship / Directorate General's Office (Owner, Supervisor and Contractor meeting room) complete with AC, tables, chairs and progress boards.
- Creation of a Workers' Barracks (Temporary Workers Quarter) for craftsmen to live in.
- Creation of a Closed Material Warehouse (For cement, electrical equipment, interior, finishing).
- Creation of an open material warehouse / stockyard (for concrete iron, scaffolding, rough materials).
- Creation of a guard post / security post at the main gate of the project.
- Construction of temporary toilets (Temporary Toilets & Septic Tanks) specifically for workers and staff.
- Provision of temporary working electrical installations (project generator rental or temporary electricity connection for parties/temporary PLN connection).
- Provision of working water installations (new temporary drilled well + water pump + tower/upper water tank).
- Provision of first aid facilities, light fire extinguishers (APAR) in office, warehouse and barracks areas

52. Demolition & Clearing Items

- Salvaging work (manual dismantling of marketable architectural components: frames, doors, roofs, cables, air conditioning, sanitary ware).
- Demolition of the cooperative building (ULP Building) and parking lot. Demolition procedure, internal transfer of patient and staff procedures as well as the suitable relocation building are required prior to demolition conducted.
-
- Demolition of the Protese Building. Demolition procedure, internal transfer of patient and staff procedures as well as the suitable relocation building are required prior to demolition conducted.
- Cutting / felling trees (land clearing) and removing large roots within the site.

- Loading and transporting all concrete debris and project waste off site to an official disposal site).

2.3.2 Construction Phase

The construction phase is scheduled for the calendar year 2027 (January–December) and beyond, with the principal activities sequenced as follows:

Workers Recruitmentt and Activity

During the construction phase, one of the initial activities to be carried out is workforce recruitment. The required workforce includes personnel in construction management, civil engineering and architecture, electrical and mechanical engineering for MEP (mechanical, electrical, and plumbing) works, administrative staff, and field workers. Field workers consist of foremen and daily workers. The recruitment process for construction workers will be the responsibility and authority of the civil works contractor. To meet the workforce requirements, the contractor will prioritize opportunities for local communities who possess relevant skills or general workers with good attitude and meet the required qualifications.

The maximum workforce required for this construction activity is estimated at 265 persons. The Sitanala Hospital will prioritise the recruitment of local workers from Tangerang City and surrounding areas in accordance with the applicable manpower regulations, while taking into consideration the required competencies and qualifications. This workforce will be mobilized gradually in accordance with the planned construction stages. The educational background of the required workforce varies, including bachelors degree (S1), diploma/associate degree (D3), senior high school or equivalent, junior high school or equivalent, and elementary school or equivalent. The estimated breakdown of workforce numbers along with the required qualifications is presented in Table 5.

Table 5 Estimated breakdown of workforce numbers.

No.	Position / Expertise	Quantity (person)	Minimum Education	Type of Work
1	Project Manager	1	Bachelor's/Master's Degree (S1/S2)	Project Leadership
2	Site Manager	1	Bachelor's Degree (S1)	Civil Planning
3	Site Engineer	2	Bachelor's Degree (S1)	Civil Planning
4	Supervisor	4	Bachelor's/Diploma (S1/D3)	Civil Construction
5	Surveyor	2	Diploma (D3)	Civil Planning
6	Mechanic	3	Diploma/Vocational (D3/SMK)	Mechanical & Electrical
7	Drafter	2	Diploma (D3)	Civil Planning
8	QA & QC	2	Bachelor's/Diploma (S1/D3)	Civil Planning
9	Quantity Surveyor	2	Bachelor's Degree (S1)	Civil Planning
10	Security	6	Senior/Junior High School	Security
11	Warehouse / Logistics	3	Senior High School	Logistics

No.	Position / Expertise	Quantity (person)	Minimum Education	Type of Work
12	Carpenter	45	Senior/Junior/Elementary	Structural Works
13	Steel Worker (Rebar)	40	Senior/Junior/Elementary	Structural Works
14	Concrete Worker	35	Senior/Junior/Elementary	Structural Works
15	Tile Worker	20	Junior/Elementary	Architectural Works
16	Partition Worker	15	Senior/Junior/Elementary	Architectural Works
17	Ceiling Worker	12	Senior/Junior/Elementary	Architectural Works
18	Façade Worker	10	Senior/Junior High School	Architectural Works
19	Mechanical Worker	28	Senior/Junior/Elementary	MEP Works
20	Electrical Worker	25	Vocational High School	MEP Works
21	HSE	2	Bachelor Degree/ certified personel from Ministry of Manpower	Safety
22	Driver Dump Truck	6	Senior/Junior High School/certified driver from Ministry of Transportation	Transportation & Material Handling
23	Heavy Equipment Operator	4	Vocational High School / Certified Operator from Ministry of Manpower	Heavy Equipment Operation
	Total	270		-

Source : Consultant estimation based on Soekiman, et al. (2010); Anditiaman, et al. (2022); Arena, et al. (2026); Prasetyo, et al. (2025); Riyanto, et al. (2025).

The basecamp or workers' barracks are constructed as temporary accommodation for workers who stay on-site during the construction phase. It is assumed that some workers do not return home every day, as certain activities are probably carried out at night. The construction of the workers' barracks is located within The Sitanala Hospital site but outside the planned main building area to avoid interfering with primary construction activities. These barracks are designed as non-permanent structures to allow for easy dismantling upon completion of construction. This will be equipped with proper clean water supply and sanitation supports.

Within the barracks area, a project office is also provided, serving as the center for administrative and technical operations. This office will be equipped with facilities such as computers, meeting tables, telephone systems, filing systems, and other necessary equipment. To facilitate the storage and management of materials, a warehouse will also be provided for storing construction materials and equipment, ensuring protection from rain, weather conditions, and security risks.

In addition, a site office will be provided to store supporting equipment, spare parts, machine components, and other materials. The size of the flying office or *direksi keet* will be adjusted according to project needs and placed in a location that does not interfere with construction activities. Once the construction activities are completed, the *direksi keet* will be dismantled and the area cleared. Damaged equipment is generally repaired near the *direksi keet* to facilitate easy access for retrieval,

workshop and storage. Therefore, this area may often contain residual materials from repair activities, such as used oil, cable scraps, welding wire remnants, and similar waste.

In addition to the facilities mentioned above, the workers' barracks will also be supplied with clean water and electricity to support both workers' daily needs and construction activities. The water supply may be sourced from the municipal water supply system (existing PDAM). No additional SIPA well to be constructed in the construction phase. The project will use the existing SIPA as a backup for the operational activitiy. The estimated water demand during the construction phase is approximately ± 46,48 m^3 per day. The estimated water demand, as well as wastewater and solid waste generation during the construction phase, is presented in Table 6.

Table 6 Estimation of water demand, domestic wastewater and solid waste generation during the construction phase

No.	Description	Quantity	Standard	Total (m^3/day)
1	**Water Demand**			
	Workers Domestic Use	270persons	0.05 m^3/person/day [a)]	13.5
	Construction Activities	55,950 m^2	0.5 liter/m^2/day [b)]	27.98
	Truck Tire Washing & Road Spraying		5 m^3/day [c)]	5
	Total			**46.48**
2	**Domestic Wastewater**			
	Workers Domestic Wastewater	270 persons	80% of water usage [d)]	10.80
	Total			**10.80**
3	**Solid Waste (Garbage)**			
	Workers Domestic Waste	270 persons	0.0025 m^3/person/day [e)]	0.675
	Construction Waste	55,950 m^2	0.0004 m^3/m^2/day[f)]	22.38
	Total			**23.055**

Source :

a) World Health Organization. (2011). Guidelines for Drinking-water Quality (4th ed.). Geneva: WHO.

b) Kementerian PUPR. (2017). Pedoman Perencanaan Sistem Penyediaan Air Bersih dan Kebutuhan Air Konstruksi. Jakarta: PUPR.

c) United States Environmental Protection Agency. (2012). Construction General Permit (CGP) and Stormwater Best Management Practices. Washington, DC.

d) Metcalf & Eddy/AECOM. (2014). Wastewater Engineering: Treatment and Resource Recovery (5th ed.). New York: McGraw-Hill.

e) World Bank. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Washington, DC.

f) World Bank. (2018). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Washington, DC.

Mobilization of materials and equipments

Mobilization activities will involve the deployment of construction personnel, heavy equipment, construction materials, and supporting resources required for project implementation.

As the Project will be implemented within an active hospital environment, mobilization activities will require careful consideration of ongoing hospital operations, including patient and visitor circulation, emergency vehicle access, utility services, and other daily healthcare activities. Particular attention will be required to manage potential interactions between construction activities and sensitive hospital receptors within and around the project area.

Prior to the commencement of major construction activities, the Contractor will be required to prepare and implement appropriate construction management plans, including construction traffic management, site logistics arrangements, utility protection measures, occupational health and safety procedures, and community health and safety measures. These plans will be developed in coordination with hospital management to support safe and efficient project implementation while minimizing disruption to hospital operations and surrounding communities.

Construction personnel, equipment, and materials will be mobilized progressively in accordance with the construction schedule, site readiness requirements, and approved construction management arrangements.

In general, the types of equipment to be used during the Construction Phase include excavators/backhoes, dump trucks, concrete mixers, compressors, cutting machines, welding machines, drilling machines, planing machines, scaffolding, manual concrete mixers, and safety equipment (such as helmets, boots and safety shoes, safety glasses, safety harnesses/full body harnesses, and others). These equipment and tools will be utilized throughout activities ranging from site preparation to physical construction works, including supporting infrastructure development. The planned use of equipment and machinery during the Construction Phase is presented in Table 7.

Table 7 Estimation of equipment and machinery during the construction phase

No.	Equipment Name	Quantity
1	Total station and automatic level	3 sets
2	Excavator/backhoe	3–4 units
3	Dump truck	9–15 units
4	Bulldozer or motor grader	1–2 units
5	Vibratory roller	2–3 units
6	Plate compactor/rammer	3–6 units
7	Dewatering pump	6 duty + 3 standby units
8	High-pressure or drainage pump	3 units
9	Foundation equipment package	3 packages
10	Supporting crawler/mobile crane	3 packages
11	Grout mixer and grout pump	3 packages
12	Spoil/slurry handling equipment	3 packages
13	Pile-testing equipment package	1 shared package
14	Tower crane or equivalent fixed lifting system	3–4 units
15	Mobile crane	2 units
16	Passenger/material hoist	3 units

No.	Equipment Name	Quantity
17	Concrete pump	Up to 3 units
18	Transit mixer truck	6–12 units on rotation
19	Concrete bucket	3 units
20	Concrete vibrator	12–18 units
21	Bar cutter	3–6 units
22	Bar bender	3–6 units
23	Rebar threading/coupler machine	3 units
24	Welding machine/transformer	9–12 units
25	Concrete cutter, core drill and grinder	6 sets
26	Jackhammer	6–8 units
27	Air compressor	3–6 units
28	Airless spray-painting equipment	3 packages
29	MEP installation tools and equipment package	3 packages
30	Heavy-item handling and installation equipment package	3 packages
31	Portable generator	3 units + 1 shared standby
32	Water tanker/mobile spraying unit	2 units
33	Wheel-wash facility	1–2 sets
34	Temporary ventilation and extraction equipment	3 packages
35	Dust, noise and vibration monitoring instruments	1 shared set

Source : Consultant estimation based on Minister Regulation of Public Works No. 8 Tahun 2023 on Guidelines for the Preparation of Unit Price Analysis for Public Works; Badan Standardisasi Nasional (BSN) (2008); Rochmanhadi (1985), Caterpillar Inc (2023); and IFC IFC (2007).

Construction materials will generally be sourced from areas within Tangerang City and transported to The Sitanala Hospital site using dump truck. The materials to be used will comply with applicable standards for hospital building construction to ensure structural integrity, durability, and quality of the final structures.

The mobilization of materials and heavy equipment will be scheduled outside peak traffic hours to avoid congestion along local roads within the Karang Sari Village. Mobilization will also avoid community rest periods and school peak hours (entry and dismissal times) to maintain safety, public order, and minimize disturbance to local residents. Estimation of material requirements during the Construction Phase is shown in Table 8.

Table 8 Estimation of material requirements during the Construction Phase

No.	Material Type / Work	Quantity	Unit	Trips
1	Bricks or AAC blocks	9,500	m^3	1,188
2	Cement	18,000	tons	720
3	Sand	14,000	m^3	1,400
4	Light steel (D<12)	180,000	bars	450

No.	Material Type / Work	Quantity	Unit	Trips
5	Crushed stone	11,500	m^3	1,150
6	Architectural + MEP works	21,000	m^3	2,100
7	Ready-mix concrete	32,000	m^3	4,000
8	Structural steel (D>12)	260,000	bars	650
9	Timber and roofing	1,500	m^3	188
	Total			11,846

Source : Consultant estimation based on Minister Regulation of Public Works No. 8 Tahun 2023 on Guidelines for the Preparation of Unit Price Analysis for Public Works (AHSP); Badan Standardisasi Nasional (BSN). (2008); Badan Standardisasi Nasional (BSN). (2019); Gordian (2024); Chudley & Greeno (2016); and IFC (2007).

Based on the estimates presented in the table above, the total number of material transport trips is approximately 11,846 trips over a construction period of 360 working days (approximately 12 months). This corresponds to an average of 33 trips per day, or approximately 4 - 5 trips per hour (assuming 8 working hours per day). The planned mobilization route for equipment and materials is expected to originate from the Ring Road and pass through local roads within the Karang Sari Village.

Table 9 Hazardous Materials and Chemicals Present or Expected to use at the Construction Site

Hazardous Material / Chemical	Likely Source / Activity	References
Asbestos-containing materials (ACMs)	Existing roofing sheets, ceiling boards, pipe insulation, wall panels, gaskets and insulation materials encountered during demolition	Cook et al. (2022); Schlünssen et al. (2023); Ridho et al. (2024)
Lead-containing paint/coatings	Existing painted steel, doors, windows, structural members and demolition debris	Cook et al. (2022); Verma et al. (2003)
Respirable crystalline silica	Concrete cutting, drilling, grinding, demolition, masonry and cement work	Kalatehjari et al. (2025); Schlünssen et al. (2023); Verma et al. (2003)]
Carbon monoxide (CO)	Diesel generators, trucks, compressors and heavy equipment	Verma et al. (2003); Boadu et al. (2023)
Diesel exhaust	Heavy construction equipment and transport vehicles	Verma et al. (2003); Boadu et al. (2023)
Welding fumes	Steel fabrication and welding activities	Verma et al. (2003); Boadu et al. (2023)
Spray paints and coatings	Architectural finishing, steel coating, equipment painting	Patel et al. (2024)
Epoxy coatings and hardeners	Floor coating, waterproofing and specialist hospital finishes	Patel et al. (2024)
Polyurethane coatings (isocyanates)	Spray coatings and insulation	Patel et al. (2024)
Paint thinners and organic solvents	Cleaning, degreasing and painting	Patel et al. (2024); Verma et al. (2003)
Adhesives and sealants	Flooring, glazing and interior finishing	Patel et al. (2024)

Hazardous Material / Chemical	Likely Source / Activity	References
Cement and wet concrete	Concrete works and masonry	Kalatehjari et al. (2025); Verma et al. (2003)
Concrete admixtures	Ready-mix concrete production	Cook et al. (2022); Patel et al. (2024)
Diesel fuel	Construction equipment and generators	Cook et al. (2022)
Lubricating oils and hydraulic fluids	Equipment maintenance	Cook et al. (2022)
Compressed gases (oxygen, acetylene)	Welding and cutting	Verma et al. (2003)
Bitumen and asphalt	Road paving and waterproofing	Verma et al. (2003)
Cleaning chemicals	Equipment cleaning and commissioning	Patel et al. (2024
Battery electrolyte (sulfuric acid)	Temporary power systems and batteries	Cook et al. (2022)

Source:Adapted by the ESIA Consultant based on Cook et al. (2022); Schlünssen et al. (2023); Patel et al. (2024); Kalatehjari et al. (2025); Boadu et al. (2023); Verma et al. (2003), and Good International Industry Practice (GIIP) for construction environmental, health and safety management.

Land clearing and preparation

Land clearing, land development, and site preparation will be undertaken as an initial phase of The Sitanala Hospital to establish suitable ground conditions for subsequent construction activities. These works will be implemented within the defined Project footprint and in accordance with the approved engineering design, applicable national regulations, and Good International Industry Practice (GIIP), including relevant guidance from the International Finance Corporation Environmental, Health, and Safety (EHS) Guidelines.

Land clearing activities will involve the removal of existing vegetation, residual structures, and surface obstructions. Clearing will be limited to areas strictly required for construction in order to minimize unnecessary disturbance. Prior to clearing, the site will be surveyed and demarcated to define the boundaries of disturbance. Vegetation clearing will be conducted using mechanical equipment, and any materials of potential reuse value will be segregated and managed accordingly. The upper layer of to soil (typically 20–30 cm) will be stripped and stockpiled in designated areas for future reuse in site reinstatement and landscaping, where feasible. Stockpiles will be managed to prevent erosion, compaction, and loss of soil quality.

All cleared biomass and debris will be handled in accordance with The Project's waste management procedures. Organic materials may be reused (e.g., for mulching) where appropriate, while non-reusable materials will be transported to licensed disposal facilities. Erosion and sediment control measures, such as silt fences, sediment traps, and temporary drainage channels, will be installed prior to and maintained during clearing activities to prevent off-site sedimentation and protect surrounding water bodies.

Following site clearing, cut and fill (earthworks) activities will be undertaken to achieve the required site grading and formation levels. Cut operations will involve the excavation of soil and, where applicable, rock from elevated areas. Excavated materials will be assessed for suitability and, where

appropriate, reused as fill material within the site. Unsuitable or surplus materials will be transported off-site to approved disposal or reuse locations.

Throughout land clearing and earthworks activities, environmental and occupational health and safety controls will be implemented. These include dust suppression through regular water spraying, stormwater management to control runoff, and stabilization of exposed surfaces to prevent erosion. Construction traffic and heavy equipment operations will be managed to ensure site safety, including the use of designated access routes and appropriate personal protective equipment (PPE) for workers.

These measures are intended to ensure that land clearing and site preparation activities are conducted in a controlled manner that minimizes environmental impacts, maintains site safety, and complies with applicable lender requirements and international best practices.

Building construction

The plan is to construct three buildings with a total building area of 55,950 m², with the following functions is shown in Table 10.

Table 10 The floor area for each building

Floor	Function	Area (m²)	Capacity
Central Surgical Building			
Level 8	Medical Education Center & MEP Area	2,000	-
Level 7	Inpatient Ward	2,000	52 beds
Level 6	Inpatient Ward	2,000	52 beds
Level 5	Inpatient Ward	2,250	52 beds
Level 4	ICU, PICU, MCU, Burn Unit & Perinatology	2,250	40–50 critical care beds
Level 3	Central Surgical Services (Operating Theatres)	2,250	7 Operating Theatres + Recovery Area
Level 2	Radiology, Laboratory & Polyclinic.	2,250	
Level 1	Lobby, CSSD, Pharmacy & Commercial Support	2,250	-
Total		**19,150**	
Oncology Building			
Level 6	Inpatient Unit	2,300	22 inpatient rooms (44 beds) and 3 isolation rooms (3 beds),
Level 5	Chemotherapy Day Care and Specialized Oncology Treatment Services	2,300	24 chemotherapy treatment chairs, 4 RIIM treatment/isolation rooms,
Level 4	Oncology Surgery, Recovery and Low Care Unit	2,500	2 pre-operative beds, 3 post-operative recovery beds, and 12 LCU beds
Level 3	Outpatient Oncology and Clinical Support Services	2,500	16 consultation/examination rooms and supporting pharmacy/administration facilities.

Floor	Function	Area (m^2)	Capacity
Level 2	Diagnostic Diagnostic Imaging, Nuclear Medicine and Radioiodine Therapy Services.	2,500	4 RIRA isolation rooms (4 beds)
Level 1	Radiotherapy, Nuclear Medicine and Oncology Outpatient Services	2,500	
Total		**20,650**	
Neurology/Urology Building			
Level 7	Medical Education, Simulation and Inpatient Services	1,250	7 inpatient rooms (14 beds), 3 isolation rooms (3 beds), ICU/NICU/bed simulation facilities, skills laboratories, clinical training rooms, and supporting ward facilities
Level 6	Inpatient Neurology and Urology Ward	1,950	18 Class 1 inpatient rooms (36 beds), 2 isolation rooms (2 beds)
Level 5	Neurological Diagnostics, Rehabilitation and Pediatric Neurodevelopment Services	1,950	
Level 4	Critical Care, Surgery and Catheterization Services	2,200	HCU (2 beds), LCU (4 beds), SCU (3 beds), 2 operating theatres, 2 pre-operative beds, 3 post-operative beds, 1 catheterization laboratory, and 2 pre/post-cath lab beds
Level 3	Hemodialysis, Endoscopy and Biopsy Services	2,200	30 hemodialysis stations, 2 isolation dialysis rooms (2 beds), 1 endoscopy rooms, 1 biopsy room, and 4 pre- and post-procedure beds
Level 2	Neurology and Urology Outpatient Services	2,200	16 consultation/examination rooms, 1 ESWL treatment room
Level 1	Neurology and Urology Outpatient, Diagnostic and Laboratory Services	2,200	-
Total		**16,150**	

Earthworks, Foundations and Substructure

The current DED V03 planning basis does not include basement construction. Earthworks are therefore expected to be principally associated with: site grading, localized excavation, foundation and pile-cap construction, ground beams, underground utilities, temporary drainage, and external infrastructure.

Excavation depths and quantities will be confirmed through the final DED. Localized groundwater inflow or rainfall accumulation may require temporary pumping or dewatering. Any pumped water will be classified and managed before reuse or discharge. Uncontrolled discharge to hospital drainage, public drainage or the hospital wastewater-treatment system will not be permitted.

Deep foundations are anticipated based on the preliminary structural and geotechnical planning basis, although the final foundation type, dimensions, installation method and depth will be confirmed through the DED. The selected foundation system will prioritize low-noise and low-vibration performance appropriate to construction within an operational hospital. The works may comprise establishment of engineered working platforms, foundation installation, testing, excavation of pile caps, ground-beam construction and associated quality-control activities.

Superstructure, Building Envelope and Fit-Out

The principal superstructure works are expected to comprise: reinforced-concrete columns, beams, slabs and structural walls, reinforcement fabrication and installation, formwork, falsework, back-propping and temporary bracing, concrete placement and curing, stair and shaft construction, roof structures, inter-building connections (sky brigde) where included in the final design, and lifting of structural and prefabricated components.

Building-envelope and architectural works will include façades, roofing, waterproofing, walls, ceilings, floors, doors, glazing and external finishes.

Fit-out activities may include: cutting and grinding, drilling and anchoring, welding and brazing, installation of partitions and ceilings, application of paints, spray coatings, adhesives, sealants and resins, installation of fixtures and specialist finishes, and internal material handling.

MEP, Medical Systems and Utility Tie-Ins

MEP and specialist installation works are expected to include: electrical distribution, emergency power and UPS systems, clean-water and hot-water systems, wastewater and drainage systems, HVAC and pressure-controlled ventilation, fire-detection and fire-protection systems, medical-gas and vacuum systems, ICT, communications and security systems, lifts and internal transportation systems, radiotherapy and imaging-related services, and other specialist clinical systems.

Construction will require temporary and permanent connections to existing hospital systems. Existing services will be surveyed and verified before excavation, penetration, isolation or connection works.

Temporary construction use of hospital electricity, water, drainage or wastewater facilities will only occur after verification of spare capacity and approval by the responsible hospital departments. Domestic construction wastewater may be connected to the hospital IPAL only after confirmation of hydraulic and treatment capacity. Concrete washout, grout water, chemical residues and other construction-process wastewater will be separately contained and managed

Testing, Commissioning and Handover

Testing and commissioning will be undertaken progressively for structural, architectural, MEP, fire-protection, medical-gas, HVAC, ICT and specialist medical systems.

Activities may include: electrical testing and energization, generator and UPS testing, water-system flushing and testing, drainage and wastewater-system testing, HVAC balancing and pressure verification, fire-alarm and fire-protection testing, medical-gas pressure, purity and alarm testing, integrated controls and communication-system testing, equipment installation and interface testing, and integrated emergency and backup-system testing.

Testing and commissioning will be coordinated with hospital operations. No new or affected clinical area will be occupied until the applicable construction completion, cleaning, utility, fire-safety, HVAC, medical-system and infection-control acceptance requirements have been satisfied.

Final handover will include: completion of defects and outstanding actions, removal of temporary works and facilities, site cleaning and reinstatement, submission of as-built records, transfer of operating and maintenance manuals, staff training, completion of environmental and social closure actions, and formal acceptance by the relevant hospital and Project authorities.



Figure 3 Central Surgical Building in 3D perspective



Figure 4 Oncology Building in 3 D Perspective



Figure 5 Neurology/Urology Building in 3D Perspective

Infrastructure Development

Clean Water System

The Sitanala Hospital will ensure the provision of a reliable, adequate, and safe clean water supply to meet operational and healthcare requirements at all times, in accordance with applicable national regulations and Good International Industry Practice (GIIP), including relevant guidance from the Asian Infrastructure Investment Bank Environmental and Social Framework and the International Finance Corporation Environmental, Health, and Safety (EHS) Guidelines.

In consideration of supply reliability and redundancy, The Project will adopt a dual-source water supply system**.** The project will use PDAM as a primary water source and groundwater well as a backu up water source in case PDAM experiences any disruption. ,.

Water from groundwater abstraction and PDAM will be conveyed to the existing Ground Water Tank (GWT), which will function as a Raw Water Tank (RWT)**.** From the RWT, water will be pumped through a treatment system consisting of filtration units to ensure compliance with applicable health and water quality standards prior to use.

Treated water will be stored in a Clear Water Tank (CWT) and subsequently distributed to Roof Tanks. From the Roof Tanks, water will be supplied to end-use points via a gravity-fed distribution system, supported by booster pumps where necessary to maintain adequate pressure across the network.

A Reverse Osmosis (RO) system will be installed to provide high-quality treated water for critical medical services, including:

53. Surgery Room
54. Central Sterile Supply Department (CSSD)
55. Haemodialysis (HD) Unit

The Ground Water Tank (GWT) capacity is designed to meet approximately one (1) day of operational water demand, ensuring resilience in case of supply interruption. The Roof Tank capacity is designed at approximately 20–30% of the Ground Tank volume, to support stable pressure and continuous distribution.

The design of the pressurized piping network will adhere to GIIP and applicable engineering standards, including the following criteria:

56. Clean water distribution will utilize a combination of gravity flow and booster pumping systems to ensure reliable service across all elevations.
57. Pipeline pressure will be maintained within a range of 1.5 to 7.5 bar, consistent with international best practice to prevent system failure and leakage.
58. Booster pump operating pressure will be maintained within 1.5–3.5 bar to ensure adequate delivery without over-pressurization.
59. Recommended pipe materials include galvanized steel, HDPE, and polypropylene (PPR PN 10 and PN 20), selected based on durability, corrosion resistance, and compliance with potable water safety requirements (i.e., non-toxic and free from heavy metals).

60. Flow velocity within the piping network will be maintained between 0.9–2.0 m/s to optimize hydraulic performance and minimize sedimentation or pipe wear.

61. Pipelines installed at high elevations or locations prone to air accumulation will be equipped with air release valves to maintain hydraulic efficiency and prevent operational disruptions.

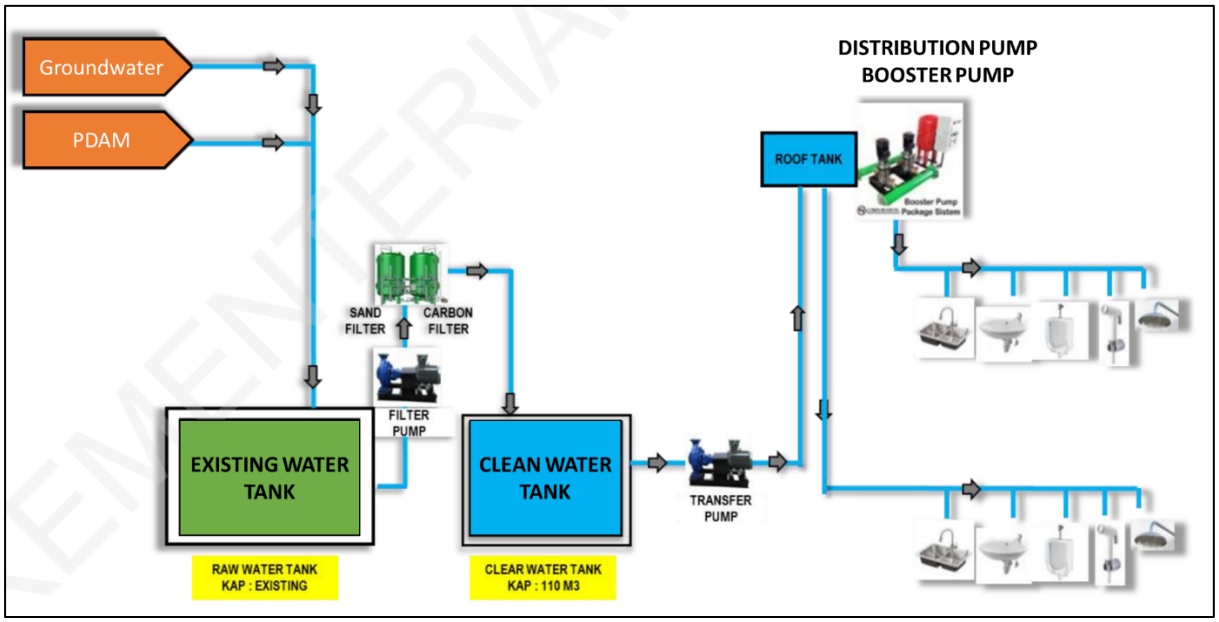


Figure 6 Clean Water System Diagram

Hot Water System

The Sitanala Hospital will implement a centralized hot water supply system utilizing an electric heat pump water heater, designed to provide efficient and reliable hot water for medical and operational needs.

Hot water will be supplied to the following rooms and plumbing fixtures:

62. Scrub-up areas

63. Sluice rooms (Spoel Hoek)

64. Patient bathrooms

65. Laboratories

66. Central Sterile Supply Department (CSSD)

The hot water system will be designed to deliver water at a temperature range of 55°C to 60°C, ensuring compliance with hygiene and healthcare standards. The required operating pressure for the hot water system is specified at 1.2–3.5 kg/cm², to ensure adequate distribution across all service points. Hot water generated by the electric heat pump water heater will be stored in a pressurized storage tank and distributed through a dedicated piping network to end users and plumbing fixtures. The electric heat pump water heater units will be installed on the building roof, optimizing space utilization and supporting efficient system operation.

Waste Management

Wastewater Treatment Management

Wastewater generated within The Sitanala Hospital originates from several sources and will be managed through a centralized treatment system, as described below:

67. Wastewater from plumbing fixtures (sanitary wastewater) will be conveyed by gravity to the existing Wastewater Treatment Plant (WWTP) / Sewage Treatment Plant (STP).
68. Wastewater from kitchen activities will be pre-treated using a grease trap to remove oils and fats prior to discharge into the existing WWTP/STP.
69. Wastewater generated from haemodialysis (HD), laboratories, and scrub areas in operating theatres (OT) will undergo specialized pre-treatment, including neutralization (e.g., via a neutralizing tank), before being discharged into the existing WWTP/STP.

In accordance with Indonesian Ministry of Health Regulation No. 7 of 2019 on Environmental Health in Hospitals, the STP capacity is designed based on the maximum wastewater flow rate plus a safety factor of approximately 10%. Accordingly, the required STP capacity for a 602-bed hospital is calculated as follows:

70. Wastewater flow: 202.26 m^3/day
71. Safety factor (~10%): ± 5.6 m^3/day
72. Total required WWTP capacity is approximately 207.86 m^3/day

The project has an existing STP with capacity as 250 m^3/day. In the future development, the project will build additional STP as 250 m^3/day. Therefore, the total STP capacity will be 500 m^3/day. Therefore, the STP facility will be sufficient to accommodate the wastewater generation from both existing and proposed hospital operations (The Project).

Hazardous Waste Management

For hazardous waste (B3 waste), based on the planned maximum inpatient capacity of RS Sitanala of 602 beds, and assuming a Class A General Hospital, the generation rate of medical waste is estimated at approximately 1.89 kg/bed/day. Accordingly, for a total of 602 beds, the estimated medical (hazardous or bio-hazard) waste generation is approximately 1,137.8 kg/day. Based on waste generation estimates and a 2-day storage capacity, the required storage areas are approximately 12 m^2 for hazardous waste.

Solid Waste Management

For domestic solid waste, based on studies conducted in 100 hospitals across Java and Bali, each inpatient generates approximately 3.2 kg of solid waste per day, of which 76.8% is classified as domestic waste, equivalent to approximately 2.46 kg/day (rounded to 2.5 kg/day). Therefore, the estimated domestic solid waste generation for a hospital with 602 beds is approximately 2.5 kg/day ×

602 beds = 1,505.0 kg/day. Based on waste generation estimates and a 2-day storage capacity, the required storage areas are approximately 16 m² for domestic solid waste.

Based on the waste generation estimates, the dimension of the existing Temporary Waste Storage Facility (TPS) is 4.5 m x 4.5 m x 3 m with volume as 60.75 m^3. It has sufficient capacity to accommodate waste generated from both current operations and the planned development activities. In terms of available area, the existing TPS is adequate to accommodate the projected increase in waste generation.

However, the frequency of waste collection should be carefully managed to prevent waste accumulation within the facility. Therefore, it is recommended that waste be collected at least twice per week to ensure that the available storage capacity remains adequate and that waste management operations continue to function effectively.

Radioactive Waste Management

The Hospital shall obtain the BAPETEN construction license before commencing construction of the radiation-specific components of the RIRA facility. Following completion of construction and commissioning, the Hospital shall obtain the applicable BAPETEN operating license before admitting patients, receiving or using radionuclides/radiopharmaceuticals for clinical purposes, or commencing any RIRA service. Issuance of the operating license constitutes a mandatory pre-operation condition and shall not be treated as a downstream compliance action. The timeline to obtain the construction license is shown in Figure 7.

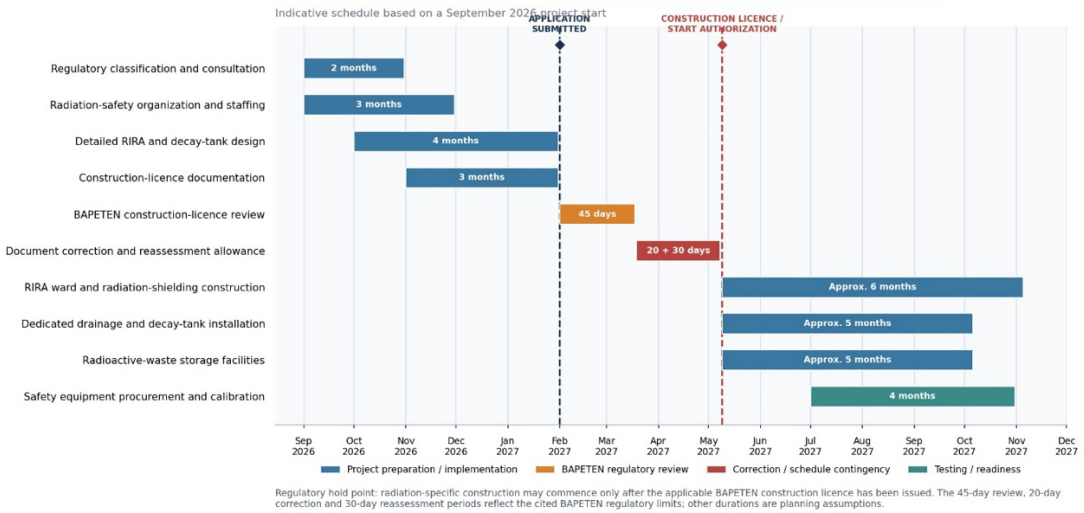


Figure 7 RIRA construction licensing timeline

Drainage system

Rainwater generated from building rooftops will be collected and conveyed through a network of roof drainage systems, consisting of gutters and vertical rainwater downpipes. These downpipes will channel stormwater from roof levels to the ground-level drainage system in a controlled manner, preventing uncontrolled runoff and potential structural or environmental impacts.

At ground level, the collected stormwater will be directed into the site drainage network, which is designed to safely convey runoff away from buildings and operational areas. The drainage system will then discharge stormwater into the existing area or municipal drainage network, ensuring proper integration with the surrounding urban infrastructure.

The design of the stormwater drainage system will take into account a maximum rainfall intensity of 300 mm/hour, representing peak rainfall conditions for The Sitanala Hospital area. Hydraulic sizing of gutters, downpipes, and drainage channels will be based on this design rainfall to ensure adequate capacity and to minimize the risk of flooding, ponding, or system surcharge during extreme weather events.

Medic Gas System

The medical gas system will comprise several essential components required to support hospital operations, including oxygen (O_2), vacuum air (VAC), nitrous oxide (N_2O), and compressed air (CA). These medical gases will be supplied from a centralized gas plant room located at the ground floor level. From this central source, the gases will be distributed throughout the facility via a dedicated piping network to various end-user points, ensuring a reliable and continuous supply for medical and clinical applications.

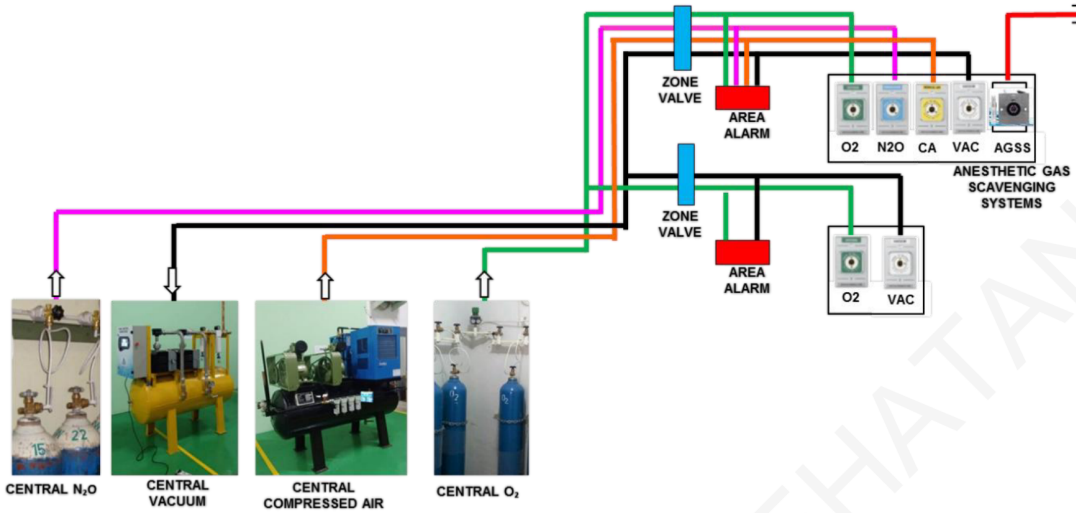


Figure 8 Medical Gas System

Reverse Osmosis (RO) Water System

The Sitanala Hospital will utilize a Reverse Osmosis (RO) water system to supply high-quality purified water for specialized medical and operational needs. RO-treated water is required to support critical services, including haemodialysis, sterilization equipment, operating theatre scrub-up areas, laboratory services, and other applications that require a high level of water purity.

The RO system operates through a multi-stage treatment process. Raw water from the cold water supply line first passes through a pre-filtration unit, which removes suspended solids and coarse particles. The water then flows through a carbon filter, where chlorine, organic compounds, and odors are removed to protect downstream components.

Following pre-treatment, the water enters the RO membrane unit, where dissolved salts, microorganisms, and other impurities are removed through a semi-permeable membrane under pressure. The purified water (permeate) is then passed through a post-filter to ensure final polishing and quality stabilization.

The treated water is subsequently stored in a dedicated storage tank and distributed to points of use through a controlled piping system. A flow restrictor is installed to regulate discharge, while reject water containing concentrated impurities is safely discharged to the drainage system.

The system also includes control components such as shut-off valves to regulate flow and maintain operational efficiency. Overall, the RO system is designed to ensure a continuous supply of high-quality water that meets healthcare standards and supports critical hospital functions. Reverse Osmosis (RO) Water System diagram is shown in Figure 9.

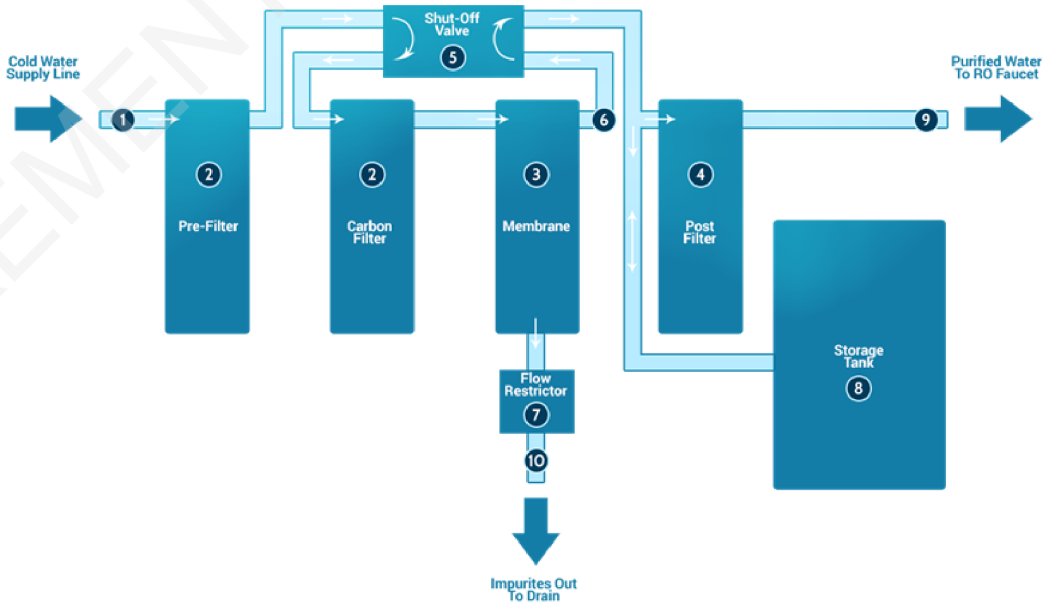


Figure 9 Reverse Osmosis (RO) Water System diagram

Fire Protection System

Automatic Sprinkler System

An automatic sprinkler system will be installed using a wet riser configuration, suitable for continuous water-filled piping systems. The system is designed based on a light fire hazard classification, consistent with healthcare facility requirements and applicable standards. Sprinkler coverage will not exceed 21.6 m^2 per sprinkler head, ensuring adequate protection density. Sprinkler heads will be installed in accordance with functional zoning:

73. Wall-mounted in inpatient areas

74. Ceiling-mounted in general and administrative spaces

Operating temperatures are selected based on room function:

75. 57°C for general areas
76. 68°C for pantry areas
77. 95°C for kitchen areas

The sprinkler system will operate within a maximum pressure of 12.1 bar, in line with internationally recognized standards such as NFPA 13. The system is designed to provide rapid fire detection and suppression, thereby minimizing fire spread and associated risks.

Hydrant System

The hydrant system will be designed as a wet riser Class III system, enabling both occupant use and fire brigade intervention. Hydrant risers will be strategically located near fire escape stairs and exits on each floor, ensuring accessibility during emergency situations.

Each hydrant box will be equipped with:

78. A 40 mm hose connection with hose and nozzle for internal use
79. A 65 mm valve for external fire brigade connection

Hydraulic performance criteria include:

80. Minimum pressure of 4.5–6.9 bar for 40 mm hoses
81. Minimum pressure of 6.9–12.1 bar for 65 mm hoses

External hydrants will be installed at intervals of approximately 90–150 meters, and Siamese connections will be provided in accessible locations to allow fire department connection to the system.

Fire Pumps and Water Supply

The fire protection system will be supported by a dedicated fire water supply and pumping system, consisting of:

82. One (1) electric main fire pump
83. One (1) diesel-driven standby fire pump
84. One (1) jockey pump for pressure maintenance

Main pumps will have a capacity of 750 GPM with a total head of 10 bar, while the jockey pump will maintain system pressure at 11 bar. The system is designed with redundancy to ensure continued operation in case of power failure or equipment malfunction.

The fire water storage tank will be designed to supply 750 GPM for a duration of 60 minutes, with a total storage capacity of approximately 170 m^3. Pump capacity and system design are based on the number of hydrant risers and expected fire demand, ensuring compliance with applicable standards.

The maximum allowable fire pump pressure is 24.1 bar, ensuring sufficient system performance without exceeding safety limits.

Portable Fire Extinguishers

Portable fire extinguishers (APAR) will be provided as first-response fire suppression equipment, strategically located throughout the facility. The selection, quantity, and placement of extinguishers will be based on hazard classification and accessibility requirements.

Key provisions include:

85. Maximum travel distance to extinguishers of 25 meters
86. Minimum provision of one extinguisher per enclosed space ≤ 250 m²
87. Additional extinguishers in parking areas and high-risk zones

Types of extinguishers include:

88. Multi-purpose dry powder (3 kg) for general areas
89. CO_2 extinguishers (5 kg, 6.8 kg, and 25 kg) for electrical, mechanical, kitchen, and generator rooms
90. All extinguishers will be clearly marked and installed in visible and accessible locations.

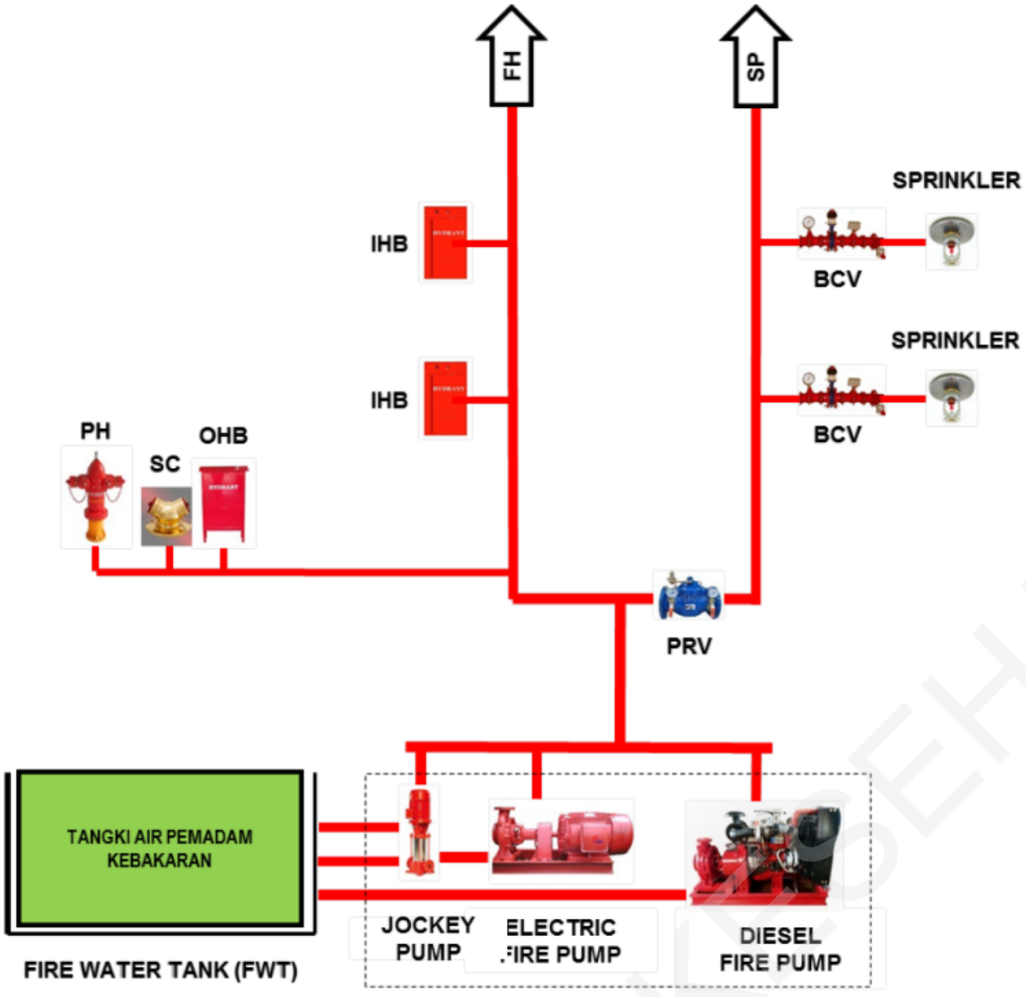


Figure 10 Fire Protection System Diagram

Heating, Ventilation, and Air Conditioning (HVAC) system

The Heating, Ventilation, and Air Conditioning (HVAC) system is designed to maintain appropriate indoor environmental conditions, including temperature and humidity, to ensure occupant comfort and support clinical requirements within The Sitanala Hospital.

For general building areas, the facility will utilize a Single Split Direct Expansion (DX) air conditioning system, which provides localized cooling and is suitable for typical functional spaces.

For critical medical areas, particularly the Surgery Room (OT/OK), a more specialized HVAC system will be implemented. This will consist of an air-cooled chiller system integrated with dedicated Air Handling Units (AHUs). The system will be equipped with advanced control mechanisms to regulate temperature, relative humidity, and room pressure, ensuring compliance with healthcare standards for sterile environments.

To maintain high indoor air quality, the system serving operating theatres will incorporate a multi-stage filtration process, including:

91. Pre-filters
92. Medium filters
93. HEPA filters

Dedicated AHU rooms will be provided to serve the operating theatre areas, ensuring controlled and reliable air supply.

For infection control, particularly in emerging infectious disease isolation rooms, the exhaust air system will be designed with enhanced safety measures. The exhaust air duct system will be equipped with HEPA filters to ensure that contaminated air is properly treated before being discharged, thereby minimizing the risk of airborne transmission to the external environment.

This HVAC design approach ensures compliance with applicable healthcare standards and Good International Industry Practice (GIIP), supporting both patient safety and operational efficiency.

Building Transportation System

The building transportation system is designed to ensure safe, efficient, and reliable vertical movement of patients, visitors, medical staff, and goods within The Sitanala Hospital, in accordance with applicable national standards and Good International Industry Practice (GIIP).

Passenger Elevators

Passenger elevators are designed to meet performance criteria suitable for hospital operations. The average interval time, defined as the waiting time from when a user presses the call button to when the elevator arrives during peak morning hours, is targeted at 40–60 seconds, except under special conditions or operational considerations.

The system is also designed to achieve a minimum 5-minute handling capacity of 10%, meaning that during peak periods, the vertical transportation system should be capable of moving at least 10% of the total building occupants within a five-minute interval.

Passenger elevators are primarily intended for:

94. Visitors of inpatients
95. Visitors attending outpatient services (Out-Patient Department / OPD)

Patient/Bed Elevators

Patient or bed elevators are designed in accordance with applicable Indonesian regulations and standards, particularly with respect to dimensions and load capacity, to accommodate patient beds, medical equipment, and staff.

These elevators are intended for:

- Inpatients (In-Patient Department / IPD)
- Hospital medical staff

The movement of inpatient transport using these elevators may be scheduled and controlled to ensure operational efficiency and minimize congestion.

Fire and Service Elevators

Service elevators are designed with sufficient capacity to transport heavy goods and equipment required for hospital operations. In emergency situations, including fire incidents, a designated fire lift function is provided, typically utilizing the service elevator.EIn the event of a fire, all elevators will automatically return to the ground floor and open their doors, facilitated by an Automatic Rescue Device (ARD) system. However, the fire/service elevator will remain operational under emergency conditions, as it is supported by a backup power supply (generator set) and equipped with fire-resistant feeder cables (e.g., FRC or MICC).

This configuration allows the fire/service elevator to be used for:

96. Emergency evacuation (as required and controlled)
97. Firefighting operations by emergency response teams

Electrical System

The primary electrical power supply will be sourced from the national utility (PLN) at a medium voltage level of 20 kV / 3-phase / 50 Hz, with a contracted capacity of 690 kVA. Medium voltage (20 kV) power from PLN will be received at the incoming Medium Voltage Panel (MVP/20 kV switchgear) and distributed through the outgoing panel to an 800 kVA transformer, which will step down the voltage from 20 kV to low voltage (230/400 V). The low-voltage power will then be distributed to various distribution panels located within each building.

A backup power supply system will be provided using diesel generator sets with a total capacity of 2 × 350 kVA, equipped with auto-start and auto-synchronization systems. As an existing generator set with a capacity of 350 kVA is already available, The Sitanala Hospital will install one additional 350 kVA

generator to complete the backup system. The electrical supply will be sourced from the nearest PLN distribution substation, which will feed power to the medium voltage panel within the building.

Additionally, an Uninterruptible Power Supply (UPS) system will be installed, with capacity tailored to the requirements of each critical equipment. The UPS system will provide backup power with a minimum autonomy of 15 minutes, ensuring continuity of essential operations during power interruptions.

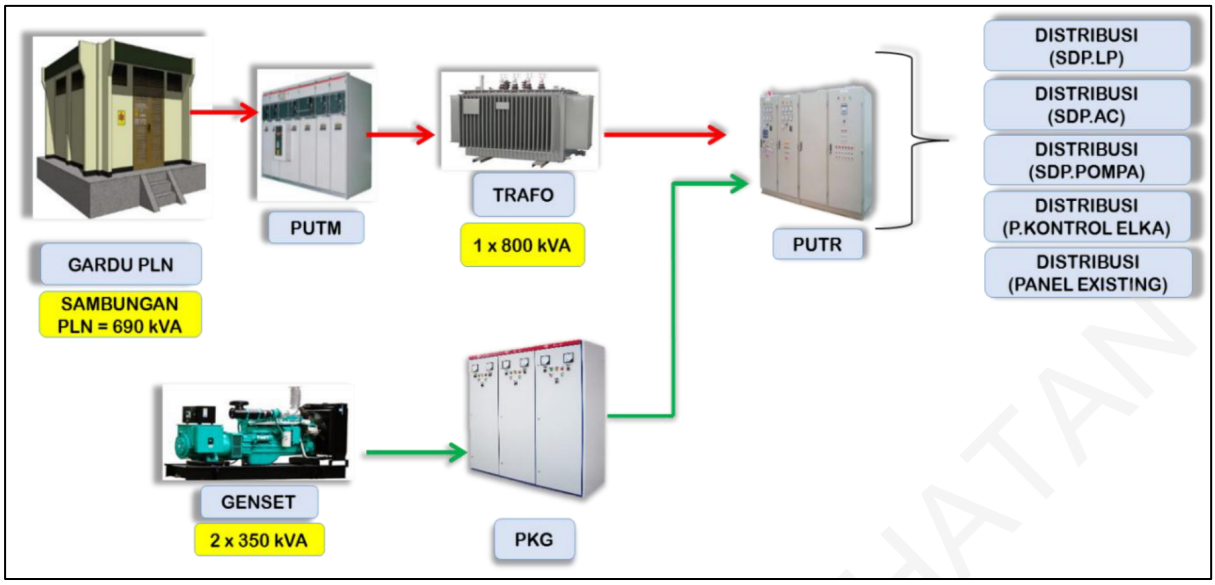


Figure 11 Electrical System Diagram

Fire Alarm System

The fire alarm system is designed as an early detection system for fire hazards, forming a critical component of the building's active fire protection system**.** This system plays a key role in ensuring the reliability and safety of the building in the event of a fire. Active fire protection systems, including fire alarm systems, are mandatory for hospital buildings**,** given that a significant proportion of occupants are patients who may be in vulnerable or weakened conditions and therefore unable to evacuate independently during an emergency. The fire alarm system is intended to provide timely detection**,** alert, and notification, enabling rapid response, safe evacuation procedures, and coordination with emergency services, thereby minimizing risks to life and property.

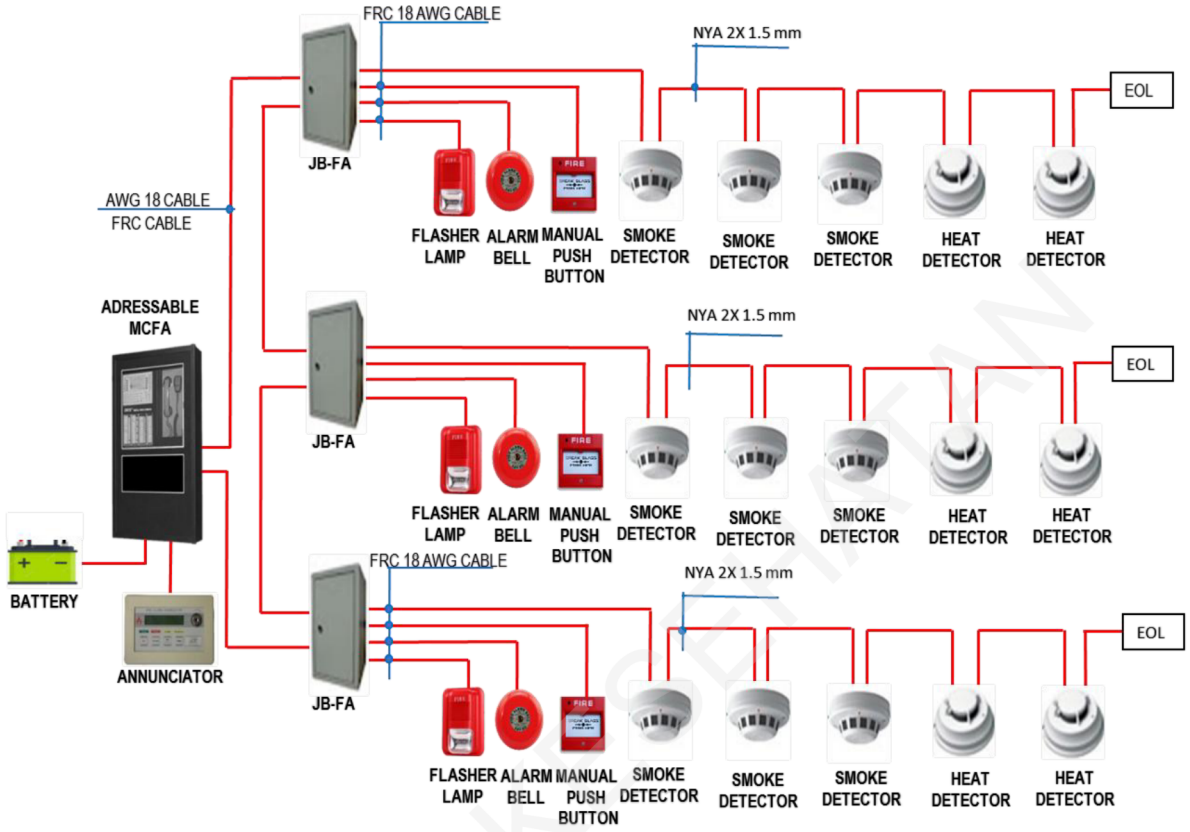


Figure 12 Fire Alarm System Diagram

Commissioning, testing, and validation

The commissioning phase will include a comprehensive program of testing, inspection, and validation to ensure that all critical systems are installed, functioning, and performing in accordance with design specifications, applicable standards, and Good International Industry Practice (GIIP). This will include HEPA filter integrity testing, whereby high-efficiency particulate air (HEPA) filters installed in critical environments (such as operating theatres and isolation rooms) are tested-typically using aerosol-based methods-to verify filtration efficiency, absence of leakage, and compliance with required cleanliness classifications.

In addition, Linear Accelerator (LINAC) source commissioning will be conducted for radiotherapy equipment to confirm that radiation output, beam characteristics, and safety interlocks meet clinical and regulatory requirements. This process involves calibration, dosimetry verification, and acceptance testing prior to clinical use.

The commissioning program will also include biomedical equipment qualification, covering installation qualification (IQ), operational qualification (OQ), and performance qualification (PQ) to ensure that all medical devices operate safely, reliably, and in accordance with manufacturer specifications and healthcare standards.

Furthermore, fire and life safety system testing will be carried out to verify the proper operation and integration of fire alarm systems, sprinklers, hydrants, emergency lighting, and evacuation systems. This includes functional testing, alarm verification, system interlocks, and emergency response

simulations to ensure readiness in the event of a fire or other emergency. Together, these commissioning activities are intended to ensure that all critical systems are safe.

2.3.3 Operational Phase

Workers recruitment

Human Resource Requirements for the Operational Phase is shown in Table 11.

Table 11 Human Resource Requirements for the Operational Phase.

No	Position	Amount (person)
A. Central Surgical Building		
1	**Medical Personnel (Specialists and Sub-specialists)**	
	Anaesthesiologists	4
	General Surgeon	6
	Specialized Surgeons	6
	Anaesthesia Nurses (assumption : 2 person/operating room; total Operating Room = 14 rooms)	28
2	**Operating Room Nursing Staff**	
	Instrument Nurse (Scrub Nurse)	28
	Circulating Nurse	14
	Recovery Room Nurse	13
3	**Supporting and Technical Personnel**	
	Nursing Assistants / Surgical Assistants	7
	Electromedical Technicians	2
	CSSD (Central Sterile Supply Department) Staff	12
	Administrative and Logistics Staff	3
	Cleaning Service	14
	Total A	**137**
B. Oncology Building		
1.	**Radiotherapy Unit**	
	Medical Physicists	4
	Radiographers (Radiotherapy Technologists / RTT)	4
	Electromedical Technicians	2
	Radiation Protection Officer (RPO / PPR)	1
2.	**Oncology Pharmacy Unit (Cytotoxic Handling)**	
	Specialist/Clinical Pharmacists	5
	Pharmacy Technicians	10

No	Position	Amount (person)
3	**Other Healthcare Personnel (Nutrition & Rehabilitation)**	
	Nutritionists/Dietitians	4
	Physiotherapists	6
	Medical Records Officers	6
	Non Medic	30
	Nurses	96
	Total B	**168**
C.	**Neurology/Urology Building**	
	Outpatient Clinics and Neurology Emergency Unit	6
	Diagnostic and Interventional Services	6
	Inpatient Wards and Stroke Unit	6
	Neurosurgery and Intensive Care Unit	6
	Total C	**36**
Total (A + B + C)		**329**

Operational of Central Surgical Building, Oncology Building and Neurology/Urology Building

The estimated total water demand for RS Sitanala, considering requirements for inpatient services, outpatient services, visitors, and other uses, is based on Indonesian Ministry of Health Regulation No. 7 of 2019 on Environmental Health in Hospitals and SNI 03-7065-2005. The calculation is as follows:

1. Clean Water Demand for Inpatients

   - Number of beds : 602 beds
   - Bed Occupancy Rate (BOR) : 70%
   - Water demand per person : 450 litres/person/day
   - Total demand : 189,630 litres/day or 189.63 m^3/day

2. Clean Water Demand for Outpatients

   - Number of visits : 250 persons/day (assumed)
   - Water demand per person : 5 litres/person/day
   - Total demand : 1,250 litres/day or 1.25 m^3/day

3. Clean Water Demand for Hospital Staff

   - Number of staff : 1,239 persons
   - Water demand per person : 50 litres/person/day
   - Total demand : 61,950 litres/day or 61.95 m^3/day

4. Total Water Demand

The total estimated daily water demand is 252.83 m^3/day (assuming a BOR of 70%)

Water supply will be sourced from the municipal water supply (PDAM) and partially from deep groundwater wells, which will be stored in the Ground Water Tank (GWT) and Roof Tank for distribution. For non-potable uses such as toilet flushing and landscape irrigation, recycled water derived from rainwater harvesting systems may be utilized to improve water efficiency.

Solid waste management

Domestic solid waste consists of organic waste (food scraps and cooking seasoning residues) and non-organic waste (paper, plastic food packaging, and cardboard boxes). For the management of this solid waste, the operator provides waste bins in every corner of rooms and inpatient wards. The collected solid waste is then segregated before being placed in the Solid Waste Temporary Storage Area (TPS). Under the existing hospital operations, solid waste is managed through the provision of segregated waste bins in each room, consisting of separate bins for medical waste and non-medical waste. Non-medical waste is collected by designated personnel and transported to the Temporary Waste Storage Area (TPS) twice daily.

The Temporary Waste Storage Area consists of a covered permanent concrete structure, measuring approximately 4.5 m × 4.5 m × 3 m (Volume approximately 60.75 m^3). Subsequently, non-medical waste is transported to the municipal landfill (TPA) through a cooperation arrangement with the Tangerang City Environmental Agency, which provides daily waste collection services. In the future, The Project will apply the same method as the existing activities .

Medical Waste Management

Medical plastic waste/plabot generated from healthcare activities, including infusion bottles, medicine bottles, blister packs, HD containers, tubing, and other plastic medical packaging, shall be managed in accordance with applicable environmental and healthcare waste regulations. Waste segregation shall be conducted at the point of generation by separating infectious waste, pharmaceutical waste, sharps waste, domestic waste, and recyclable medical plastic waste. Medical plastic waste intended for further treatment shall be placed in yellow containers or bags labelled with medical hazardous waste symbols. Waste contaminated with cytotoxic substances, hazardous pharmaceuticals, antibiotics, or excessive infectious materials shall not be included in any recycling or reuse program and shall be managed as hazardous medical waste.

Cleaning service personnel shall collect the waste using appropriate personal protective equipment (PPE), including masks, gloves, aprons, boots, and additional face protection where necessary. The waste shall be transported using dedicated closed trolleys through designated waste transportation routes to the Temporary Hazardous Waste Storage Facility (TPS Limbah B3). Environmental Health/Sanitation personnel shall conduct weighing, recording, and documentation of the waste, including waste type, source, date, and quantity, in the hazardous waste logbook and related tracking documents.

The waste shall be stored temporarily in a hazardous waste storage area that complies with regulatory requirements, including impermeable flooring, proper ventilation, drainage systems, restricted access, and appropriate hazardous waste labelling. Medical plastic waste intended for recovery or recycling

shall first undergo disinfection or sterilization using approved treatment technologies such as autoclaving or other licensed treatment systems. Operational parameters including temperature, pressure, and contact time shall meet the required standards, and sterilization effectiveness shall be verified periodically using biological or chemical indicators.

Following sterilization, the waste may undergo shredding or destruction to prevent illegal reuse and to facilitate recycling processes. Only waste that has been confirmed sterile and free from hazardous residues may be transferred to licensed hazardous waste recyclers or recovery companies. All transfers shall be supported by proper documentation, including waste manifests, transfer records, and environmental management documentation. The sale or transfer of untreated medical waste to unauthorized collectors or informal recyclers shall be strictly prohibited.

All personnel involved in waste handling activities shall receive adequate training on hazardous waste management and occupational health and safety procedures. Healthcare facilities shall provide supporting emergency response equipment and facilities, including handwashing stations, spill kits, and exposure response procedures. Documentation and reporting related to hazardous waste management shall be maintained in accordance with applicable legal and regulatory requirements.

Based on the planned maximum inpatient capacity of 602 beds, and assuming a healthcare waste generation rate of approximately 1.89 kg/bed/day for a Class A General Hospital, the Project is expected to generate approximately 1,137.8 kg of healthcare waste per day.

For the purpose of estimating storage and transportation requirements, a bulk density of 150 kg/m³ for uncompacted medical waste has been applied, consistent with values commonly referenced in international medical waste management guidance (WHO, 2014). Accordingly, the estimated medical waste generation rate is approximately 7.6 m³/day.

The estimated healthcare waste generation is summarized as follows:

98. Inpatient capacity: 602 beds

99. Healthcare waste generation rate: 1.89 kg/bed/day

100. Total healthcare waste generation: 1,137.8 kg/day

101. Assumed bulk density: 150 kg/m³

102. Estimated medical waste volume: approximately 7.6 m³/day

The existing hazardous waste storage facility (*TPS Limbah B3*) has a storage capacity of approximately 210 m³. Based on the projected maximum hospital capacity of 602 beds and an estimated healthcare waste generation rate of 1.89 kg/bed/day, the Project is expected to generate approximately 1,137.8 kg/day of healthcare waste. Assuming a bulk density of 150 kg/m³, this is equivalent to approximately 7.6 m³/day of medical waste.

Based on these assumptions, the existing TPS B3 would provide approximately 27–28 days of storage capacity under maximum operational conditions. Therefore, the existing hazardous waste storage facility is considered adequate to accommodate the projected healthcare waste generation from the expanded hospital operations, provided that waste collection and off-site transportation continue to be undertaken on a regular basis by licensed waste management contractors.

Non Medical Hazardous waste management

The hazardous waste generated includes used batteries/accumulators, B3-contaminated waste from spill kits, used B3 packaging, used oil, used fluorescent lamps (TL) and ink cartridges, as well as contaminated rags and gloves. All of these wastes are stored for a maximum period of 90 days in hazardous waste temporary storage. Those wastes will be transported and managed by a licensed third party from Ministry of Environment. Based on the estimated medical hazardous waste generation rate of approximately 1,137.8 kg/day (equivalent to approximately 7.6 m^3/day), non-medical hazardous waste generated from supporting activities such as laboratories, pharmacies, maintenance operations, reverse osmosis systems, radiology services, and utility facilities is conservatively estimated at approximately 5% of the medical hazardous waste stream (WHO, 2014). Accordingly, non-medical hazardous waste generation is estimated at approximately 56.9 kg/day, equivalent to approximately 0.29 m^3/day with density as 200 kg/m^3 (WHO,2014). The existing hazardous waste storage facility (TPS Limbah B3) has a total storage capacity of approximately 210 m^3. Based on the estimated generation of non-medical hazardous waste of approximately 0.29 m^3/day, arising from laboratory activities, pharmacy operations, maintenance activities, reverse osmosis systems, radiology services, and utility facilities, the available storage capacity is considered more than adequate.

Even assuming a conservative effective storage capacity of 75% of the total facility volume to account for operational requirements such as waste segregation, access aisles, and safety provisions, the available storage capacity would remain approximately 157.5 m^3. This capacity would provide approximately 276–543 days of storage for non-medical hazardous waste, significantly exceeding operational requirements given that hazardous waste is routinely collected and transported off-site by licensed hazardous waste management contractors. Accordingly, the existing TPS Limbah B3 is considered sufficient to accommodate the projected generation of non-medical hazardous waste associated with the operation of the proposed facilities.

Wastewater management

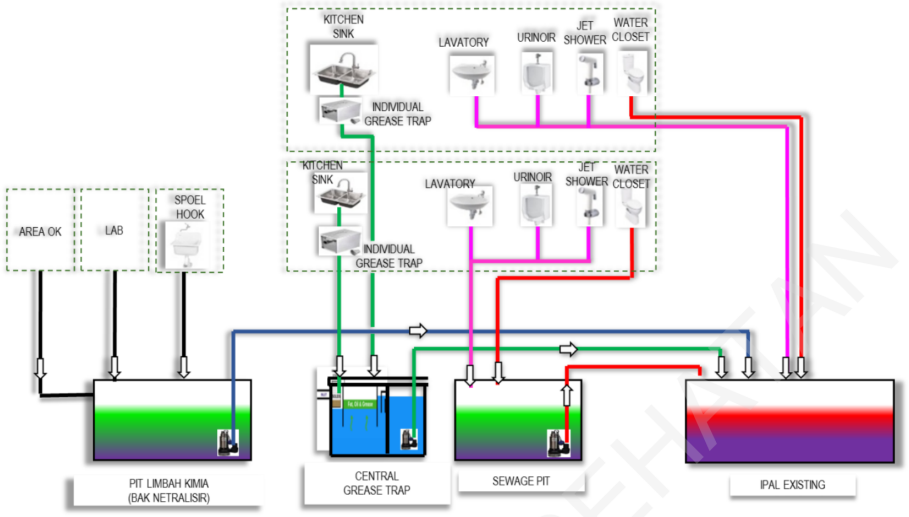


Figure 13 Flowchart of wastewater management

The figure illustrates a wastewater management system within a healthcare facility or institutional building, where wastewater streams are segregated based on their sources and characteristics prior to being conveyed to the wastewater treatment plant (WWTP). Wastewater generated from laboratory areas, operating rooms (OK area), and the spoelhoek is directed through a dedicated piping system to a chemical waste pit or neutralization tank for preliminary treatment of chemical substances and potentially hazardous contaminants. This system is intended to prevent hazardous chemical wastewater from directly entering the domestic wastewater network or the main wastewater treatment facility.

Wastewater originating from kitchen sinks is initially passed through individual grease traps installed at each source point to separate oils and grease. The wastewater is subsequently conveyed to a central grease trap for further separation and treatment before being discharged to the existing WWTP system. The installation of grease traps is intended to reduce oil and grease concentrations that may interfere with the piping network and the biological treatment processes within the wastewater treatment plant.

Domestic wastewater generated from lavatories, urinals, jet showers, and water closets is conveyed to a sewage pit serving as a temporary collection chamber. From the sewage pit, the wastewater is pumped and transferred to the existing WWTP for further treatment. The piping arrangement shown in the figure demonstrates the separation of grey water, black water, kitchen wastewater, and chemical wastewater streams to ensure that each type of wastewater receives appropriate handling according to its specific characteristics prior to final treatment.

Overall, the system applies the principle of wastewater segregation based on pollutant sources in order to improve treatment efficiency, prevent operational disturbances within the WWTP, reduce the risk of environmental contamination, and ensure wastewater management is conducted in accordance with environmental health principles and applicable healthcare wastewater management regulations.

In accordance with Indonesian Ministry of Health Regulation No. 7 of 2019 on Environmental Health in Hospitals, the WWTP capacity is designed based on the maximum wastewater flow rate plus a safety factor of approximately 10%. Accordingly, the required WWTP capacity for a 602-bed hospital is calculated as follows:

103. Wastewater flow: 202.26 m³/day

104. Safety factor (~10%): ± 5.6 m³/day

105. Reused treated wastewater: 40,452 m³/day

106. Total required STP capacity approximately 207.86 m³/day

The project has an existing STP with capacity as 250 m^3/day. In the future development, the project will build additional STP as 250 m^3/day. Therefore, the total STP capacity will be 500 m^3/day.

Radioactive waste management

As presented in Figure 14, the radioactive-waste-management system shall be developed, tested, verified, and approved before the RIRA ward begins treating patients. Operational radioactive-waste management therefore starts with preparatory activities in July 2027 and progresses through commissioning, BAPETEN licensing, final readiness verification, and routine operation.

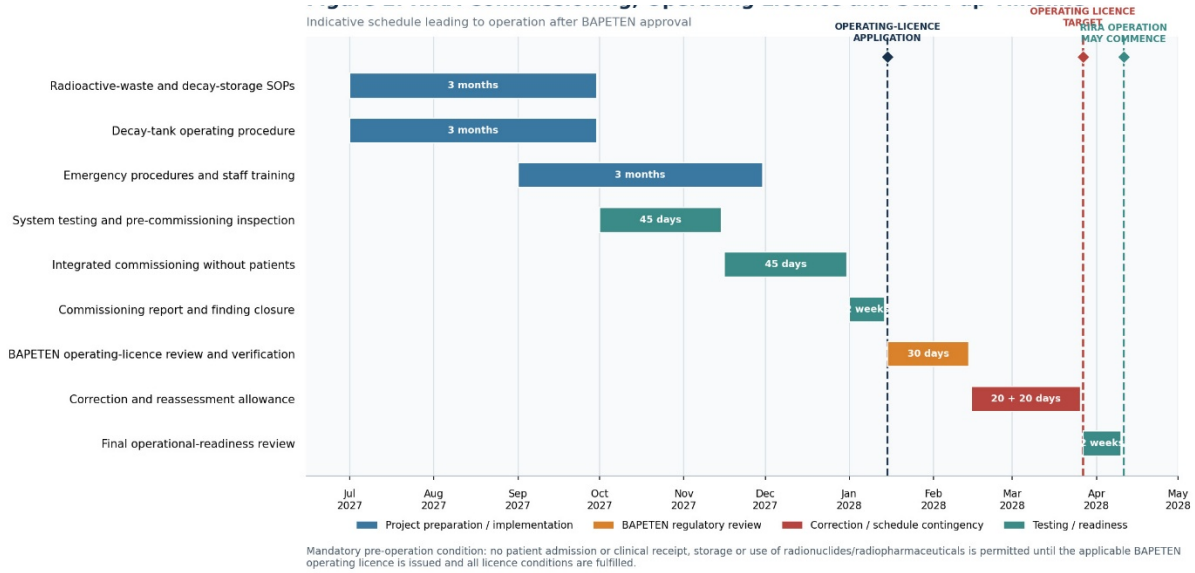


Figure 14 RIRA commisisioning, operating license and start-up timeline

2.3.4 Decommissioning Considerations

While the planning horizon of this ESIA covers the construction and operational phases of the redevelopment, decommissioning considerations are flagged for assets expected to reach end-of-life within the Master Plan horizon - including the STP components scheduled for replacement after capacity expansion, the existing stack and ageing MEP equipment in the older blocks, and the LINAC source decay management. Detailed decommissioning plans will be developed at the appropriate juncture in line with PermenLHK requirements and AIIB ESS1 closure provisions.

2.3.5 Smart and Green Hospital Strategy

The redevelopment is configured as a Smart and Green Hospital, integrating digital health, energy efficiency, water stewardship, and climate resilience into the design. Strategic dimensions include:

107. Smart Hospital: integrated Hospital Information System; electronic medical records; telemedicine; SATUSEHAT integration; remote diagnostics; clinical workflow automation; smart Building Management Systems for HVAC, lighting, and energy.

108. Green Hospital: high-efficiency envelope (passive cooling, glazing performance, daylighting); HVAC and lighting energy efficiency; rooftop photovoltaic potential (target 1.0–1.5 MWp pending DED feasibility); water-efficient fixtures; rainwater harvesting and stormwater detention; mature-tree retention and native landscape; circular-economy supplier partnerships.

109. Climate-Resilient Hospital: reinforced drainage and flood-management for low-lying Jabodetabek conditions; emergency power continuity (genset + PV-battery); facility design that supports patient comfort under extreme heat events; integration with the Banten provincial disaster-management framework.

110. Universal Design: accessibility provisions across all new buildings, in compliance with the UN Convention on the Rights of Persons with Disabilities, including barrier-free movement, accessible signage, and inclusive sanitary facilities.

3 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

3.1 AIIB Environmental and Social Framework

3.1.1. Environmental and Social Policy (ESP)

The AIIB Environmental and Social Policy (ESP), within the Environmental and Social Framework (ESF) amended through 26 June 2024, establishes environmental and social screening, categorization, assessment, disclosure, consultation, monitoring, and management requirements for AIIB-financed projects. AIIB determines the Project category. The overall TRUST Project has been assigned Category B. For RSUP Dr. Sitanala, the assessment therefore needs to demonstrate that adverse risks and impacts are predominantly site-specific, manageable through established mitigation measures, and appropriately addressed through the ESIA/ESMP and associated plans.

3.1.2. ESS1 - Environmental and Social Assessment and Management

ESS1 governs the environmental and social assessment and management of the Project. Requirements material to RSUP Dr. Sitanala include, among others: integrated assessment of direct, indirect, induced and cumulative risks and impacts; climate change and greenhouse-gas considerations; screening and management of Associated Facilities; labor and working conditions; community health and safety; cultural heritage; stakeholder engagement and information disclosure; implementation of the mitigation hierarchy; and ongoing monitoring and reporting. Where AIIB identifies material gaps or outstanding actions, these should be addressed through time-bound corrective measures and, where required by AIIB, an Environmental and Social Action Plan (ESAP) or equivalent agreed instrument with clear responsibilities, resources and completion dates. Relevant E&S requirements must also be incorporated into procurement and contract documents.

3.1.3. ESS2 - Involuntary Resettlement

ESS2 addresses land acquisition and involuntary resettlement, including both physical displacement and economic displacement such as temporary or permanent loss of access to formal or informal economic activities. The 2024 relocation of 26 staff households within the RSUP Dr. Sitanala compound must therefore be treated as a legacy matter requiring documented due diligence and a determination of whether it was directly linked to the proposed Project. Completion before AIIB financing does not by itself make ESS2 inapplicable. Current Project-related access restrictions affecting street vendors or other informal economic activities must also be screened separately for potential economic displacement and, if confirmed, managed through proportionate compensation/livelihood-restoration measures and any instrument required by AIIB before impacts occur.

3.1.4. ESS3 - Indigenous Peoples

ESS3 establishes specific protections where Indigenous Peoples are present in, or affected by, a Project. Current screening for the RSUP Dr. Sitanala Area of Influence has not identified groups meeting the AIIB ESS3 criteria; accordingly, ESS3 is not triggered based on presently available information. This conclusion should be maintained as a documented screening finding and revisited if new information emerges. The former leprosy-patient community remains an important vulnerable/distinct stakeholder group requiring tailored engagement and accessibility measures under ESS1 and the Stakeholder Engagement Plan.

3.1.5. Environmental and Social Exclusion List (ESEL)

Screening of the current Project scope against AIIB's Environmental and Social Exclusion List (ESEL) has not identified an excluded activity. ESEL screening should nevertheless be maintained as an ongoing control during design development, procurement, contractor/subcontractor selection, and any material change in Project scope. Project eligibility should therefore be stated subject to continued compliance with the ESEL, the ESP, applicable ESSs, and the Legal Agreements.

3.2 National Legal Framework of the Republic of Indonesia

3.2.1 Environmental Constitution

Article 28H paragraph (1) of the 1945 Constitution of the Republic of Indonesia guarantees every person the right to live in physical and spiritual prosperity, to have a place to dwell, and to enjoy a good and healthy environment. The principal umbrella law operationalising this right is Law No. 32 of 2009 on Environmental Protection and Management (UU PPLH), as amended by the Job Creation Law (UU 6/2023) and its implementing regulation PP 22/2021.

3.2.2 EIA Framework and Environmental Approvals

The Sitanala Hospital redevelopment is subject to the Environmental Impact Assessment (AMDAL) regime under PP 22/2021, operationalised by PermenLHK 4/2021. The AMDAL deliverables (KA-ANDAL, ANDAL, RKL-RPL) will be reviewed by the Komisi Penilai AMDAL of the Banten Environmental Agendy, and Environmental Approval Lingkungan will be issued by the competent authority. The existing operational baseline of The Sitanala Hospital has previously been formalised through an Environmental Evaluation Document (*Dokumen Evaluasi Lingkungan Hidup-DELH*), a retroactive instrument applicable to facilities operating before AMDAL obligations crystallised, and through the existing environmental permit (*Izin Lingkungan*) from the Tangerang Major.

3.2.3 Wastewater Management

Hospital wastewater management is regulated by Regulation of the Minister of Environment/Environmental Control Agency of the Republic of Indonesia Number 11 of 2025 concerning Domestic Wastewater Quality Standards and Domestic Wastewater Treatment. Technology Standards (PermenLH/BPLH 11/2025) in Annex I Point A Number 3 and operationalised through the IPLC permit. The expansion of patient capacity to 600 beds will require capacity expansion of the WWTP, formalised through the WasteWater Technical Approval.

3.2.4 Air Emissions Management

Stationary-source air emissions from hospital operations, are regulated by Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Emission Standards for Internal Combustion Engines (PermenLHK 11/2021). Emission compliance is to be demonstrated through periodic stack testing by KAN-accredited laboratories, with Emission Technical Approval prepared in parallel with this ESIA.

3.2.5 Hazardous Waste Management

Hazardous waste (Bahan Berbahaya dan Beracun-B3) generated by hospital activities is regulated by PP 22/2021 (consolidated B3 provisions), Minister of Environment and Forestry Regulation Number 6 of 2021 concerning Procedures and Requirements for Hazardous and Toxic Waste Management (Peraturan Menteri Lingkungan Hidup dan Kehutanan No. 6/2021-PermenLHK 6/2021) and Minister

of Environment and Forestry Regulation Number 56 of 2015 concerning Procedures and Technical Requirements for the Management of Hazardous and Toxic Waste from Healthcare Facilities (Peraturan Menteri Lingkungan Hidup dan Kehutanan No.56/2015 - PermenLHK No. 56). The existing temporary hazardous waste storage (Tempat Penyimpanan Sementara Limbah B3 – TPS LB3) under TPS LB3 permit, will be extended under the Hazardous Waste Technical Detail (Rincian Teknis Limbah B3-Rintek LB3) instrument, prepared in parallel with this ESIA, to accommodate The Sitanala Hospitaled increase in B3 volume associated with expanded patient throughput and the LINAC-related decay storage.

3.2.6 Traffic and Transportation

Traffic Impact Assessment (*Analisis Dampak Lalu Lintas-ANDALALIN*) is regulated by Law No. 22 of 2009 on Traffic and Road Transportation, Government Regulation Number 32 of 2011 concerning Management and Engineering, Environmental Impact Analysis, and Traffic Demand Management (*Peraturan Pemerintah No 32/2011 - PP No. 32/2011*), Minister of Transportation Regulation Number 17 of 2021 concerning the Implementation of Traffic Impact Analysis (*Peraturan Menteri Perhubungan No. 17/2021 - Permenhub No. 17/2021*). The existing ANDALALIN recommendation issued Transporation Agency of Tangerang City (*Dinas Perhubungan Tangerang City*) in September 2019, based on a parking provision of 392 SRP cars, 205 SRP motorcycles, and 4 SRP trucks against a calculated demand of 9 SRP cars and 148 SRP motorcycles has been registered.

3.2.7 Spatial Planning

Spatial-planning compliance is assessed against the Regional Spatial Planning (*Rencana Tata Ruang Wilayah -RTRW*) of Banten Province, the RTRW of Tangerang City, and any superseding Detailed Spatial Plan (*RDTR – Rencana Detail Tata Ruang*) applicable to Neglasari District. The Approval of Conformity for Spatial Utilization Activities (*Persetujuan Kesesuaian Kegiatan Pemanfaatan Ruang-PKKPR*) is the operative instrument under PP No. 21 of 2021. The Sitanala Hospital site sits within a designated public-services / healthcare-facility zone consistent with its century-long operational footprint.

3.2.8 Health and Hospital Services

Hospital operations are governed by Law No. 17 of 2023 on Health and the implementing PP No. 28 of 2024, Law No. 44 of 2009 on Hospitals, PP No. 47 of 2021 on Hospital Operations, and Permenkes No. 40 of 2022 on Technical Requirements for Hospital Buildings, Infrastructure, and Equipment. The redevelopment is further anchored in the national KJSU reform programme set out in KMK No. HK.01.07/MENKES/1277/2024 (Cancer-Heart-Stroke-Uronephrology referral network).

3.2.9 Cultural Heritage

Cultural heritage is regulated by Law No. 11 of 2010 on Cultural Heritage (Cagar Budaya), with subsequent implementing instruments at the City and Provincial level. However, no disgnation letter from goverment, locally or nationally, confirming the cultural heritage of the Sitanala Hospital. Confirmation from Sitanala Hospital Management stating that no Cultural Heritage status of the Hospital. Hence, the Project location is not considered as cultural heritage. The national legal framework most relevant to cultural heritage management is presented in the table below.

Table 12 Relevance of the National Legal Framework for Cultural Heritage Management

Regulatory Level	Regulation	Key Provisions	Relevance to ESIA / ESS8
1. Constitution	The 1945 Constitution of the Republic of Indonesia, Article 32 paragraphs (1) and (2)	The State shall advance Indonesia's national culture and respect and preserve regional languages as part of the nation's cultural heritage.	Provides the constitutional basis for the protection, preservation, and promotion of cultural heritage in the context of national development.
2. Cultural Heritage Law	Law No. 11 of 2010 on Cultural Heritage	Establishes the legal framework for the identification, designation, ownership, protection, development, utilization, preservation, National Cultural Heritage Register, and prohibition of damage to cultural heritage. Cultural heritage includes cultural objects, buildings, structures, sites, and cultural heritage areas.	Serves as the primary legal basis for the identification, protection, and management of cultural heritage within the ESIA and for the preparation of a Chance Find Procedure (CFP).
3. Cultural Advancement Law	Law No. 5 of 2017 on the Advancement of Culture	Regulates the protection, development, utilization, and promotion of cultural advancement objects, including traditions, customary practices, traditional knowledge, rituals, languages, folk games, and cultural expressions.	Provides the legal basis for identifying and assessing potential impacts on intangible cultural heritage that may be affected by the Project.
4. Government Regulation	Government Regulation No. 1 of 2022 on the National Register and Preservation of Cultural Heritage	Regulates procedures for the registration, designation, preservation, utilization, adaptation, relocation, supervision, and management of cultural heritage. This Regulation serves as the implementing regulation for Law No. 11 of 2010.	Provides the national technical framework for the management and preservation of cultural heritage that may be affected by project activities.
5. Regional Regulation (where applicable)	Provincial, Regency, or Municipal	Regulates the inventory of local cultural heritage assets, preservation mechanisms, protection zoning, and the	Provides the basis for identifying locally designated cultural heritage sites and

Regulatory Level	Regulation	Key Provisions	Relevance to ESIA / ESS8
	Regulations on Cultural Heritage	respective responsibilities of local governments.	protected areas within the Project's Area of Influence (AoI).

3.2.10 Employment and Occupational Health and Safety

Workforce protection is regulated principally by Law No. 13 of 2003 on Manpower and PP No. 50 of 2012 on the Implementation of the Occupational Health and Safety Management System (SMK3). Construction-phase OHS will be operationalised through the contractor's SMK3 plan and complemented by IFC General EHS Guidelines and ILO Core Conventions. Operational-phase OHS is integrated with The Sitanala Hospital's existing K3RS framework.

3.2.11 Gender Mainstreaming

111. Law No. 7 of 1984 ratifying CEDAW (the Convention on the Elimination of All Forms of Discrimination against Women), which anchors Indonesia's commitment to eliminate discrimination against women. The hospital should Adopt a written non-discrimination and gender-equality policy that explicitly prohibits discrimination against women in recruitment, promotion, training, remuneration, termination, and access to benefits, use sex-disaggregated HR data (numbers of women/men by position, contract type, training access, promotions) to monitor whether women and men benefit equally and identify glass-ceiling positions, Ensure equal access for women to training, leadership positions (e.g., head of unit, supervisor, committee members), and participation in hospital committees (K3RS, ethics, quality, grievance), include explicit protection for pregnant and breastfeeding workers (no dismissal or demotion due to pregnancy; reasonable accommodations, breastfeeding rooms, adjusted shifts in high-risk areas), and integrate prevention of gender-based discrimination and harassment into the Code of Conduct and all employment/outsourcing contracts, supported by training and disciplinary sanctions

112. Law No. 39 of 1999 on Human Rights, which recognizes equality and non-discrimination principles in the enjoyment of rights. The hospital should embed human-rights principles into hospital policies: dignity, equality, non-discrimination, participation, accountability, and access to remedy for staff, patients, and visitors, develop and socialize a patient and staff rights charter that includes equal treatment, freedom from degrading treatment, and protection from discrimination or harassment based on gender, disability, mental health status, religion, establish fair and accessible grievance mechanisms for both workers and patients (including anonymous options and protection against retaliation), and record/track cases to ensure follow-up, ensure special protection for vulnerable groups: psychiatric patients, women, children, persons with disabilities, and low-income patients, for example by informed-consent procedures adapted to capacity, chaperones during examinations, and stricter supervision in high-risk wards, Provide regular training for all categories of workers (including outsourced staff) on human-rights standards in healthcare, respectful

communication, non-discrimination, and how to respond when rights violations or abuse are observed.

113. Law No. 13 of 2003 on Manpower focusing on General Worker Protection. This regulation requires right to a safe work environment and prohibition of discrimination, harassment, and exploitation. The hospital should include explicit non-discrimination and anti-harassment clauses in all employment and outsourcing contracts (doctors, nurses, CS, drivers, security, etc.), ensure a safe hospital environment through clear rules on behavior, dress code, use of facilities, and protection from retaliation for complainants, and integrate these aspects into induction training, code of conduct, and periodic refreshers.

114. Law No. 12 of 2022 on the Crime of Sexual Violence, which strengthens the legal framework on sexual violence prevention, victim protection, and case handling in Indonesia. The hospital should Adopt a zero-tolerance policy for sexual harassment, exploitation, and other forms of sexual violence, explicitly referring to the TPKS Law, develop confidential reporting mechanisms (including for anonymous reports) managed by trained staff who understand survivor-centred, do-no-harm principles, prepare clear internal procedures for receiving complaints, protecting confidentiality, separating victim and alleged perpetrator, and referring cases to law enforcement and external services when needed, and provide psychosocial support, medical care, and legal aid referrals to victims of SEA/SH, including workers, patients, and visitors.

115. Law No. 36 of 2009 on Health and Healthcare Worker Protection. This regulation require hospital to protect against violence during medical duties and provide security assistance to workers. The hospital should deploy security personnel in high-risk areas (ER, ICU, psychiatric wards) and ensure CCTV/controlled access to sensitive areas, establish clear SOPs for responding to threats/violence against staff, including rapid security response and incident documentation and provide legal support and assistance (statement letters, legal counsel referral) for staff who become victims of violence

116. Presidential Instruction No. 9 of 2000 on Gender Mainstreaming in National Development, which instructs ministries, agencies, governors, and regents/mayors to integrate gender into planning, formulation, implementation, monitoring, and evaluation of development policies and programs. This makes gender mainstreaming a cross-sector governance obligation rather than a standalone social program. Several regulations related to gender mainstreaming and protection of women on violences.

3.3 Other International Frameworks Applicable in Indonesia

Beyond the AIIB ESF, the assessment draws on the following international frameworks as benchmarks for Good International Industry Practice (GIIP) - referenced in AIIB ESF Section 38 and applied throughout this ESIA (Table 13).

Table 13 International Framework and Application to This ESIA

Framework / Source	Application to this ESIA
WBG EHS Guidelines - General (2007)	Cross-cutting environmental, occupational, and community H&S benchmarks
WBG EHS Guidelines - Healthcare Facilities (2007)	Sector-specific standards for hospital design, waste, and emissions
WHO - Safe Management of Wastes from Health-Care Activities (2014)	Authoritative guidance on healthcare waste segregation and treatment
IFC - Cumulative Impact Assessment Good Practice Handbook (2013)	Methodological basis for cumulative impact analysis (Chapter 6)
IPCC Guidelines for National GHG Inventories (2006, 2019 Refinement)	Methodology for the GHG inventory (Chapter 8)
ILO Core Conventions	Labour and working-conditions provisions for the construction phase
UN Convention on the Rights of Persons with Disabilities (CRPD)	Universal Design accessibility provisions
WHO - Air Quality Guidelines (2021)	Reference benchmarks for ambient air quality assessment (Chapter 4.5)

3.4 International Legal Framework on Gender Equality

Women's rights are further reinforced through international legal instruments and United Nations mandates that promote gender equality and gender mainstreaming. These include the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the United Nations Economic and Social Council (ECOSOC), and the Commission on the Status of Women (CSW). Collectively, these frameworks provide the foundation for integrating gender considerations into development planning, policymaking, and project implementation while promoting equal participation, non-discrimination, and the protection of women's rights.

Table 14 International Legal Framework on Gender Equality

No.	Laws, Regulations, and International Instruments	Description
Gender		
1.	**Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)**	CEDAW is a comprehensive international legal instrument that promotes gender equality and women's rights. Through its monitoring system, recommendations, and complaint mechanisms, CEDAW contributes to ensuring that women's rights are recognized, protected, and upheld worldwide. It has also encouraged legislative and policy reforms in many countries, including improvements in women's political rights, access to education and employment, protection from

No.	Laws, Regulations, and International Instruments	Description
		domestic violence, and access to reproductive health services, in line with the Committee's recommendations.
2.	**United Nations Economic and Social Council (ECOSOC)**	ECOSOC promotes gender equality through several key roles, including: • Adopting **ECOSOC Resolution 1997/2**, which introduced the concept of gender mainstreaming across all United Nations policies and programmes. • Supporting initiatives to ensure women's equal representation in decision-making processes at both national and international levels. • Overseeing and guiding the work of the **Commission on the Status of Women (CSW)** and **UN Women** in advancing women's rights and gender equality.
3.	**Commission on the Status of Women (CSW)**	The CSW has made significant contributions to advancing gender equality by: • Developing key international policy documents, including the **Beijing Declaration and Platform for Action (1995)**, which serves as the global framework for achieving gender equality and women's empowerment. • Monitoring the implementation of international commitments related to women's rights under UN conventions and policies. • Advocating policies to address gender-based violence, promote women's economic empowerment, and increase women's participation in political and public decision-making.
4.	**United Nations Conference on Environment and Development (UNCED), 1992**	UNCED recognized the critical role of women in achieving sustainable development through several key international instruments, including: • **Agenda 21 (Chapter 24: Global Action for Women Towards Sustainable and Equitable Development)**, which emphasizes the full integration of women into environmental management and sustainable development policies. • **The Rio Declaration on Environment and Development**, which highlights the importance of public participation, including the meaningful involvement of women, in environmental decision-making processes. • Encouraging governments to develop gender-responsive environmental policies and strengthen women's participation in climate action and sustainable development initiatives.

3.5 Gap Analysis between AIIB ESF and Indonesian Legislation

The Gap Analysis compares applicable Indonesian requirements with AIIB's ESP, ESSs and ESEL to identify supplementary measures needed for Project compliance. The Project must meet both applicable national requirements and AIIB requirements; where applicable national or Client requirements are more stringent, those more stringent elements apply. The principal findings and required gap-closing measures are presented in the following table.

Table 15 Gap Analysis between AIIB ESF and Indonesian Legislation

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
ESS 1: Environmental and Social Assessment and Management			
Assessment and Management Process – ENVIRONMENTAL SCOPE			
Conduct environmental and social assessments to identify direct, indirect, cumulative and induced risks associated with The Sitanala Hospital and impacts on physical, biological, socio-economic and cultural resources in The Sitanala Hospital's area of influence	- Law Number 32 of 2009 concerning Environmental Protection and Management (Rules are no longer valid) - Government Regulation Number 22 of 2021 on Environmental Protection and Management	Direct, indirect, and cumulative impacts are assessed within national regulatory frameworks. However, the requirements to identify and assess the risks and impacts caused by The Sitanala Hospital on physical, biological, socioeconomic and cultural resources Lack of requirements to define areas of influence and to apply	Induced risks (e.g. SEA/SH due to labour flows) have been identified and mitigation measures proposed in this ESIA/ESMP ESIA/ESMP defines project areas of influence to ensure E&S risks and impacts
Apply a hierarchical approach to mitigation in environmental and social assessments, by: (a) anticipating and avoiding risks and impacts; (b) where the avoidance is not feasible, minimizes or reduces the risk and impact to an acceptable level; (c) once the risks and impacts have been minimized or reduced, mitigation; and (d) where residual risk or impact remains, compensation or balance thereof, if technically and financially feasible.	No explicit requirements about entering the mitigation hierarchy in the environment and social management plan	Lack of requirements to adopt a mitigation hierarchy in the environment and social management plan	The Project will implement a mitigation hierarchy where identified risks and impacts will be avoided where possible. If avoidance is not possible, the risks and impacts minimize or reduce to an acceptable level. Risk avoidance and E&S impacts will be explored both in the design and implementation of The Sitanala Hospital (construction stage).
Screening for Associated Facilities	No requirements in national regulations	Lack of requirements	The Project will screen for Associated Facilities when the design is complete. If AF is found, AIIB's ES requirements will be applied to the extent possible
Conduct meaningful consultations with people affected by The Sitanala Hospital and other	- SK. Provincial Governor. DKI Jakarta No. 76/2001, concerning Operational Guidelines for Community Involvement	Not	Meaningful consultations will be conducted on the basis of free prior consultations, and informed information for affected project

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
stakeholders and facilitate their participation in consultations	and Information Disclosure in the EIA Process. - Government Regulation Number 22 of 2021 concerning Environmental Protection and Management		stakeholders and interested stakeholders. Consultation, gender, disclosure requirements (30 days for Cat B project prior to AIIB board consideration)
Environmental Coverage			
Conduct a broad assessment of potential environmental risks and impacts, both positive and adverse, associated with The Sitanala Hospital	- Law Number 32 of 2009 concerning Environmental Protection and Management (Rules are no longer valid) - Government Regulation Number 22 of 2021 on Environmental Protection and Management	No gaps identified	
Consider the direct, indirect, and cumulative impacts of project at The Project 's to be funded by the AIIB on biodiversity and ecosystem services	-	There are no direct and indirect impacts due to biodiversity and ecosystems	-
Biodiversity Impacts Avoid the adverse impact of The Sitanala Hospital on biodiversity. Biodiversity offsetting should be designed and implemented to achieve results that can reasonably be expected to result in no net losses and preferably net biodiversity gains	- Law (UU) Number 5 of 1994 concerning Ratification of the United Nations Convention on Biological Diversity - Presidential Instruction (Inpres) Number 1 of 2023 concerning Mainstreaming Biodeversity Conservation in Sustainable Development	Not	-
Pollution Prevention Implementing pollution prevention and control technologies and practices – consistent with international good practices, as reflected in internationally recognized standards, such as the World Bank Group's Environmental, Health and Safety (EHSG) Guidelines	- Law Number 32 of 2009 concerning Environmental Protection and Management - Government Regulation Number 22 of 2021 on Environmental Protection and Management	Not	The Project is consistent in the prevention and control of environmental pollution as the World Bank Group's Environmental, Health and Safety (EHSG) Guidelines

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
Medical management Garbage Medical Waste Management	- Law Number 18 of 2008 concerning Waste Management - Ministry of Environment and Forestry Regulation Number 19 of 2021 concerning Procedures for the Management of Non-Hazardous and Toxic Waste	Government Regulation No. 22/2021 classifies medical waste, which includes clinical waste with infectious properties, pharmaceutical products or expired chemicals, medical and laboratory equipment contaminated with infectious waste, and wastewater treatment sludge from hospitals, among others, as hazardous waste. This regulation stipulates that general hazardous waste must be handled in accordance with the provisions outlined in Government Regulation 22/2021 itself, with specific guidelines stipulated in the Regulation of the Minister of Environment and Forestry No. 6 of 2021 concerning Procedures and Requirements for Hazardous Waste Management (called 'KemenKLHK 6/2021') and the Ministry of Environment and Forestry Environment and Forestry Regulation No. 56 of 2015 concerning Procedures and Technical Requirements for the Management of Hazardous Waste from Health Care Facilities	The Project will ensure compliance with applicable medical waste regulations by: • Conduct an initial audit of existing medical waste management practices and infrastructure. • Provide capacity building and training to healthcare facility staff on the speakers, storage, treatment, and disposal of hazardous waste. • Support the establishment or upgrade of appropriate waste treatment facilities (e.g., increase capacity of wastewater treatment plant, temporary waste storage areas, and, amend partnerships with licensed third-party services to treat and dispose of the increased volume of medical waste). • Implement a medical waste monitoring system with clear roles and responsibilities to ensure compliance with regulatory guidelines. • Regularly report on medical waste handling practices as part of The Project 's environmental monitoring framework. • Provision of separate bins according to the characteristics of medical waste
Resource Efficiency. Implement technically and financially feasible measures to improve the efficiency of energy and water consumption, as well as material resources and other inputs	National regulations generally promote the reduction of resource consumption whenever possible. However, certain methods and standards are not explicitly proposed		The Project will be implemented technically and financially viable measures to increase energy, water, and energy consumption. raw materials, as well as other resources, if possible. The Sitanala Hospital is committed to including energy efficiency as a Criteria

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
			for Evaluation of Bids in Selection equipment
Climate Change. Assess proposed projects in relation to climate change mitigation and adaptation	- Law Number 31 of 2009 concerning Climate Change	Although Law No. 31/2009 addresses climate change, project-level assessment requirements for climate change risk, adaptation and mitigation are not explicitly defined or uniformly enforced across sectors.	Integrate climate risk screening and adaptation planning into the initial project design. Require climate-related impact assessments as part of environmental and social assessments. Building the capacity of project implementers to use climate risk and resilience tools. Establish monitoring indicators related to climate adaptation outcomes.
Greenhouse gases. Assess alternatives under The Sitanala Hospital, and implement technically and financially feasible and cost-effective options that support the Client in meeting their NDCs	- Presidential Regulation Number 98 of 2021: Implementation of Carbon Economic Value for the Achievement of Nationally Determined Contribution Targets and Control of Greenhouse Gas Emissions in National Development - Presidential Decree Number 14 of 2024: The Government of Indonesia's Efforts to Reduce Greenhouse Gas Emissions	While the Presidential Regulation supports GHG reduction and carbon economic value, there is a lack of clear guidance on estimating, reporting, and mitigating GHG emissions at The Sitanala Hospital level, especially for small- to medium-scale developments.	Conduct baseline GHG emissions assessments during project preparation. Identify and evaluate technically and economically viable alternatives with lower emissions. Integrate GHG mitigation measures in project design, such as improving energy efficiency or using renewable energy sources. Implement annual monitoring and reporting of GHG emissions in accordance with NDC targets.
Assessment and Management Process – SOCIAL SCOPE			
Vulnerable groups and discrimination. Assess social risks and impacts affecting vulnerable groups or individuals, and discrimination against groups or individuals in providing access to	- Law 2/2012 as amended in the Omnibus Law does not contain any special provisions on the protection of vulnerable	There are no specific regulations within the national legal framework that require social risk assessments or prevention of discrimination in access to development	This project will identify and assess potential risks and social barriers that may disproportionately affect vulnerable groups. Social Impact Assessments () will be

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
development resources and Project benefits, especially against vulnerable groups	groups in the context of land acquisition for development in the public interest	resources and project benefits for vulnerable groups.	conducted, and targeted outreach will be implemented to ensure the inclusion of these groups in the consultation and benefits of The Sitanala Hospital. Specific action plans will be developed, as needed, to avoid discrimination and promote equitable access.
Gender. Identify potentially adverse gender-specific risks and impacts of The Sitanala Hospital that have a disproportionate impact on one gender compared to another, consider how The Sitanala Hospital's risks and impacts may increase those gender-specific risks and impacts and develop mitigation measures to mitigate them. The risks associated with Gender-Based Violence, including Sexual Exploitation and Sexual Harassment/Harassment need to be screened in relation to potential labour flows.	No requirements in national regulations	National regulations do not mandate the identification or mitigation of gender-specific impacts of development projects.	The Project will include gender analysis as part of the Environmental and Social Assessment (ESA) to identify gender-specific risks and impacts. Measures will be integrated into The Sitanala Hospital design to ensure gender equality, including targeted support, women's participation in consultations, and monitoring of gender-disaggregated data. The Gender Action Plan (GAP) will be prepared and implemented accordingly.
Health and Safety			
Health and Safety of Workers and Communities. Assess health and safety risks to Project workers and communities affected by The Sitanala Hospital. For such workers and communities, implement measures to prevent accidents, injuries, and illnesses (including, as appropriate, measures to avoid or minimize exposure to infectious and non-communicable diseases, including pandemics) associated with The Sitanala Hospital	- Government Regulation Number 50 of 2012 concerning the Implementation of Occupational Health and Safety Management System - Regulation of the Minister of Public Works and Public Housing Number 10 of 2021 concerning Guidelines for Construction Safety Management Systems - Government Regulation No. 30 of 2021 concerning Road Traffic and Transportation, includes traffic impact	There are no specific regulations mandating to avoid or minimize potential public exposure to water-related water, infectious and non-communicable diseases. The latest policies and regulations put in place by the Government of Indonesia have extensively covered the risks related to the spread of COVID-19 and have adopted social distancing and general hygiene measures.	The Project will implement a health and safety management plan that aligns with international best practices, including the requirements of the AIIB's ESF and the relevant WBG EHS Guidelines. Specific measures will be included to assess and manage risks to workers and communities, including those related to waterborne diseases, infectious and non-communicable diseases (e.g., pandemics). The Project will adopt proactive protocols for hygiene, social

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
	analysis (ANDALALIN) requirements for projects that have the potential to disrupt the security, safety, order, and flow of road traffic		distancing (as relevant), community awareness, and infection prevention, especially during public health emergencies.
Occupational Health and Safety. In addition to the general provisions above, implement the following measures designed to provide safe and healthy working conditions to Project workers:	- Law Number 1 of 1970 concerning Occupational Health and Safety (OHS) Management - Regulation of the Ministry of Manpower Number 5 of 2018 concerning Occupational Health and Safety (OHS) Standards for Workers and the Work Environment - Regulation of the General Minister Manpower and Housing No. 10 of 2021 on Guidelines for Construction Safety Management System - Minister of Public Works and Public Housing Instruction No. 02/IN/M/2020 on Protocols to prevent the spread Coronavirus disease 2019 (COVID-19) in Construction Services	The national framework covers substantial OHS requirements, but Project-specific alignment with AIIB ESS1 and applicable GIIP should be demonstrated, including contractor management, incident reporting, emergency preparedness, worker grievance arrangements, and monitoring.	The Project will implement OHS measures in accordance with applicable national regulations and AIIB ESS1, supported by relevant Good International Industry Practice such as the WBG EHS Guidelines where appropriate. Measures will include hazard identification and risk control, induction and refresher training, PPE, health surveillance as relevant, emergency preparedness, incident notification and investigation, and contractor/subcontractor oversight.
The entry of the workforce. Assess and manage the risk of adverse impacts on society that may result from the temporary labour flow caused by The Sitanala Hospital. Where such risks may exist, apply the following principles to be applied by the Client: (a) seek to avoid or minimize labor flows by utilizing local labor whenever possible; and (b) assess and manage labour inflow risks (including the risk of disease transmission or GBV or sexual exploitation and harassment (SEA)) on appropriate	K3 regulations in Indonesia do not include SEA/SH risk prevention.	There is a gap	Prepare and implement a Workforce Management Plan and encourage Contractors to engage local workers for skilled and unskilled work. The risks of GBV, SEA/SH are addressed through a) training of project workers (especially contractor workers) on zero risk and tolerance, b) raising public awareness (especially for a) workers and b) community

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
instruments, depending on risk factors and their level			members in and around the construction site), c) signing of a Code of Conduct by project workers (especially Contractor workers).
Building Security. When The Project includes new buildings and structures accessible to members of the public, consider the additional risks of potential public exposure to operational accidents or natural hazards, including extreme weather events.	- Law No. 28 of 2002 concerning Buildings.	Not	Integrate building design risk assessments for natural hazards and operational accidents into The Sitanala Hospital planning process. Safety measures such as early warning systems, emergency exits, fire prevention systems, and climate-resistant features should be adopted in line with international best practices and AIIB requirements.
Traffic and Road Safety. Identify, evaluate, and monitor traffic and road safety risks for Project workers and affected communities during The Sitanala Hospital Life Cycle, develop measures and plans to address them, and incorporate technically and financially feasible road safety components into The Sitanala Hospital design, where applicable, to prevent and mitigate potential road safety impacts on affected communities	- Law Number 22 of 2009 concerning Road Traffic and Transportation	-	Develop and implement Traffic Impact Analysis as part of The Sitanala Hospital
Security personnel. When a Project worker is assigned to provide security to protect Client's personnel and property (Project security worker), assess the risks posed by these security arrangements to people inside and outside The Sitanala Hospital site.	No requirements in national regulations	There is a gap	Establish clear protocols for the selection, training, and supervision of security personnel
Labor and Working Conditions			
Labor Management Relations. Provide a good labor management relations system for Project	- Law Number 11 of 2020 concerning Manpower		The Project will establish and implement labor management procedures consistent

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
workers, which includes the following, consistent with relevant national legislation	- Law on Creation Number 13 of 2003 concerning Workforce - Law Number 20 of 2023 concerning State Civil Affairs Apparatus		with AIIB ESS1 requirements on labor and working conditions. These procedures will define employment terms, non-discrimination and equal opportunity, prohibition of child and forced labor, OHS requirements, contractor obligations, and an accessible worker grievance mechanism.
Civil Servants. If government civil servants are employed in connection with The Sitanala Hospital (either full-time or part-time) and they remain subject to the terms and conditions of existing public sector employment agreements and relevant national laws applicable to civil servants,	Government civil servants remain subject to applicable public-sector employment terms and national civil-service legislation.	AIIB ESS1 provides a specific treatment for government civil servants who remain subject to existing public-sector employment terms and applicable national law; the Project should avoid incorrectly applying private-sector labor-management provisions to replace those statutory arrangements.	Where civil servants work in connection with the Project and remain under existing public-sector employment terms, statutory civil-service arrangements continue to apply. Project-specific OHS, safeguarding, incident reporting and grievance channels may be offered as supplementary measures, and Project roles/responsibilities should be clearly documented.
Child Labor and Forced Labor Child Labor. To protect children from harm to their health, safety, and morale, take all necessary measures to prevent children under the age of 18 from being employed to work under The Sitanala Hospital. Forced labor. Take all necessary measures in connection with The Sitanala Hospital so that no work or services not performed voluntarily are demanded of a person under threat of violence or punishment	- Law Number 13 of 2003 concerning Manpower as amended by Law Number 11 of 2020 concerning Omnibus Law and Law - Number 21 of 2007 concerning the Eradication of Human Trafficking has regulated the prohibition of the use of child labor and forced labor	Employers are generally prohibited from hiring children under the age of 18. However, a child between the ages of 13 and 15 can do light work, as long as the work does not interfere with him physically, mentally, or socially welfare and development.	As this project is related to construction activities that pose fundamental risks related to health and safety in the workplace, persons under the age of 18 will not be involved in the execution of any project work
ESS 2: Land Acquisition and Involuntary Resettlement			
Loss of access to assets or resources or land use restrictions. If adverse environmental, social or economic impacts of Project activities involve loss	- Law Number 2 of 2012 concerning Land Acquisition for Development in Public	While existing regulations such as Law No. 2/2012 and related amendments provide a framework for land acquisition	Improve screening processes to identify direct and indirect project impacts on land

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
of access to assets or resources or land use restrictions, identification of impacts to be avoided, or when avoidance is not feasible, at least minimized, reduced, or compensated, through environmental and social assessments	Interest as amended by Law No. 6 of 2023 the amendment of the Job Creation Law - Government Regulation No. 39 of 2023 on Government Amendments - Regulation No. 19 of 2021 concerning Implementation of Land Acquisition for Development in the Public Interest - Government Regulation No. 2 of 2015 concerning the Handling of Social Conflicts - Regulation of the Minister of ATR/BPN (MAA) No. 19/2021 concerning Technical Implementation of Land Acquisition for Development for the Public Interest - Presidential Regulation Number 62 of 2018 on Social Impact Handling in the Land Acquisition Process - Law No. 78 of 2023 Presidential Decree concerning eligibility for compensation of land ownership	and social impact management, the emphasis is limited to identifying, avoiding, or minimizing partial or temporary restrictions on land use or access to resources, especially for informal users or vulnerable groups. Compensation will be provided to eligible people under Presidential Regulation No. 78/2023, which requires at least 10 years of continuous land use, done in good faith and recognized by the landowner or local village head. This will be treated as a living document and Action Plan in ARAP report.	access and resource use, including those affecting informal users. Prioritize avoidance and minimization of impacts through initial project design and stakeholder engagement. Provide clear guidelines and mechanisms for grant support and/or livelihood restoration for all affected parties, not just legal landowners. Ensure an inclusive consultation process with those affected by land-use restrictions, especially vulnerable and marginalized groups. Monitor and evaluate the effectiveness of mitigation measures, with corrective actions taken as needed.
Grievance Compensation Mechanism Appropriate Project-level GRM to receive and facilitate the resolution of concerns and complaints of people who believe they have been affected by the environmental or social impact of The Sitanala Hospital, and to inform affected people of the availability of The Sitanala Hospital	Employment-related complaints are managed through unions or through mechanisms described in individual workers' contracts. Such mechanisms often do not allow anonymity and are likely inaccessible to contractors, subcontractor workers, part-time workers, and other vulnerable workers	National requirements for GRMs for employment-related issues have not ensured there are various channels through which workers can lodge their grievances conveniently and in a timely manner	Appropriate Project-level GRM to receive and facilitate the resolution of concerns and complaints of people who believe they have been adversely affected.
Stakeholders engagement and Information Disclosure	- Law Number 14 of 2008 concerning Public Information Disclosure	The Public Information Disclosure Law Number 14 of 2008 also requires government agencies to provide	The Project will develop and implement a Stakeholder Engagement Plan (SEP) in line with AIIB requirements. The plan will outline

ESS AIIB	Indonesian Laws and Regulations	Gaps	Proposed Measures to Reduce the Policy Gap
	- Government Regulation Number 22 of 2021 concerning Environmental Protection and Management	information needed by the public, including planned activities, budgets and expenditures, and other data relevant to public understanding. Previous practice in the sector includes information disclosure and engagement processes, including managing the impact of access restrictions Public participation in the AMDAL process has been significantly reduced under the Job Creation Act, limiting public engagement.	strategies for meaningful consultations with affected communities and stakeholders throughout The Sitanala Hospital cycle, including mechanisms to disclose relevant project information in a timely and easily accessible manner. Particular attention will be paid to ensuring inclusive engagement, especially where national regulations limit participation, such as in the EIA process. The Sitanala Hospital will also establish a feedback mechanism and grievance redress to manage community issues and ensure accountability.

4 ENVIRONMENTAL BASELINE

4.1 Geographic and Administrative Context

The Project is located in the western part of the Jabodetabek metropolitan agglomeration at Jl. Dr. Sitanala No. 99, Karang Sari Village, Neglasari District, Tangerang City, Province of Banten, postcode 15121. Tangerang City covers thirteen kecamatan with a generally low-lying topography ; Neglasari District sits at approximately 10–20 masl, four kilometres from the City centre, near Soekarno-Hatta International Airport. The administrative hierarchy and neighbouring land uses surrounding the compound are summarised in Table 16.

Table 16 The administrative hierarchy and neighbouring land uses surrounding the compound

Aspect	Description
Province	Banten
City / Regency	Tangerang City
Sub-district (Kecamatan)	Neglasari
Urban village (Kelurahan)	Karang Sari (and adjacent Selapajang Jaya, Kedaung Wetan)
Address	Jl. Dr. Sitanala No. 99, Tangerang, Banten 15121
Site coordinates	Longitude : 106° 38' 10.879" E Latitude : 06° 09' 44.891" S
Land area	142,000 m²
Existing built footprint	31,025 m²
Northern boundary	Sports facility and residential settlement
Western boundary	Jalan Dr. Sitanala (collector road)
Eastern boundary	Jalan Pembangunan VI (local road)
Southern boundary	Residential settlement
Distance to Soekarno-Hatta International Airport	Approximately 2.5 km - within metropolitan-airport buffer zone
Distance to City centre (Kantor WaliTangerang City)	Approximately 1 km

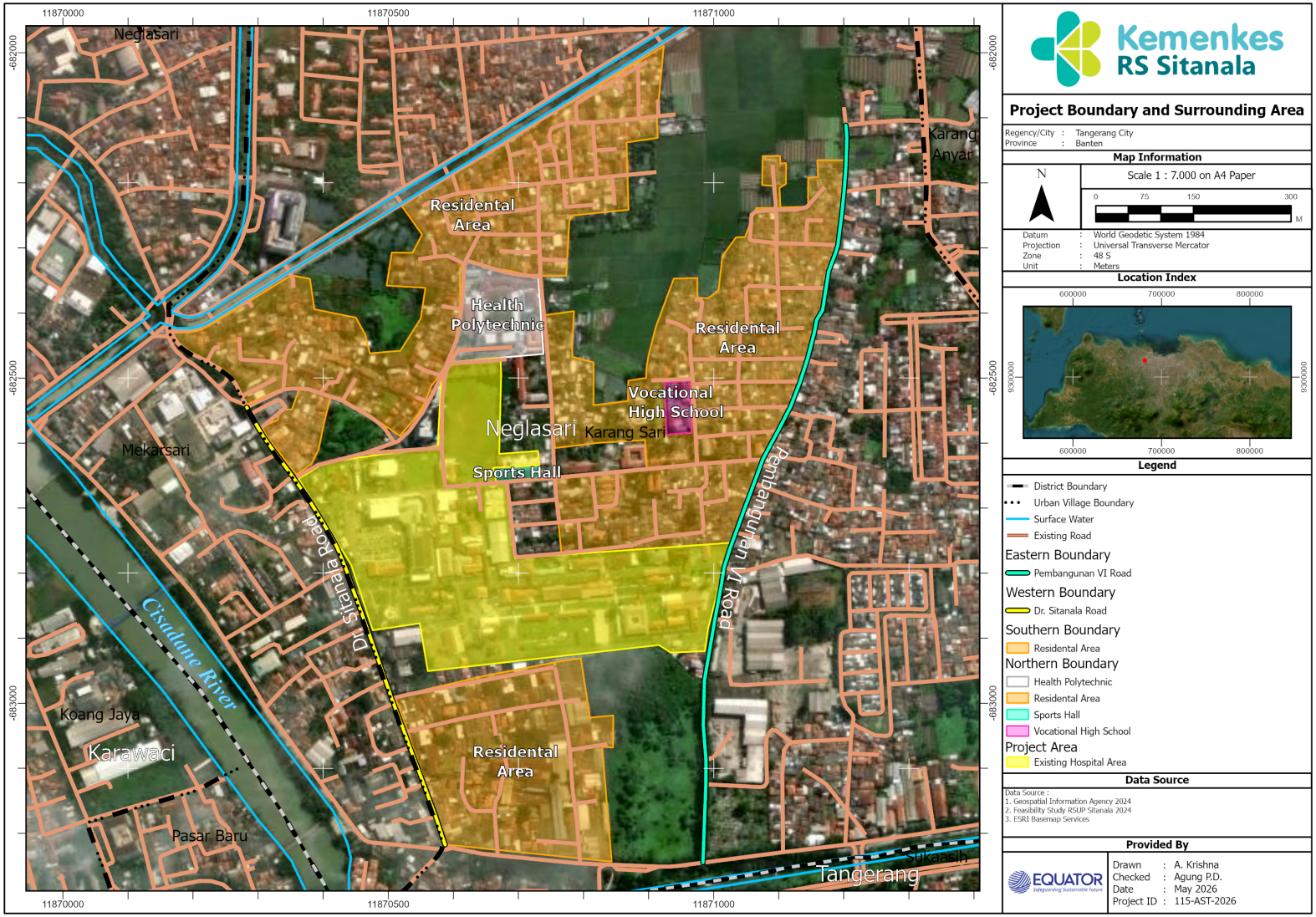


Figure 15 Project Boundary with Surrounding Area

4.2 Topography and Geology

In terms of topographic characteristic, the Karang Sari area is located at an elevation of approximately 10-20 meters above sea level (masl). According to R.A. van Zuidam (Aerial Photo-Interpretation in Terrain Analysis and Geomorphologic Mapping, 1985) the Tangerang area is generally categorized within the lowland/plain elevation range (0-50 m). Therefore, the elevation classification used in this assessment has been simplified into low-relief classes suitable for urban village-scale analysis. The elevation within the assessment area generally consists of the following classes:

Table 17 Elevation Classification

Elevation Range	Elevation Class
0-5 m	Very Lowland
>5-10 m	Lowland
>10-20 m	Slightly Elevated Lowland
>20-35 m	Moderately Elevated Area
>35 m	Relatively High Area

The Sitanala Hospital area is predominantly located within the 10-20 m elevation range, indicating that the area generally represents a slightly elevated lowland urban setting with relatively low relief. Considering the relatively low elevation and the dominance of built-up surfaces, certain parts of the area may exhibit sensitivity to localized inundation and surface runoff accumulation during periods of high rainfall.

In terms of slope characteristics, the Karang Sari area generally has slope gradients ranging from approximately 2-8%. In general, the slope classification within the assessment area consists of:

Table 18 Slope Classification

Slope Range	Slope Class
0-2%	Very Flat
2-8%	Flat
8-15%	Gently Sloping

Accordingly, The Sitanala Hospital area can be categorised as having flat to gently sloping terrain with relatively low relief. These conditions are generally favourable for hospital and urban infrastructure development due to relatively low landslide susceptibility and good site accessibility. Nevertheless, considering that the area is located within a lowland urban setting dominated by built-up surfaces, the existing topographic conditions may increase sensitivity to surface runoff and localized inundation during periods of high rainfall.These topographic conditions are closely related to the regional geological and geomorphological setting of the Tangerang area. Based on the Geological and Development Centre (GRDC. 1992), The Sitanala Hospital area is primarily situated within Quaternary alluvial deposits (Qa), which dominate the northern part of the assessment area and represent relatively young unconsolidated typical of lowland alluvial plains. The surrounding geological

formations also include Banten Tuff deposits (QTvb), alluvial fan deposits, and localized beach-ridge deposits distributed across wider Tangerang region.

The alluvial deposits generally consist of clay, silt, sand, gravel, and other unconsolidated fine-grained materials form through fluvial depositional processes, while the Banten Tuff formation is composed of tuff, tuffaceous claystone, and tuffaceous sandstone. The Sitanala Hospital site itself, located at an elevation of approximately 10-20 meter above sea level (masl), is located within the relatively gentle alluvial plain characteristic of the north-western Banten lowland area. These geological conditions generally indicate relatively low relief terrain suitable for urban and infrastructure development. Although the unconsolidated alluvial materials may contribute to higher sensitivity toward surface runoff accumulation and localized inundation during periods of intense rainfall.

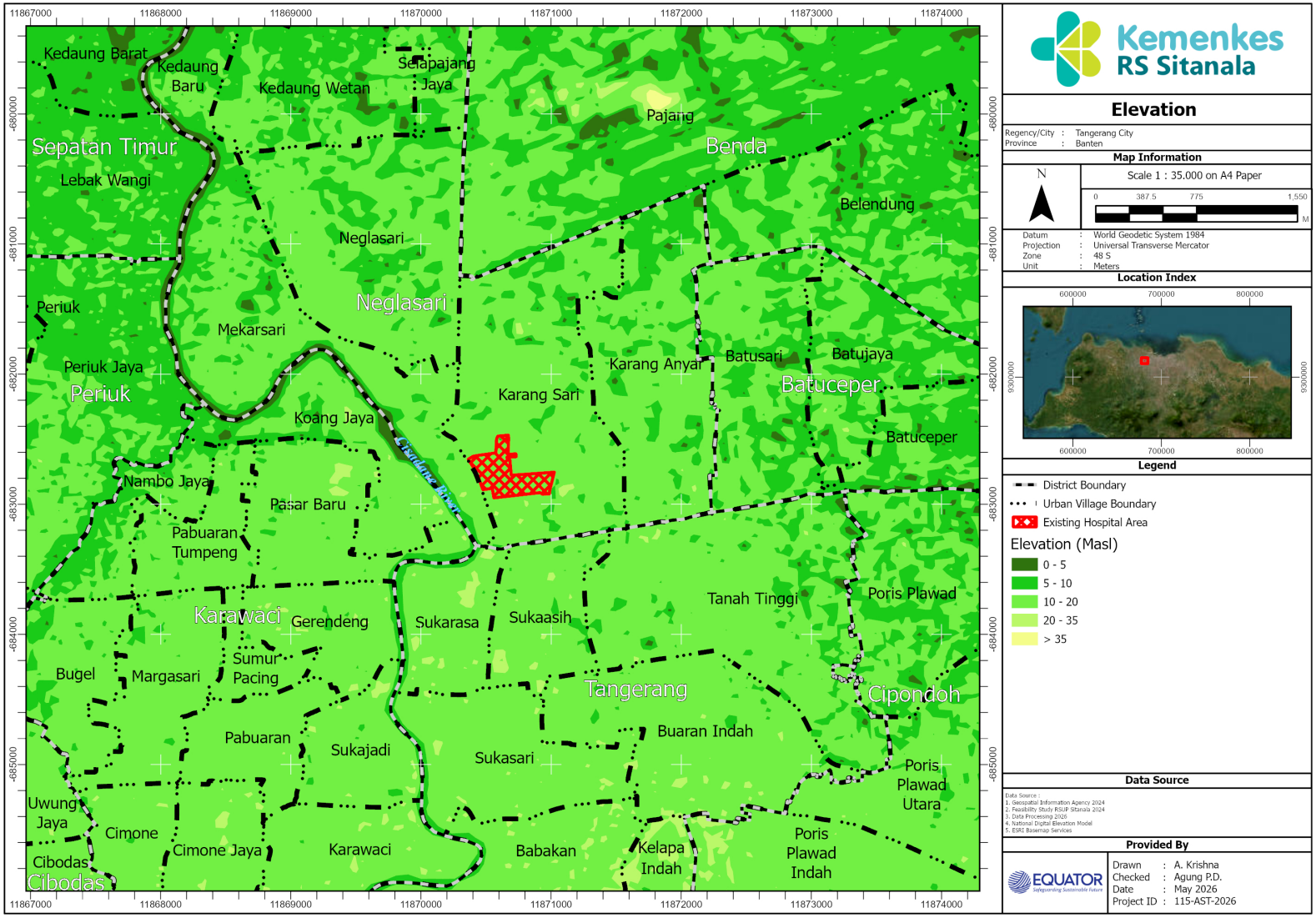


Figure 16 Overlay map of project location and elevation

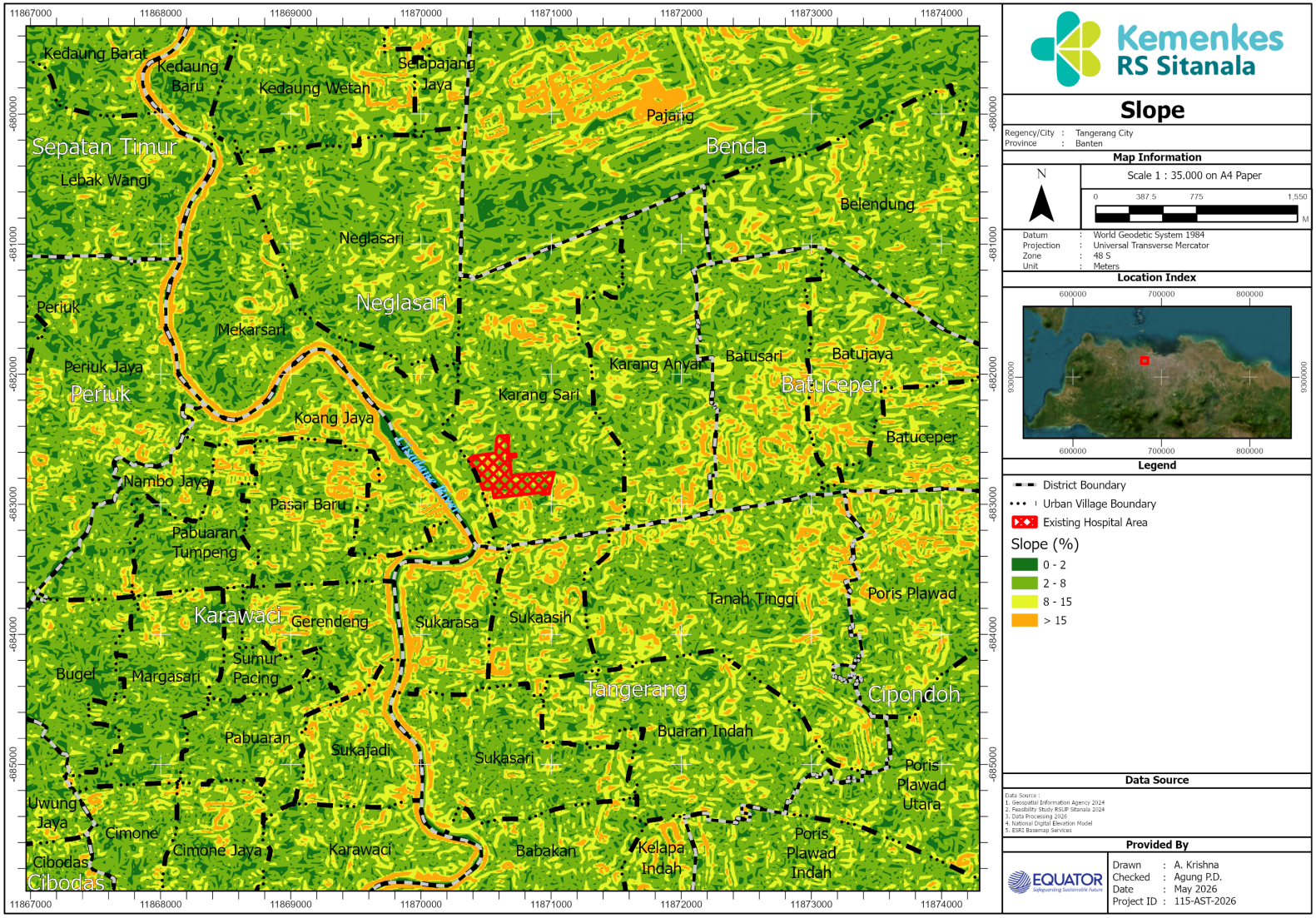


Figure 17 Overlay map of project location and slope



Figure 18 Overlay map of project location and Geological

4.3 Climate and Meteorology

Tangerang City experiences a tropical climate (Köppen Am classification - tropical monsoon) with distinct wet and dry seasons. The principal climate parameters drawn from BMKG Stasiun Meteorologi Kelas I Soekarno-Hatta and BMKG Stasiun Tangerang are summarised in Table 19.

Table 19 The principal climate parameters drawn from BMKG Stasiun Meteorologi Kelas I Soekarno-Hatta and BMKG Stasiun Tangerang

Parameter	Value / Range
Climate classification	Tropical monsoon - Köppen Am
Mean annual rainfall (long-term reference)	Approximately 1,800 – 2,200 mm/year
Wet season	November – April; peak January–February (typically > 300 mm/month)
Dry season	May – October; August historically driest
Mean monthly temperature	26 °C – 29 °C
Relative humidity (annual mean)	Approximately 75 – 85 %
Prevailing wind	Easterly to south-easterly (dry season); westerly to north-westerly (wet season)
Mean wind speed	Approximately 1.5 – 3.5 m/s
Tropical-cyclone exposure	Limited direct exposure; secondary monsoon effects in transition months

4.3.1 Rainfall Intensity Analysis

Based on the Master Document (DELH 2019) and daily rainfall records from the BMKG Soekarno-Hatta Meteorological Station, the 25-year design rainfall adopted for The Sitanala Hospital site is 223.47 mm/day. This value was derived from frequency analysis of historical extreme-rainfall data and is used as the basis for site drainage capacity and flood-contribution volume calculations.

4.3.2 Climate Change Projections

According to BMKG data, 2024 was the warmest year on record over the 1981–2024 observation period in Indonesia, with a mean air-temperature anomaly of +0.8 °C above the 1991–2020 normal (national average 26.7 °C; 2024 actual: 27.5 °C). Climate change projections for the Tangerang region under RCP 4.5 and RCP 8.5 scenarios (IPCC AR6 / BMKG statistical downscaling) indicate the following:

117. Mean temperature increase: +0.5 °C to +1.2 °C by 2040 (relative to the 1991–2020 baseline), with implications for building cooling loads that must be factored into the HVAC design of the new facilities.

118. Rainfall pattern shifts: daily extreme rainfall intensity is projected to increase by 5–15% by 2040 even though total annual rainfall remains relatively stable, necessitating a minimum 10% climate-change allowance above baseline IDF design values for site drainage capacity.

119. Increased frequency of La Niña events, associated with prolonged wet seasons and higher flood discharges in the Cisadane River Basin

4.4 Hydrology and Hydrogeology

The site sits within the Cisadane–Angke regional hydrological system. Surface water drainage from Neglasari District flows generally northward toward the Java Sea via tributary canals connected to the Cisadane and Angke main channels. Groundwater extraction within the urbanised Tangerang aquifer is regulated by Surat Izin Penggunaan Air (SIPA), and The Sitanala Hospital draws from on-site shallow and intermediate-aquifer wells under registered SIPA permits. The combined Jabodetabek-region experience of groundwater overdraft and land subsidence reinforces the importance of continuous water-stewardship monitoring at The Sitanala Hospital scale.

Hospital water balance considerations relevant to this assessment include:

120. Source : combination of PDAM Tirta Benteng municipal supply and on-site SIPA-licensed wells; redundancy critical given metropolitan supply continuity considerations.

121. Demand projection : current consumption serving 250 beds; projected demand at 600-bed operational capacity will scale proportionally, requiring SIPA augmentation and a rainwater-harvesting / efficiency strategy.

122. Wastewater discharge : through the existing WWTP under the IPLC permit, with effluent ultimately routed to the municipal stormwater network; capacity expansion is operationalised through the parallel Pertek BMAL deliverable. This WWTP capacity expansion will be financed by the AIIB.

4.4.1. Cisadane Watershed Characteristics

The Sitanala Hospital in Neglasari District is located within the Cisadane Watershed (DAS Cisadane), one of the national-priority watersheds managed by the Ciliwung Cisadane River Basin Agency (BBWS Ciliwung Cisadane). The key characteristics of the Cisadane Watershed are as follows:

123. Watershed area: ±1,375 km² (Ridwansyah et al., 2014; Sudinda, 2020), extending from Kabupaten Bogor (upstream) to Kabupaten Tangerang (downstream). The upper Cisadane sub-watershed covers 835.79 km² with hilly terrain on the slopes of Mount Salak and Mount Pangrango.

124. Main river length: ±138 km, originating at Mount Pangrango and discharging at Tanjung Burung, Kabupaten Tangerang (Java Sea). The river system comprises 85 sub-watersheds (IPB, 2021).

125. Discharge regime (Bendung Pasar Baru gauging data, 2017–2021, IPB 2021): Qmax = 199.4 m³/s; Qmin = 4.9 m³/s; monthly average Q = 59.5 m³/s. Highest recorded flood discharge: 315.4 m³/s (19 January 2022). Reliability analysis at 90% confidence level yields a dependable discharge of 18.2 m³/s.

126. Water resources authority: BBWS Ciliwung Cisadane, operating the SIH3 hydrological telemetry system that monitors water levels and rainfall in real time at observation stations including Bendung Pasar Baru (Lower Cisadane).

4.4.2. Flood Risk

HEC-RAS modelling (IPB, 2023) indicates that the annual flood inundation area in the Lower Cisadane Watershed increases by approximately ±24.41 ha per year. Kecamatan Teluk Naga, Sepatan Timur, Paku Haji, and Neglasari (where The Sitanala Hospital is located) are among the areas with the highest inundation probability, with a total inundation extent of 644.7 ha and depths ranging from 0.40 m to 1.33 m as the return-period discharge increases.

The primary flood-causation factors include river-channel narrowing and downstream sedimentation, land-use change (conversion of rice paddies and gardens to settlements), and increased surface run-off due to urbanisation. Major flood events were recorded in January 2022 (inundating 30 kecamatan) and February 2020 (inundating 11 kelurahan around Bendung Pasar Baru–Jembatan Kedaung).

Implications for The Sitanala Hospital site: Neglasari District lies within the Lower Cisadane flood-affected zone. As a Class A referral hospital, The Sitanala Hospital is a critical lifeline facility whose continuity of medical service must be safeguarded during extreme events.

Field monitoring by The Sitanala Hospital as documented in the UKL-UPL and RKL-RPL Implementation Reports (Semester 1/2023 through Semester 1/2025) records no riverine flooding (luapan Sungai Cisadane) on The Sitanala Hospital grounds during the wet season. However, hospital management and on-site observation confirm that localised surface ponding occurs in parts of the compound during high-intensity rainfall events, receding within a short period once rainfall subsides. This indicates that the existing internal drainage and infiltration capacity is at or near its design limit under current rainfall regimes and will require augmentation before the additional impervious footprint of the IBS, Oncology, and Neurology & Urology buildings is introduced. Existing stormwater controls comprise green open space (Ruang Terbuka Hijau, RTH) totalling 13,883.80 m² - approximately 62% of the current open land area - together with nine (9) infiltration wells each measuring 1 m × 1 m × 4 m depth, in accordance with Ministerial Regulation PU No. 11/2014.

The site's internal drainage system separates wastewater and stormwater conveyance. Covered drainage channels measure 1 m wide by 0.8 m deep, while the main collector drains are 1–1.5 m wide by 0.8–1.2 m deep. Capacity evaluation using the Rational Method indicates that the existing drainage network accommodates runoff from a 25-year return-period storm event under historical rainfall statistics. However, this design basis does not incorporate the +5–15% climate uplift in extreme rainfall projected for the 2040 horizon (Section 4.3.2), nor the additional impervious area introduced by the new buildings.

Runoff contribution volume analysis based on the Master Document (DELH 2019) using 25-year design rainfall (223.47 mm) yields: runoff volume without Hospital activities = 543.74 m³; with Hospital activities = 1,720.16 m³; differential volume = 1,176.42 m³. Applying a +15% climate-change uplift to the design rainfall raises the indicative differential to approximately 1,353 m³, which shall be treated as the minimum on-site retention requirement for The Sitanala Hospital. Compliance with Ministerial Regulation PU No. 11/2014 on Stormwater Management for Buildings and Their Premises shall be demonstrated through a combination of (i) one or more retention ponds with combined live storage ≥

1,400 m³, (ii) additional biopore infiltration holes and recharge wells distributed across the post-construction RTH, and (iii) green-roof or permeable-pavement treatments where structurally feasible.

The new buildings include basement levels (refer to Section 2.2.2 and pending design confirmation), which represent the most flood-vulnerable elements of the development. Basement flood protection shall comprise: (i) entrance ramps and ventilation openings set above the 100-year flood level plus 0.5 m freeboard; (ii) flood gates or demountable barriers at all basement entries; (iii) redundant sump pumps with emergency power backup sized for the design pluvial inflow plus a safety factor of 1.5; (iv) waterproof membranes and tanking to the depth of the groundwater table identified in Section 4.14; and (v) electrical and life-safety equipment for the basement to be located above the protected level wherever practicable. safety. Because The Sitanala Hospital is a referral hospital serving Tangerang City and the wider region, flood disruption to access roads, ambulance routes, electrical supply, medical gases, and the wastewater treatment plant could translate directly into adverse community health outcomes. Tangerang City lies within the Jakarta Groundwater Basin (Cekungan Air Tanah / CAT Jakarta), a multi-layered aquifer system with the following characteristics Shallow aquifer (<40 m): unconfined aquifer within Cisadane alluvial deposits; well yields vary from 1–5 L/s; vulnerable to contamination from surface activities. Intermediate aquifer (40–150 m): confined aquifer within sandstone formations; well yields of 5–10 L/s; water quality is generally better but water levels have experienced drawdown due to over-extraction across the Jabodetabek region. Deep aquifer (>150 m): confined aquifer within limestone formations; extraction is limited and requires a special Governor's permit.

Land subsidence in the Tangerang area has been recorded at 1–5 cm/year (BIG, 2020) due to groundwater overdraft, which exacerbates flood-inundation risk. Tangerang City's SIPA (Water Use Permit) policy limits extraction rates per well and requires the construction of infiltration wells as compensation. Based on existing operational data recorded in the RKL-RPL implementation reports (2023–2025), the hydrogeological conditions and water infrastructure at The Sitanala Hospital site are as follows:

Water Supply Source and Consumption. Average total clean-water consumption is 180.19 m³/day, comprising groundwater (deep well) at 23.14 m³/day and PDAM Tirta Benteng municipal supply at 138.25 m³/day (UKL-UPL Semester 1/2023). Groundwater abstraction accounts for 10–20% of total demand. The deep wells are located in the Gedung Adhiyatma area and staff housing compound, while average community well depth in the surrounding area is 10–15 m (shallow aquifer). Groundwater abstraction is covered by a valid SIPA (Water Use Permit). Clean water is stored in a ground water tank (capacity 192 m³) and roof water tanks before being distributed by gravity to individual building units.

Based on the RKL-RPL evaluation reports, no significant groundwater-level decline has been attributed to hospital activities. Community well depth in the surrounding area ranges from 10–15 m, and groundwater abstraction by The Sitanala Hospital does not affect the community's shallow-well supply. Hospital management has implemented water-conservation measures by transitioning to PDAM as the primary clean-water source.

4.5 Air Quality and Noise

4.5.1 Nosocomial Air Quality

Nosocomial air quality refers to the microbiological quality of indoor air within healthcare facilities, particularly in critical areas such as operating rooms, intensive care units (ICU), isolation rooms, neonatal care units, and inpatient wards. Poor indoor air quality in healthcare facilities may increase the risk of healthcare-associated infections (HAIs) through airborne transmission of bacteria, fungi, and other pathogenic microorganisms. Therefore, maintaining acceptable air quality standards is essential to support infection prevention and control programs, protect patients and healthcare workers, and ensure a safe hospital environment.

The nosocomial air quality baseline provides the basis for evaluating potential impacts of the Project on hospital infection control and patient safety. The data establish existing microbiological air quality conditions within sensitive healthcare environments and allow the assessment of whether construction activities, dust generation, or ventilation disruptions may increase the risk of airborne contamination and healthcare-associated infections. This baseline is therefore critical for identifying sensitive receptors, evaluating impact significance, and developing mitigation measures to maintain hospital operations and infection prevention standards throughout the construction phase.

The evaluation of monitoring results was conducted by comparing the measured bacterial concentrations with the applicable Indonesian environmental health standards, including:

127. Ministry of Health Regulation (Permenkes) No. 02 of 2023 for operating rooms with a standard limit of 35 CFU/m^3; and

128. Ministry of Health Decree (Kepmenkes) No. 1204 of 2004 for inpatient wards, ICU, and isolation rooms with standard limits ranging from 200–500 CFU/m^3 depending on room classification.

4.5.2 Surgery Rooms

The monitoring results for nosocomial air quality in the operating rooms indicate that all bacterial concentration measurements complied with the environmental quality standard of 35 CFU/m^3 in accordance with Ministry of Health Regulation No. 02 of 2023. The measured concentrations ranged from 0–30 CFU/m^3 during the monitoring periods from Semester I 2023 to Semester I 2025. The lowest concentration was recorded at several points in Operating Room 4 during Semester I 2023 (0 CFU/m^3), while the highest concentration was 30 CFU/m^3 recorded in Operating Room 3 and Operating Room 4 during 2024. Overall, the operating rooms demonstrated good air quality performance and effective infection control management. Nosocomial Air Quality in Operating Room (OR) is shown in Figure 19.

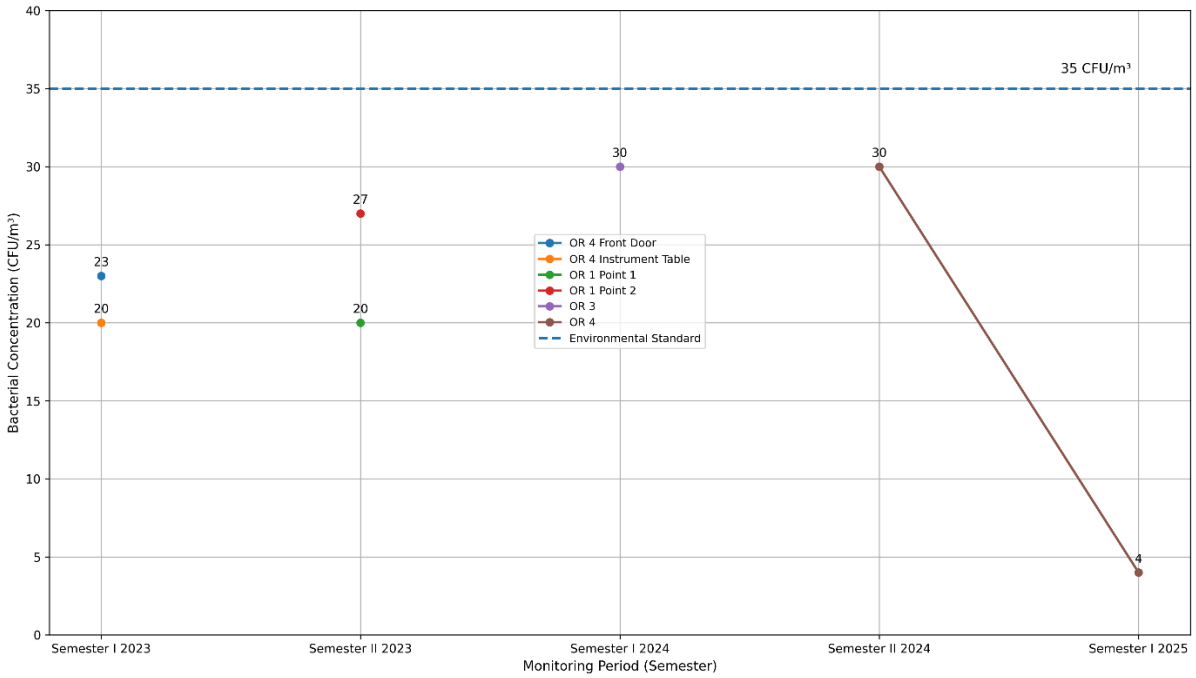


Figure 19 Nosocomial Air Quality in Operating Room (OR)

4.5.3 ICU, Isolation, and Special Treatment Rooms

The air quality monitoring results for ICU, isolation, and special treatment rooms showed that most monitoring locations complied with the environmental standard of 200 CFU/m³ as stipulated in Decree of the Ministry of Health No. 1204 of 2004. However, several rooms exceeded the applicable standard, including Perina Room (233 CFU/m³), Bima 1 Room (213 CFU/m³), and ICU Ventilator Rooms 2 & 3 (553 CFU/m³). The highest concentration recorded in ICU Ventilator Rooms 2 & 3 indicates potential issues related to ventilation performance, room occupancy, or airborne contamination control. Nevertheless, several locations such as NICU, ICU Isolation, and HCU Isolation Room 3509 still showed acceptable air quality conditions. Overall, the air quality in ICU and isolation areas was generally controlled, although several exceedances indicate the need for improved ventilation management and routine environmental sanitation. Nosocomial Air Quality in ICU and Isolation Rooms is shown in Figure 20.

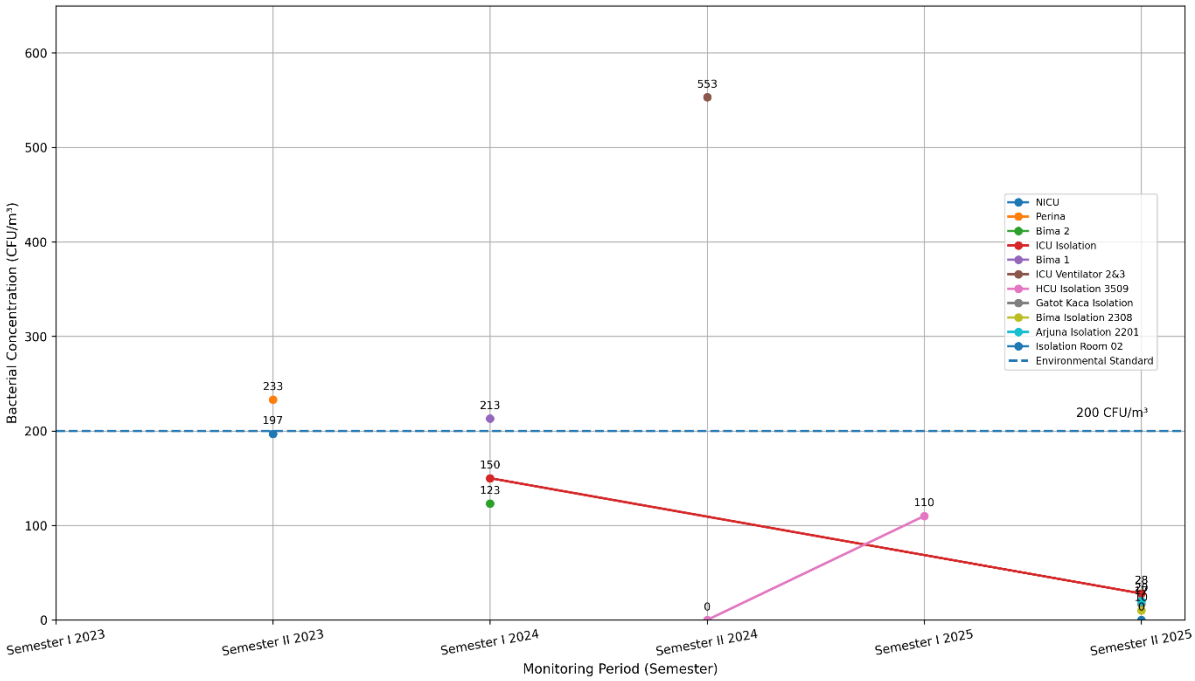


Figure 20 Nosocomial Air Quality in ICU and Isolation Rooms

4.5.4 General Treatment Rooms

The monitoring results for general treatment rooms showed that all measured bacterial concentrations were within the applicable environmental quality standard range of 200–500 CFU/m³ according to Decree of the Ministry of Health No. 1204 of 2004. The measured concentrations ranged from 0–443 CFU/m³ during the monitoring periods. The highest concentration was recorded in Gatot Kaca Room No. 2421 at 443 CFU/m³, which remained below the maximum allowable limit of 500 CFU/m³. Other monitored rooms, including Nakula Isolation Room, Gatot Kaca Room 2406, and Yudhistira Class 3 Male Ward, also complied with the applicable standards. Overall, the air quality conditions in the general treatment rooms were considered acceptable and compliant with the environmental standards. Nosocomial Air Quality in General Treatment Rooms in Figure 21.

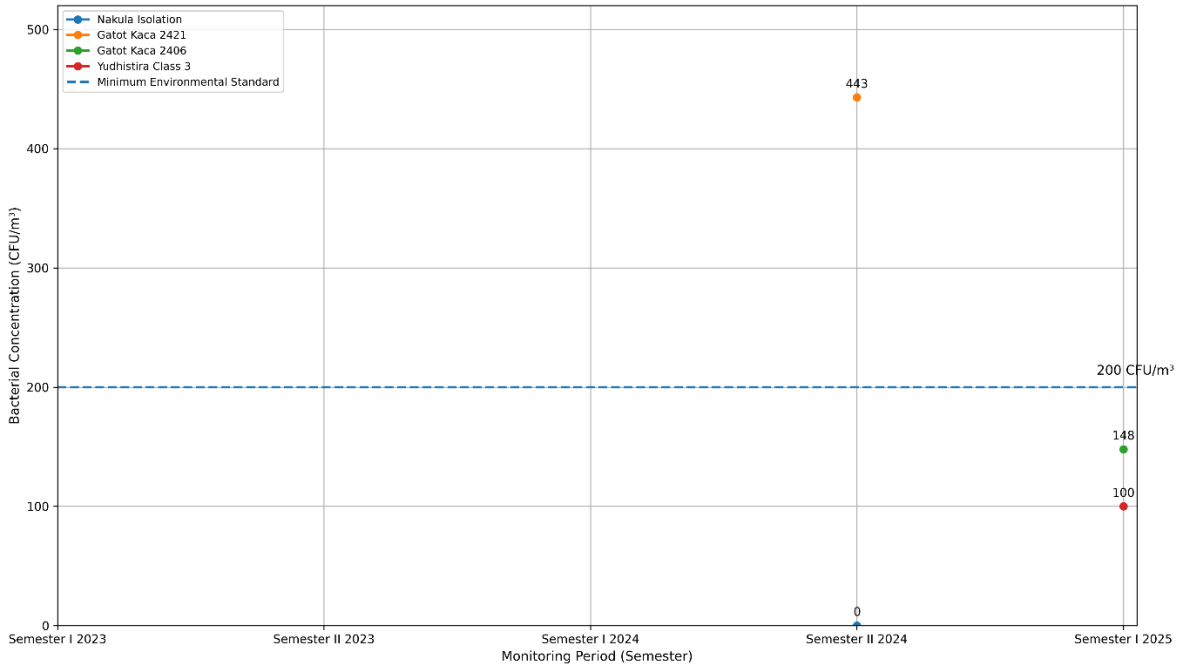


Figure 21 Nosocomial Air Quality in General Treatment Rooms

4.5.5 Ambient Air Quality

In addition to establishing the current concentrations of air pollutants in and around the project area, the ambient air quality baseline serves as a benchmark for evaluating any potential changes related to the project. In order to evaluate incremental air emissions from construction and operation, such as emissions from construction equipment, increased vehicle movements, material handling activities, standby generators, and other operational sources, a robust baseline is an essential component of the Environmental and Social Impact Assessment (ESIA). Additionally, the baseline serves as the foundation for assessing adherence to relevant environmental regulations and assessing the possible impact significance to sensitive receptors, including hospital patients, healthcare personnel, guests, and neighboring residential areas.

The ambient air quality data for the project came from regular environmental monitoring at Dr. Sitanala Central General Hospital during Semester I 2023 and Semester II 2025. In order to offer a thorough data set to describe current air quality conditions, the monitoring program combines many sample periods and representative monitoring stations around the hospital complex. Since the project entails renovating an existing hospital rather than creating a brand-new greenfield location, the available monitoring data are thought to be enough representative to set baseline conditions.

No additional baseline air quality monitoring is thought to be required to support the effect assessment based on the monitoring findings that are already available. The current dataset facilitates the creation of suitable mitigation strategies, offers enough information to evaluate possible project-related consequences, and accurately characterizes temporal fluctuations in ambient air quality. Therefore, it is not anticipated that additional baseline monitoring will significantly affect the results of the air quality impact assessment or the suggested mitigation strategy.

Overall, during the monitoring period, the ambient air quality in the Project area met Government Regulation (PP) No. 22 of 2021's Indonesian National Ambient Air Quality Standards (Figure 20). Sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone (O3), total suspended particulates (TSP), particulate matter (PM10 and PM2.5), and lead (Pb) measurements were all below the relevant national regulatory limits.

The current state of the hospital's surrounding air quality is typically within acceptable national environmental norms, according to monitoring results, and there is no indication of any major local sources of emissions from hospital operations. Instead, the detected pollutant concentrations are a good indicator of the urban environmental conditions that are currently prevalent in the Project area.

When compared to the stricter International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines, some parameters were nearing or exceeding IFC reference values, despite the fact that all measured data fell within Indonesian legislative norms. Rather than emissions from current hospital operations, the majority of these exceedances are caused by background environmental conditions.

The measured SO 2 concentrations varied from roughly 27 to 42 µg/Nm 3 and were consistently higher than the 20 µg/Nm 3 IFC EHS Guideline threshold. The Indonesian ambient air quality standard of 75 µg/Nm³ was still far higher than these amounts, though. The comparatively stable SO_2 concentrations observed during the monitoring period suggest that the measured values are not indicative of hospital-specific emissions but rather of background urban air quality. The local commercial and residential activities, moderate to high traffic volumes, the surrounding road network, and regional emission sources all likely have an impact on the observed SO 2 concentrations. The measured concentrations may also be impacted by local meteorological factors like wind direction, atmospheric stability, and pollution dispersion characteristics. As a result, exceedances of the IFC reference value are not seen as a sign of a dominant source of emissions inside the Project area, but rather as reflective of current baseline circumstances.

In some monitoring events, primarily in Semester I and Semester II of 2025, nitrogen dioxide (NO2) concentrations were near or slightly above the IFC annual recommendation value of 40 µg/Nm³, although they generally complied with the Indonesian requirement. Like SO_2, these concentrations are thought to reflect background urban emissions primarily from surrounding urban activities and vehicle traffic.

For the duration of the monitoring period, the PM_4[1] concentration was consistently below the Indonesian standard and the IFC EHS Guideline, indicating comparatively favorable ambient conditions for coarse particulate matter. However, many of the PM_2.[1] readings exceeded the 25 µg/Nm³ IFC guideline value, especially at the monitoring site close to the hospital complex's front. However, every measured concentration of PM_2.[1] was below the national Indonesian standard of 55 µg/Nm³. Road traffic, regional emissions, and other diffuse urban sources are the typical urban background conditions that cause the high PM2.5 concentrations; hospital operations are not the cause.

During every monitoring period, carbon monoxide (CO) levels were far below both the IFC guideline and the Indonesian regulatory standard, suggesting a very minimal risk of CO exposure inside the Project area. The ambient air in the Project area is subject to very low levels of heavy metal contamination, as evidenced by the lead (Pb) concentrations that remained well below both national and international guideline values throughout all monitoring events.

According to the IFC EHS Guidelines, fine particulate matter (PM2.5), sulfur dioxide (SO2), and, to a lesser extent, nitrogen dioxide (NO2) are the most sensitive air quality parameters that require constant monitoring during the project's execution. However, the observed exceedances are not the consequence of project-related activities and are instead indicative of background environmental conditions.## Environmental Management and Impact Assessment Consequences

A solid foundation for assessing possible incremental consequences related to the suggested redevelopment actions is provided by the baseline results. Therefore, small changes resulting from building activities over the current baseline concentrations should be taken into account in near-term effect assessments. The detected IFC exceedances are often indicative of background conditions, and the current air quality generally satisfies national regulations.

As part of the Environmental and Social Management Plan (ESMP), the project will implement a number of mitigation strategies to reduce possible construction-related effects on air quality. Regular dust suppression, traffic control, appropriate upkeep of construction trucks and equipment, regulation of the handling of construction materials, and correct housekeeping during the construction phase are some of these precautions. Ambient air quality monitoring should be carried out during construction to confirm the efficacy of mitigating measures, identify any unexpected changes in air quality, and show continued adherence to pertinent international recommendations and appropriate national requirements.

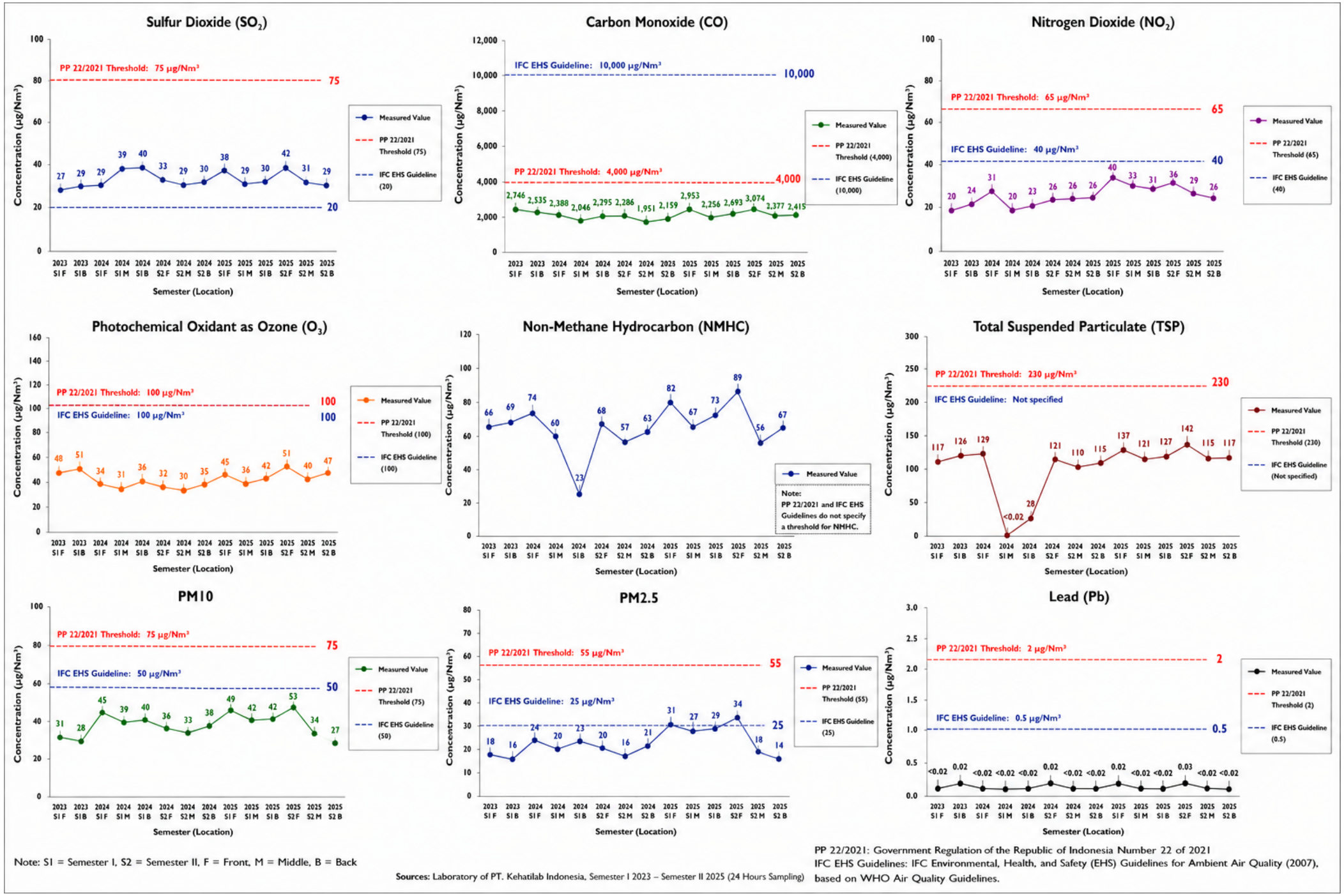


Figure 22 Trendline of Ambient Air Quality Concentration (Semester 1 2023 – Semester 2 2025)

4.5.6 Stationary Source Emissions

The stationary source emissions baseline characterizes emissions from existing hospital facilities, including generators, boilers, and wastewater treatment systems. This information contributes to the impact assessment by establishing current emission levels and identifying existing sources of atmospheric pollutants. The baseline supports the assessment of cumulative impacts associated with the proposed expansion and allows comparison between existing and future operational emission scenarios. It also assists in evaluating the effectiveness of proposed pollution control measures and cleaner technology options.

Electrical generator air emission monitoring is carried out on 2 generators, namely 500 kVA and 1000 kVA generators. Monitoring on the 500 kVA generator is carried out in semester 1-2023, semester 2-2023 and semester 2-2024 (Figure 23). Meanwhile, monitoring on the 1000 kVA generator is carried out in Semester 1-2024 and Semester 1-2025 (Figure 24). The results of generator emission measurements were analyzed based on the Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Emission Standards for Internal Combustion Engines for oil-fueled generators.

500 kVA Generator

Based on the monitoring graphs for the 500 kVA generator (Figure 23), the measured concentrations of Carbon Monoxide (CO) ranged from 462–570 mg/Nm³, consistently exceeding the applicable emission standard of 170 mg/Nm³. This indicates that the combustion efficiency of the generator may not yet be optimal and requires further operational evaluation, including periodic engine tuning and fuel combustion inspection.

Meanwhile, Nitrogen Oxides (NOx) concentrations ranged from 349–464 mg/Nm³, which remained well below the applicable emission standard of 3,400 mg/Nm³ throughout the monitoring periods. The decreasing trend observed in Semester 2 of 2024 indicates improved combustion performance and relatively stable generator operation.

Overall, the monitoring results indicate that NOx emissions from the 500 kVA generator complied with the applicable emission standards, while CO emissions exceeded the regulatory threshold and therefore require corrective maintenance and operational improvement.

1000 kVA Generator

Based on the latest monitoring results for the 1000 kVA generator, the overall emission performance showed significant improvement in Semester II of 2025 compared with previous monitoring periods (Figure 24).

Carbon Monoxide (CO)

CO concentrations decreased substantially from 552 mg/Nm³ in Semester I 2024 and 543 mg/Nm³ in Semester I 2025 to 165 mg/Nm³ in Semester II 2025. This indicates a major improvement in combustion efficiency and generator operation. However, the measured concentration still remained above the applicable emission standard of 77 mg/Nm³, indicating that further optimization and maintenance are still required.

Nitrogen Oxides (NOx)

NOx concentrations showed a significant declining trend from 688 mg/Nm³ in Semester I 2024 to 350 mg/Nm³ in Semester I 2025 and further decreased to 76 mg/Nm³ in Semester II 2025. All monitoring results remained well below the applicable emission standard of 1,850 mg/Nm³, demonstrating stable combustion performance and effective emission control.

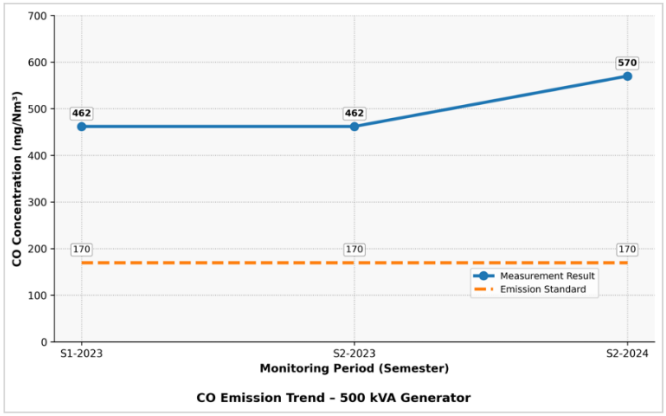
Sulfur Dioxide (SO_2)

SO_2 concentrations remained consistently very low throughout the monitoring periods, decreasing from 61 mg/Nm³ to below detectable levels (<1 mg/Nm³). The results were significantly below the applicable emission standard of 160 mg/Nm³, indicating good fuel quality and minimal sulfur-related emissions.

Total Particulate

Particulate concentrations remained below the applicable emission standard of 95 mg/Nm³ in all monitoring periods. Although particulate concentration increased from <1 mg/Nm³ in Semester I 2024 to 56 mg/Nm³ in Semester I 2025 and 47 mg/Nm³ in Semester II 2025, the values still complied with the regulatory threshold and indicate acceptable particulate emission performance.

The latest monitoring results indicate that the 1000 kVA generator generally demonstrated improving emission performance over time, particularly for NOx and CO emissions. All monitored parameters complied with the applicable emission standards except for CO, which, although significantly reduced in Semester II 2025, still exceeded the regulatory threshold. Continued preventive maintenance, periodic tuning, and combustion optimization are therefore recommended to further reduce CO emissions and maintain overall generator performance.



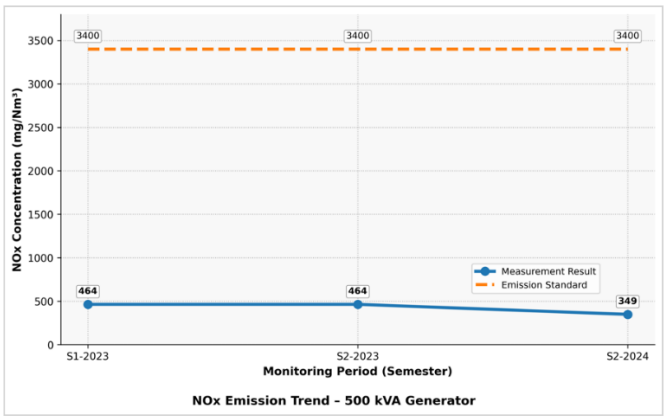
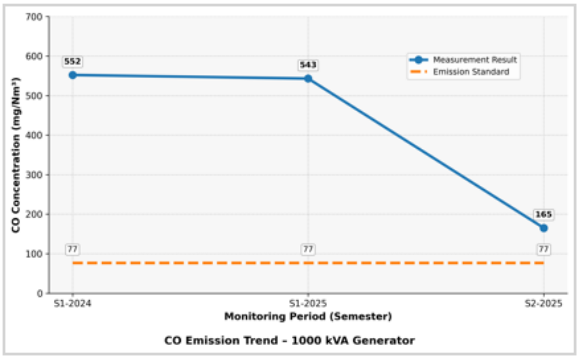
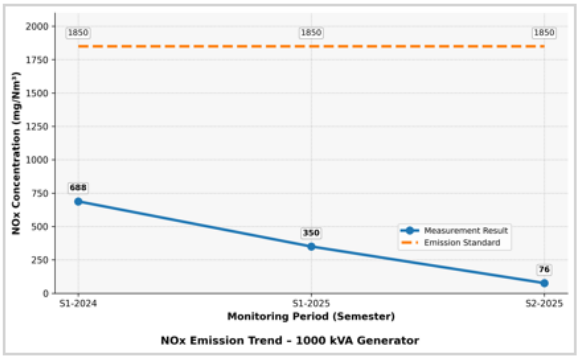
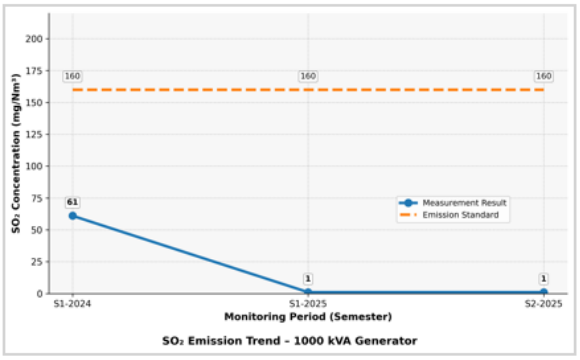


Figure 23 NOx and CO Emission from 500 kVA Generator







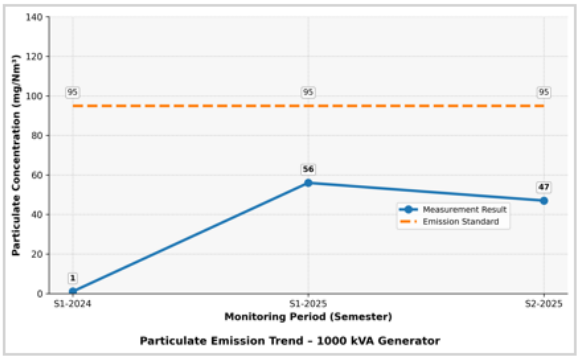


Figure 24 CO, NOx, SO_2, and Particulate Emission from 1000 kVA Generator

4.5.7 Noise

The noise baseline provides a reference for evaluating potential changes in environmental noise levels resulting from project construction and operation. By identifying existing acoustic conditions and sensitive receptors such as patients, healthcare staff, nearby residents, schools, and places of worship, the baseline enables the assessment of impact magnitude and significance. The data are used to predict construction and operational noise impacts, determine compliance with applicable standards, and develop mitigation measures to minimize disturbance to hospital activities and surrounding communities.

The noise level around Dr. Sitanala Hospital uses primary data from direct measurements in the field. Noise measurements were carried out on weekdays and weekends. Noise level measurements were carried out at 4 (four) points, namely the mobilization road at coordinates 6°9'44.96" S, 106°38'1.66" E; IBS Building Area at coordinates 6°9'42.35" S, 106°38'5.47" E; Oncology Building Area at 6°9'47.52" S, 106°38'6.31" E; and Karang Sari Area at coordinates 6°9'44.09" S, 106°38'12.70" E. The results of the noise measurements are presented in the table below.

Table 16 Noise Level Around Dr. Sitanala Hospital

Measurement Time	Sampling Point	Noise Level Analysis Results			Noise Level Standard
		Daytime Noise (Ls)	Night Noise (Lm)	Day-Night Noise (Lsm)	
Weekend	KB-1 (Mobilization Road)	67,5	53,6	**66,0**	55*
	KB-2 (IBS Building Area)	46,4	43,5	**47,2**	55**
	KB-3 (Oncology Building Area)	46,7	43,2	**47,3**	55**
	KB-4 (Karang Sari Area)	45,6	41,5	**45,9**	55*
Weekday	KB-5 (Mobilization Road)	69,8	55,6	**68,3**	55*
	KB-6 (IBS Building Area)	47,7	44,5	**48,4**	55**
	KB-7 (Oncology Building Area)	47,2	44,3	**48,0**	55**
	KB-8 (Karang Sari Area)	46,8	42,7	**47,2**	55*

Source: Primary Data (2026)
Noise Level Standards of the Minister of Environment Decree No. 48 of 1996 (*residential areas 55 dB(A) and **hospitals 55 dB(A))

The measurement results show that the day-night noise level (Lsm) ranges from 45.9–68.3 dB(A). In general, the noise level on weekdays is higher than on weekends, especially at the Mobilization Road point (KB-1 and KB-5), which is influenced by the high traffic activity of operational vehicles and public transportation on weekdays. The highest noise value was recorded at KB-5 on weekdays at 68.3 dB(A).

Meanwhile, the noise level at the IBS Building, Oncology Building, and Karang Sari area ranges from 45.9–48.4 dB(A) both on weekdays and weekends, so it is still below the quality standard of 55 dB(A) according to the Decree of the Minister of Environment Number 48 of 1996. In general, the noise conditions in the main impact recipient area still meet environmental quality standards.

4.5.8 Indoor Air and Ventilation

The indoor air and ventilation baseline establishes existing environmental conditions within hospital buildings and provides essential information for assessing impacts on patient comfort, occupational health, and infection control. The baseline contributes to the impact assessment by identifying existing ventilation performance and indoor environmental quality conditions that may be affected by construction activities or building modifications. The data support the evaluation of potential risks associated with dust intrusion, ventilation disruption, and indoor contaminant accumulation, and assist in defining design and operational controls for new facilities.

Aspect *indoor air and ventilation* Hospital building construction encompasses all areas and stages of activity that could potentially impact indoor air quality and the building's ventilation system. This scope encompasses the pre-construction, construction, and operational stages of The Sitanala Hospital, including construction of the main building, treatment rooms, emergency rooms, operating rooms, laboratories, isolation rooms, pharmacy areas, mechanical and electrical utilities, and air conditioning and mechanical ventilation systems. According to Minister of Health Regulation No. 2 of 2023, environmental health quality standards include three parameters: physical parameters: temperature, lighting, humidity, ventilation rate, noise, PM_{10}, and $PM_{2.5}$; chemical parameters: Sulfur dioxide (SO_2), Nitrogen dioxide (NO_2) ; biological parameters: number of microbes (bacterial count) in the air).

Based on this, in the Tangerang hospital development activity plan to describe indoor air quality and ventilation conditions, secondary data will be used, namely the Environmental Management and Monitoring Plan Implementation Report (SM I 2021 – SM I 2025).

Indoor Air Quality

Based on the results of indoor air chemical quality monitoring in the Anatomy Laboratory, Pharmacy B3 Warehouse, and Laundry Room areas in Semester I and II of 2023, all parameters are still below the quality standards according to the Minister of Health Regulation No. 2 of 2023. The parameters measured include T.VOS, CO_2, PM_{10}, $PM_{2.5}$, lead (Pb), SO_2, CO, NO_2, and formaldehyde.

The concentrations of all parameters indicate that indoor air conditions remain good and safe for hospital workers and visitors. Particulate matter, pollutant gases, and volatile chemical compounds remain well below established thresholds, indicating that the ventilation system, room cleanliness, and chemical management are functioning properly.

Indoor Air Quality

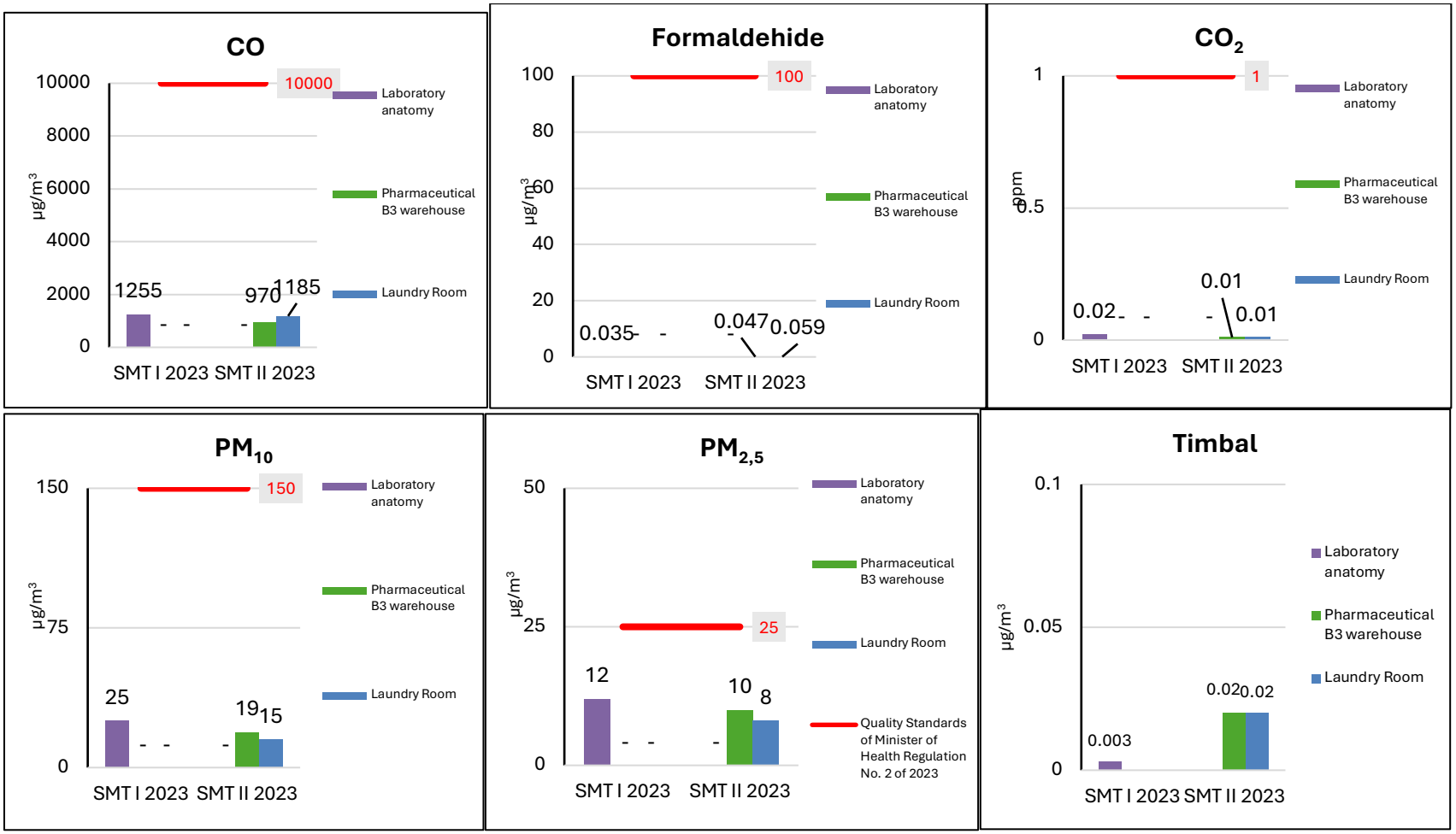


Figure 25 Indoor Air Quality in the Laboratory Anatomy, Pharmaceutical B3 Warehouse, and Laundry Room

Number of Microbes in the Air

As explained in Sub-Chapter 4.5.1 regarding *Nosocomial Air Quality* Microbiological air quality monitoring in operating rooms, ICUs, isolation rooms, and treatment rooms generally indicates that airborne bacterial concentrations still meet applicable standards. However, several rooms exceed these standards, necessitating improvements in ventilation management, environmental sanitation, and infection control to maintain safe hospital air quality and support healthcare services.

Indoor Noise Level

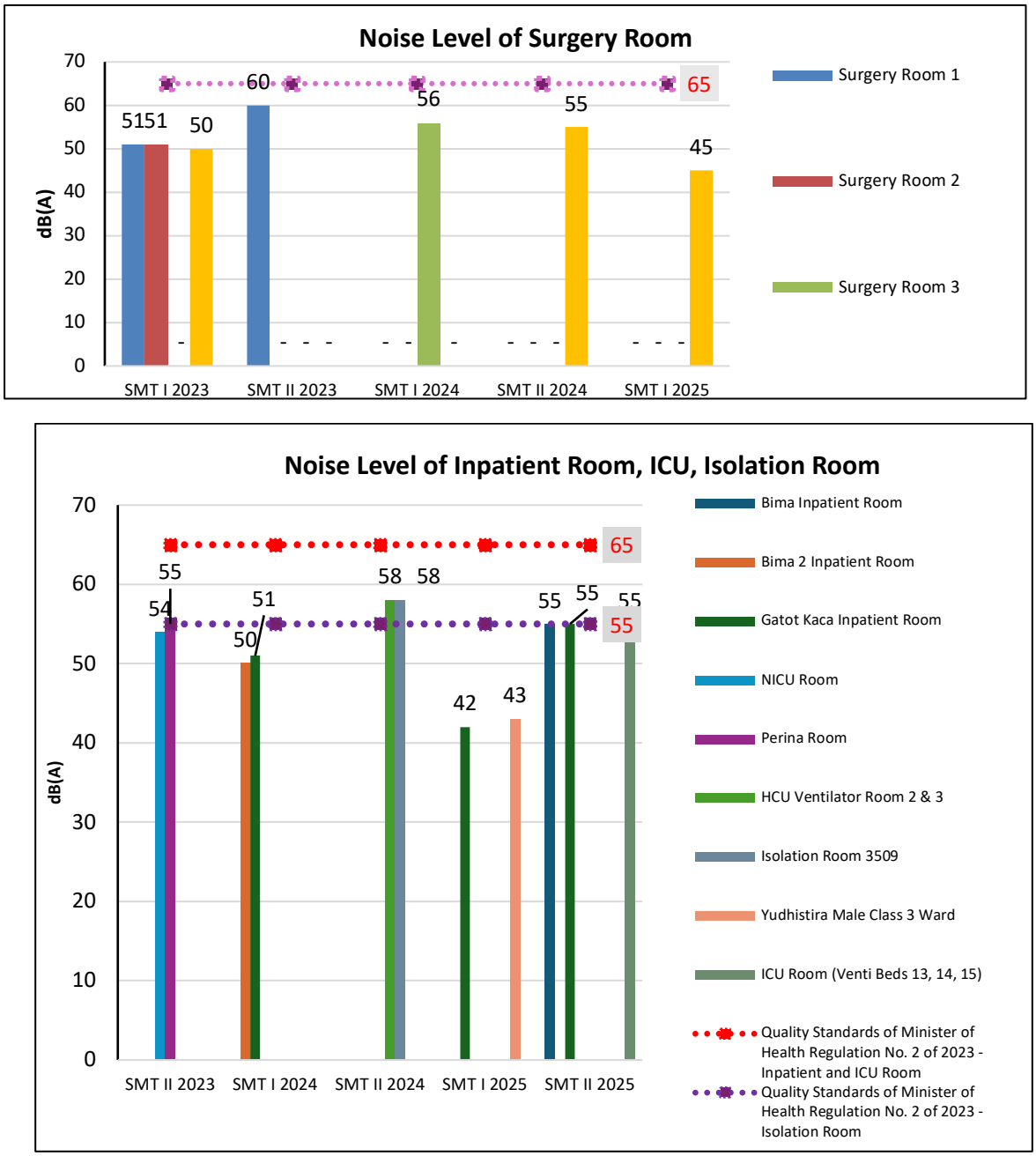


Figure 26 Indoor Noise Monitoring

Based on the results of monitoring noise levels in operating rooms, inpatient rooms, ICUs, and isolation rooms for the period of Semester I 2023 to Semester II 2025, in general the noise levels still meet the

quality standards according to the Minister of Health Regulation No. 2 of 2023. The noise levels in operating rooms range between 45–60 dB(A), while in inpatient rooms, ICUs, and isolation rooms range between 42–58 dB(A).

Most of the measurements were below the quality standard, but the noise level in isolation room 3509 was 58 dB(A), which falls short of the 55 dB(A) standard set by the Minister of Health Regulation No. 2 of 2023 (Isolation Rooms). This is influenced by service activities and the use of medical equipment. Overall, the noise level in The Sitanala Hospital environment is still considered controllable and safe for the comfort of patients and healthcare workers.

Temperature, Relative Humidity, and Lighting

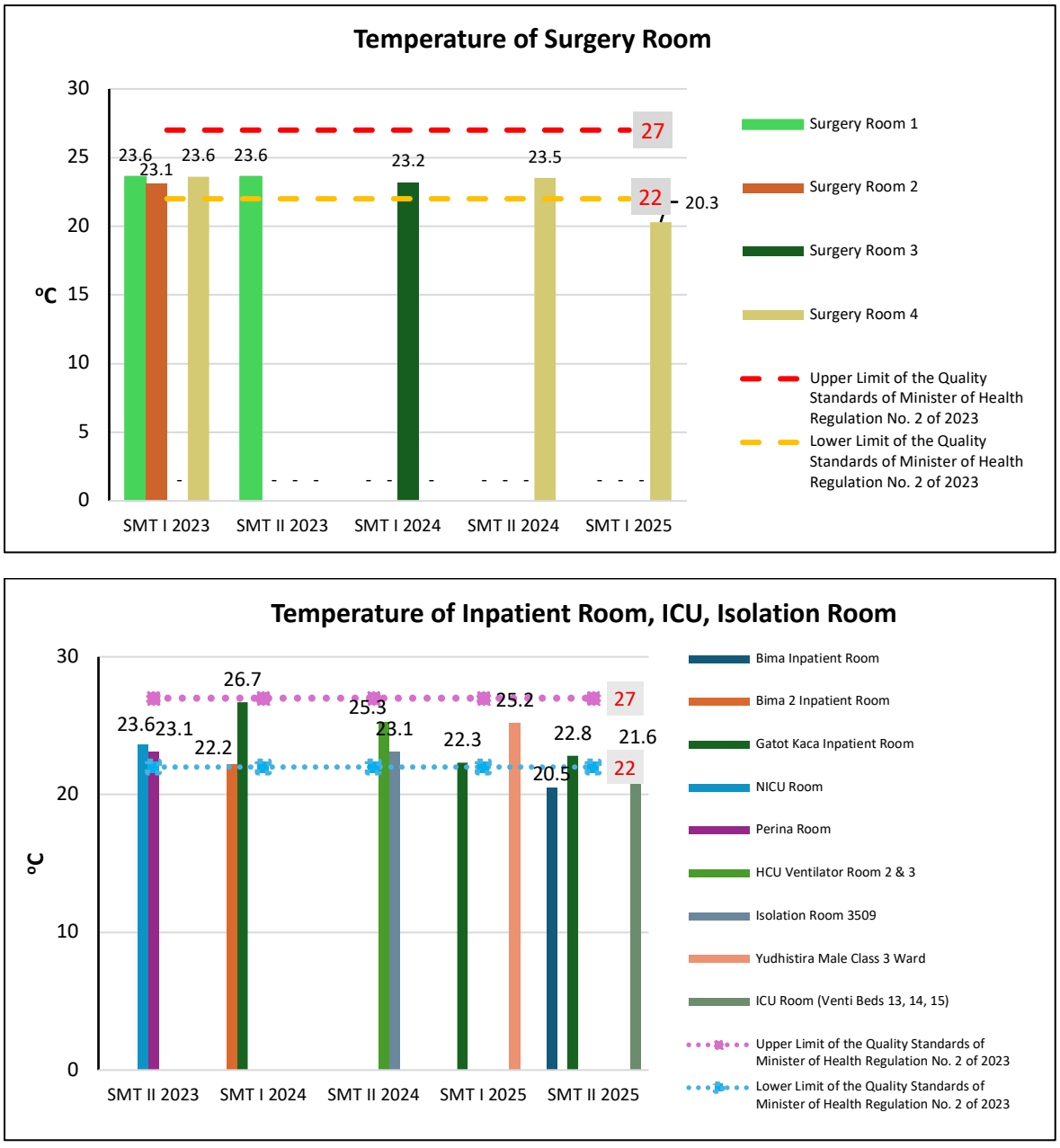
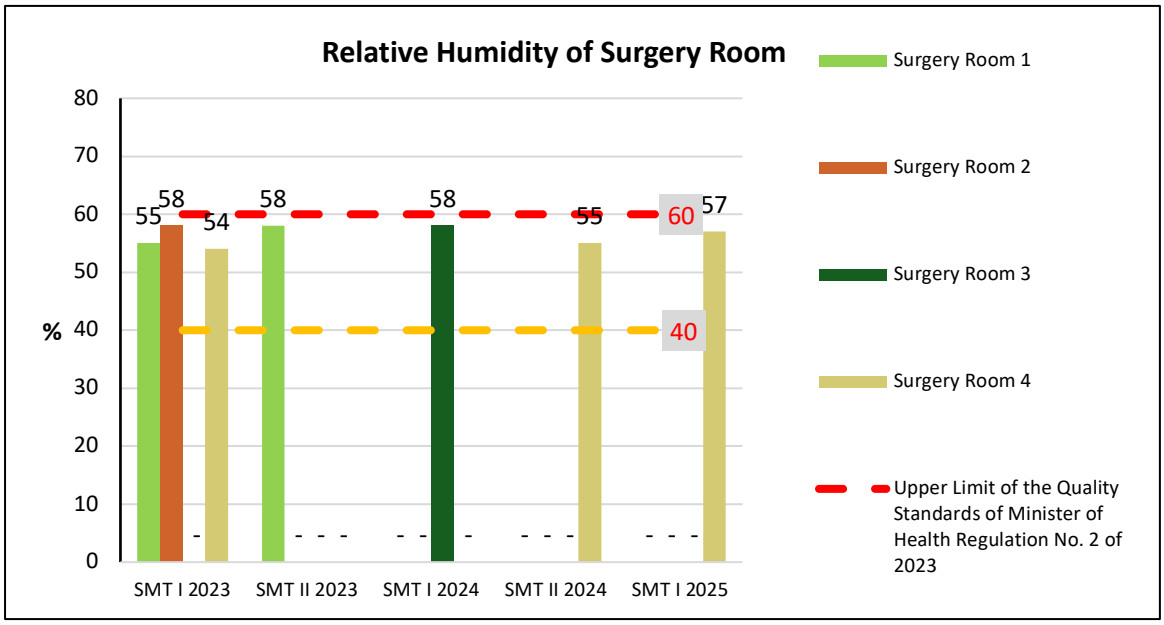


Figure 27 Indoor Temperature

The results above indicate that most service rooms have met the temperature quality standards set by the Minister of Health Regulation No. 2 of 2023. In the operating room, the temperature was recorded at 20.3–23.6°C, thus remaining within the required standard range of 22–27°C. However, in SMT I 2025, there was one measurement result of 20.3°C, which was slightly below the minimum standard limit.

Meanwhile, in inpatient wards, the intensive care unit (ICU), isolation rooms, the neonatal intensive care unit (NICU), and the perinatal unit (Perina), room temperatures generally range from 20.5 to 26.7°C. Most measurements meet the required quality standards. However, some rooms have temperatures approaching or slightly below the standard minimum limit of 22°C, requiring regular regulation and monitoring of the air conditioning system to ensure patient and medical staff comfort.



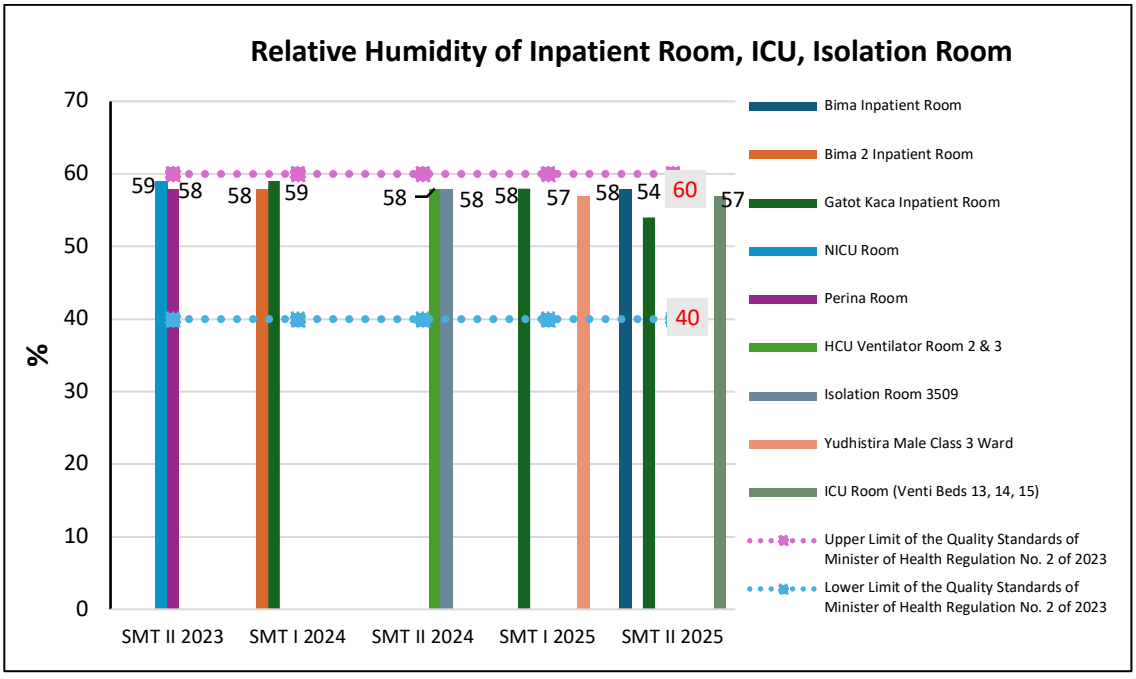
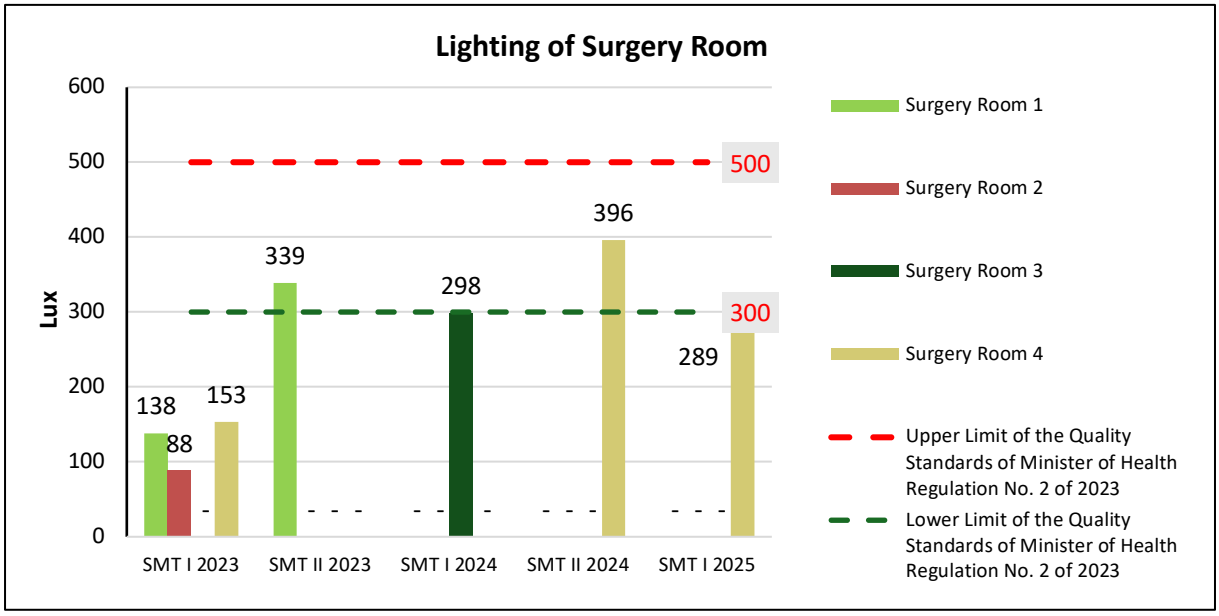


Figure 28 Indoor Relative Humidity

Based on the measurements above, the humidity in all operating rooms is in the range of 54–58%, thus still meeting the quality standards set by Minister of Health Regulation No. 2 of 2023, which is 40–60%. The relatively stable humidity values indicate that the operating room air conditioning and ventilation systems are functioning properly.

Based on measurements in the inpatient wards, ICU, isolation wards, NICU, and Perina, humidity levels were recorded at 54–59%, all within the required standard range. This indicates that indoor air quality is well maintained and supports the comfort of patients and medical personnel during their activities.



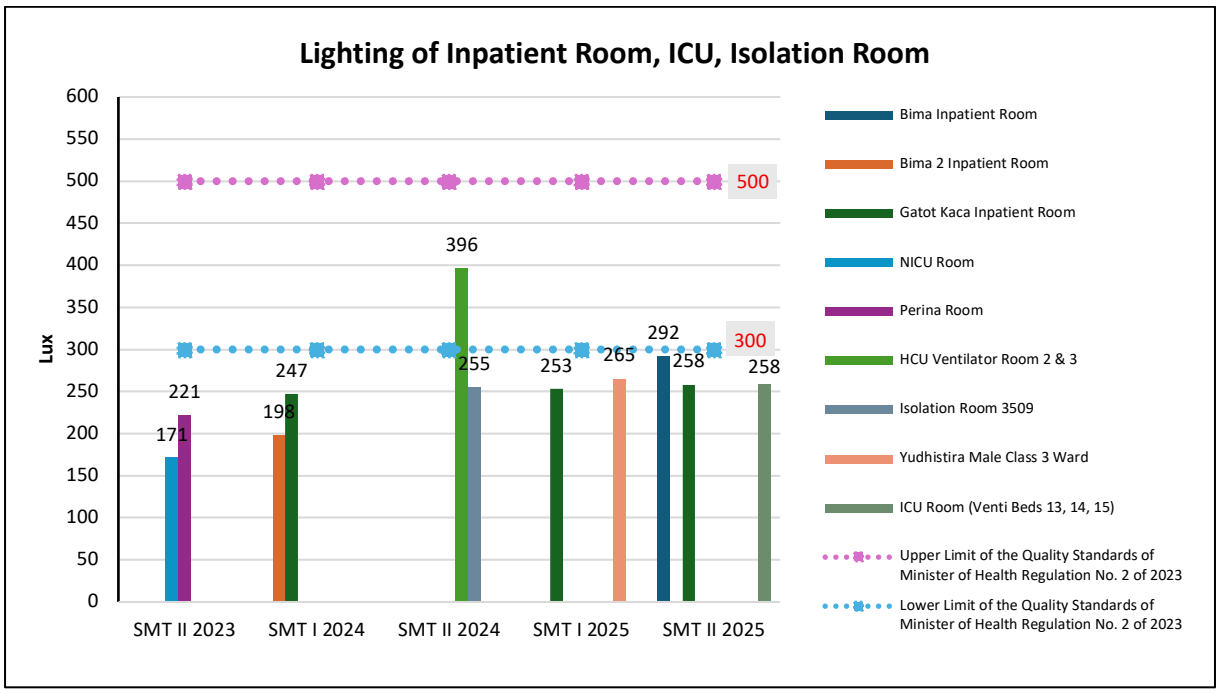


Figure 29 Indoor Lighting

Based on the measurement results above, the lighting levels in the operating rooms showed varying values between 88–396 lux. Most of the measurement results were still below the quality standard set by Minister of Health Regulation No. 2 of 2023, which is 300–500 lux. However, there were several measurement periods that met the standard, such as in SMT II 2023 and SMT II 2024. This condition indicates the need to optimize the lighting system in several operating rooms to ensure that light intensity meets medical service standards.

Based on measurements in the inpatient wards, ICU, isolation wards, NICU, and Perina, lighting levels ranged from 171 to 396 lux. Most measurements fell below the minimum standard of 300 lux, although some rooms met lighting standards. Therefore, maintenance and additional lighting in several rooms are necessary to support comfort and the effectiveness of healthcare services.

4.6 Vibration

The vibration baseline provides a benchmark for evaluating potential vibration impacts generated by excavation, piling, construction equipment, and increased traffic movements. Within a hospital environment, vibration is particularly important due to the presence of sensitive medical equipment, critical healthcare services, and vulnerable patients. The baseline contributes to the impact assessment by enabling the prediction of vibration-related effects on building structures, medical equipment performance, patient comfort, and neighbouring receptors, thereby informing mitigation measures and construction management requirements.

Vibration measurements were carried out around the Dr. Sitanala Hospital area. Vibration measurements are divided into 2 (two) measurements, namely health vibrations and mechanical vibrations. Health vibration measurements consist of 4 (four) points, namely the mobilization road at coordinates 6°9’44.96” S, 106°38’1.66” E; IBS Building Area at coordinates 6°9’42.35” S, 106°38’5.47” E; Oncology Building Area at 6°9’47.52” S, 106°38’6.31” E; and Karang Sari Area at coordinates 6°9’44.09” S, 106°38’12.70” E.

Mechanical vibration measurements also consist of 4 (four points, namely the basement area of the Adhyatma Building at coordinates 6°9’42.85” S, 106°38’5.56” E; the roof top area of the Adhyatma Building at coordinates 6°9’42.85” S, 106°38’5.56” E; the Yudhistira Building area at coordinates 6°9’46.77” S, 106°38’5.95” E; and the residential area opposite the multipurpose GOR at coordinates 6°9’42.16” S, 106°38’10.72” E. The results of health vibrations are presented below.

Table 17 Health Vibration Analysis Results

Frequency (Hz)	Results (in microns = 10^{-6} meter)				Method*
	GTL-01 Mobilization road	GTL-02 Area Gedung IBS	GTL-03 Oncology Building Area	GTL-04 Karang Sari Area	
4	0,682	0,472	0,404	0,128	SNI 05-1629-1989
5	0,524	0,305	0,272	0,083	
6,3	0,364	0,185	0,166	0,054	
8	0,235	0,107	0,099	0,033	
10	0,164	0,074	0,069	0,024	

Frequency (Hz)	Results (in microns = 10^{-6} meter)				Method*
	GTL-01 Mobilization road	GTL-02 Area Gedung IBS	GTL-03 Oncology Building Area	GTL-04 Karang Sari Area	
12,5	0,114	0,050	0,046	0,015	
16	0,074	0,032	0,029	0,010	
20	0,042	0,021	0,020	0,007	
25	0,022	0,014	0,013	0,005	
31,5	0,015	0,010	0,008	0,003	
40	0,009	0,007	0,006	0,002	
50	0,007	0,005	0,004	0,002	
63	0,004	0,003	0,002	0,001	

Source: Primary data (2026)

Table 18 Quality Standards of the Decree of the Minister of State for the Environment No. 49 of 1996 Attachment 1

Frequency (Hz)	Maximum Vibration Level (in microns = 10^{-6} meter)			
	Do not disturb	Bother	Uncomfortable	Painful
4	< 100	100-500	>500-1000	>1000
5	< 80	80-350	>350-1000	>1000
6,3	< 70	70-275	>275-1000	>1000
8	< 50	50-160	>160-500	>500
10	< 37	37-120	>120-300	>300
12,5	<32	32-90	>90-220	>220
16	<25	25-60	>60-120	>120
20	<20	20-40	>40-85	>85
25	<17	17-30	>30-50	>50
31,5	<12	12-20	>20-30	>30
40	<9	9-15	>15-20	>20
50	<8	8-12	>12-15	>15
63	<6	6-9	>9-12	>12

The results of health vibration measurements at four points showed relatively low values across the entire measurement frequency range. The highest value was recorded at GTL-01 (mobilization road) at 0.682 microns at a frequency of 4 Hz, while other locations had lower values. When compared with the Decree of the Minister of State for the Environment Number 49 of 1996 Attachment I, all measurement results are still in the non-disturbing category, because the values are far below the quality standard threshold at each frequency. This indicates that the existing vibration conditions at the study location do not have the potential to cause disturbances to public comfort or health.

Table 19 Mechanical Vibration Analysis Results

Measurement Location	Vibration Results (mm/sec)			
	On the Foundation			On the Flat Surface of the Upper Floor
	<10 Hz	10-50 Hz	50-100 Hz	Frequency Mix
GTL-05 Basement Area of Adhyatma Building	0,747	0,221	0,080	-
GTL-06 Roof Top Area of Adhyatma Building	-	-	-	0,534
GTL-07 Yudhistira Building Area	0,688	0,198	0,070	-
GTL-08 Residential Area Across from the Multipurpose Sports Hall	0,503	0,135	0,036	-

Source: Primary Data (2026)

Table 20 Vibration Quality Standards Decree of the Minister of Environment No. 49 of 1996 Attachment III

Building Type	Vibration Results (mm/sec)			
	On the Foundation			On the Flat Surface of the Upper Floor
	<10 Hz	10-50 Hz	50-100 Hz	Frequency Mix
Buildings for commercial purposes, industrial buildings, and similar buildings	<10	20-40	40-50	40
Housing and buildings with similar plans and uses	5	5-15	15-20	15
Structures which are sensitive to vibrations, unlike those mentioned in nos. 1 and 2, and have high cultural value, such as preserved buildings.	3	3-8	8-10	8,5

The results of mechanical vibration measurements show that the values on the foundation range between 0.036–0.747 mm/day, while on the flat surface of the upper floor the value obtained is 0.534 mm/day. When compared withDecree of the Minister of State for the Environment Number 49 of 1996 Attachment III, All measurement results were below the quality standards for the buildings being measured, both in the building and residential areas. Therefore, the existing mechanical vibration conditions do not have the potential to cause structural damage or disrupt the function of buildings near the planned activity location.

4.7 Biodiversity and Ecology

The site sits within an established urban environment, built-up healthcare campus with mature institutional landscaping, surrounded by residential settlement and a sports facility. The biodiversity context is therefore characteristic of urban-fringe modified habitat: ornamental and tropical landscape vegetations within the compound, and fragmented green corridors in the surrounding kelurahan. There are no protected natural areas, conservation forests, or critical habitats of conservation concern within the immediate area of influence.

Not with standing the urban context, the institutional landscape of The Sitanala Hospital carries:

129. Mature trees of varying species - providing shade, microclimate buffering, and institutional landscape character; tree retention is a project commitment, with 1:1 replacement (and prioritisation of native species) where unavoidable removal is required.

130. Limited fauna of urban-tolerant species - birds, small reptiles, and synanthropic species typical of metropolitan compounds.

131. Aesthetic and microclimate value supporting healing-environment principles within The Sitanala Hospital institutional culture.

4.7.1 Flora

The flora baseline establishes the existing vegetation resources within the project area and provides the foundation for assessing ecological impacts associated with site development. The baseline contributes to the impact assessment by identifying vegetation that may be removed, modified, or affected by project activities and by evaluating the ecological functions provided by existing green spaces. The data support the assessment of habitat alteration, landscape impacts, biodiversity loss, and ecosystem service changes, while also informing mitigation, restoration, and landscape enhancement measures.

The plant habitat at the Sitanala Hospital project site is a modified habitat that has changed significantly due to human activities, including urban development, infrastructure development, and land-use changes. Flora observations were conducted at three locations: the New Central Surgical Installation (IBS), the New Integrated Oncology Center, the New Neurology & Urology Center, and the Green Open Space. The flora inventory identified 36 plant species at the observation sites, with the list presented in Table 20.

Table 20 The flora identified at the Sitanala Hospital

No.	Local name	Family	Scientific Name
	Hurbs		
1.	Alang-alang / Cogongrass	Poaceae	*Imperata cylindrical*
2.	Kencana ungu / Britton's wild petunia	Acanthaceae	*Ruellia simplex*
3.	Bunga tasbih / Edible canna	Cannaceae	*Canna indica*
4.	Lidah mertua / Snake plant	Asparagaceae	*Sansevieria trifasciata*

No.	Local name	Family	Scientific Name
5.	Rumput siak-siak / Umbrella dracaena	Asphodelaceae	*Dianella ensifolia*
6.	Pisang / Banana	Musaceae	*Musa paradisiaca*
7.	Bunga matahari / Sunflower	Asteraceae	*Helianthus annuus*
8.	Bunga kenop / Globe amaranth	Amaranthaceae	*Gomphrena globosa*
9.	Cabai / Chili	Solanaceae	*Capsicum annuum*
10.	Adas hutan / Dogfennel	Asteraceae	*Eupatorium capillifolium*
11.	Bambu kuning / Golden bamboo	Poaceae	*Bambusa vulgaris*
		Shrub	
12.	Teh-tehan / Wild tea	Euphorbiaceae	*Acalypha siamensis*
13.	Pucuk merah / Red lip	Myrtaceae	*Syzygium myrtifolium*
14.	Singkong / cassava	Euphorbiaceae	*Manihot esculenta*
15.	Song of India	Asparagaceae	*Dracaena reflexa*
16.	Hanjuang / Broad-leaved palm lily	Asparagaceae	*Cordyline fruticosa*
17.	Bunga kertas / Paper flower	Nyctaginaceae	*Bougainvillea glabra*
18.	Sinyo nakal /Golden dewdrop	Verbenaceae	*Duranta erecta*
19.	Sri gading / Cornstalk dracaena	Asparagaceae	*Dracaena fragrans*
		Liana	
20.	Rambusa / Fetid passionflower	Passifloraceae	*Passiflora Foetida*
21.	Kemarungan / Ivy gourd	Cucurbitaceae	*Coccinia grandis*
		Palm	
22.	Palem raja / King palm	Arecaceae	*Archontophoenix cunninghamiana*
23.	Palem manila / Manila palm	Arecaceae	*Adonidia merrillii*
24.	Palem phinis / Pygmy date palm	Arecaceae	*Phoenix roebelenii*
		Trees	
25.	Mangga / Manggo	Anacardiaceae	*Mangifera indica*
26.	Lengkeng / Longan	Sapindaceae	*Dimocarpus longan*
27.	Kecrutan / African flame tree	Bignonia Family	*Spathodea campanulata*
28.	Jambu Semarang / Java-apple	Myrtaceae	*Syzygium samarangense*
29.	Kemboja / Frangipani	Apocynaceae	*Plumeria rubra*
30.	Glodokan tiang / False ashoka tree	Annonaceae	*Polyalthia longifolia*
31.	Petai / Stink bean	Fabaceae	*Parkia speciosa*
32.	Belimbing Wuluh/ Bilimbi	Oxalidaceae	*Averrhoa bilimbi*
33.	Cemara lilin / Mediterranean cypress	Cupressaceae	*Cupressus sempervirens*

No.	Local name	Family	Scientific Name
34.	Karet merah / Rubber plant	Moraceae	*Ficus elastica*
35.	Ketapang / Madagascar almond	Combretaceae	*Terminalia mantaly*
36.	Anting putri / Water jasmine	Apocynaceae	*Wrightia Religiosa*

Source: Field Survey, 2026

Location of the New Central Surgical Installation (IBS)

The site of the New Central Surgical Installation (IBS) is an open area dominated by ground cover vegetation, with only one identified plant species: Cogongrass (*Imperata cylindrica*). The vegetation in this area grows naturally as pioneer vegetation commonly found in open areas. Based on its conservation status, Imperata cylindrica is not listed on the IUCN Red List and is not included in the list of protected flora under Minister of Environment Regulation Number 106 of 2018 on Protected Plant and Animal Species. The location of the New Central Surgical Installation (IBS) is shown in Figure .

Location of the New Integrated Oncology Center, and the New Neurology & Urology Center

At the location of the New Integrated Oncology Center and the New Neurology & Urology Center, a total of 23 plant species were identified, consisting of ground cover, hurbs, shrubs, liana, and trees. The vegetation community at this location is dominated by Cogongrass (Imperata cylindrica), which covers most of the open areas. Based on an assessment of conservation status according to the IUCN Red List, there are 11 plant species classified as Least Concern (LC), or low risk of extinction, and 2 species classified as Data Deficient (DD), or species for which scientific information is currently inadequate to conduct a comprehensive assessment of extinction risk. Meanwhile, none of the identified plant species are listed as protected under Indonesian law and regulations. The following plant species were identified at the New Integrated Oncology Center and New Neurology & Urology Center:

Table 21 The flora identified at the New Integrated Oncology Center, and the New Neurology & Urology Center

No.	Local name	Family	Scientific Name	IUCN	IP	MIGR	END
			Hurbs				
1.	Alang-alang / Cogongrass	Poaceae	*Imperata cylindrical*	-	NP	-	-
2.	Kencana ungu / Britton's wild petunia	Acanthaceae	*Ruellia simplex*	-	NP	-	-
3.	Bunga tasbih / Edible canna	Cannaceae	*Canna indica*	-	NP	-	-
4.	Lidah mertua / Snake plant	Asparagaceae	*Sansevieria trifasciata*	-	NP	-	-
5.	Rumput siak-siak / Umbrella dracaena	Asphodelaceae	*Dianella ensifolia*	-	NP	-	-
6.	Pisang / Banana	Musaceae	*Musa paradisiaca*	-	NP	-	-

No.	Local name	Family	Scientific Name	IUCN	IP	MIGR	END
			Shrub				
7.	Teh-tehan / Wild tea	Euphorbiaceae	*Acalypha siamensis*	-	NP	-	-
8.	Pucuk merah / Red lip	Myrtaceae	*Syzygium myrtifolium*	LC	NP	-	-
9.	Singkong / cassava	Euphorbiaceae	*Manihot esculenta*	-	NP	-	-
10.	Song of India	Asparagaceae	*Dracaena reflexa*	LC	NP	-	-
11.	Hanjuang / Broad-leaved Palm Lily	Asparagaceae	*Cordyline fruticosa*	LC	NP	-	-
12.	Bunga kertas / Paper flower	Nyctaginaceae	*Bougainvillea glabra*	LC	NP	-	-
13.	Sri gading / Cornstalk dracaena	Asparagaceae	*Dracaena fragrans*	LC	NP	-	-
			Liana				
14.	Rambusa / Fetid Passionflower	Passifloraceae	*Passiflora Foetida*	-	NP	-	-
15.	Kemarungan / Ivy gourd	Cucurbitaceae	*Coccinia grandis*	-	NP	-	-
			Trees				
16.	Mangga / Manggo	Anacardiaceae	*Mangifera indica*	DD	NP	-	-
17.	Lengkeng / longan	Sapindaceae	*Dimocarpus longan*	DD	NP	-	-
18.	Kecrutan / African Flame Tree	Bignonia Family	*Spathodea campanulata*	LC	NP	-	-
19.	Jambu Semarang / Java-apple	Myrtaceae	*Syzygium samarangense*	LC	NP	-	-
20.	Kemboja / Frangipani	Apocynaceae	*Plumeria rubra*	LC	NP	-	-
21.	Glodokan tiang / False Ashoka Tree	Annonaceae	*Polyalthia longifolia*	LC	NP	-	-
22.	Petai / Stink bean	Fabaceae	*Parkia speciosa*	LC	NP	-	-
23.	Belimbing Wuluh/ Bilimbi	Oxalidaceae	*Averrhoa bilimbi*	LC	NP	-	-

Source: Field Survey, 2026
Note: LC=Least Concern, DD=Data Devicient, IP=Indonesia Protected Species, NP=Not Protected, Migr=Migratory, End=Endemic

Location of Green Open Space

Sitanala Hospital has a Green Open Space as part of its efforts to promote greening and improve environmental quality on its grounds. Currently, Sitanala Hospital has gardens and green open spaces

covering 13,883.80 m², approximately 10% of the hospital's total land area. Based on a biodiversity assessment, 16 plant species were identified in the Green Open Space area, serving as landscape elements and as limited habitats for urban fauna. According to the IUCN Red List, 9 plant species are classified as Least Concern (LC) and 1 as Vulnerable (VU), while none of the identified species are listed as protected plants in Indonesia. The plant species identified in the Green Open Space are presented in Table 22.

Table 22 The flora identified at Green Open Space Area

No.	Local name	Family	Scientific Name	IUCN	IP	MIGR	END
			Hurbs				
1.	Alang-alang / Cogongrass	Poaceae	*Imperata cylindrical*	-	NP	-	-
2.	Bunga matahari / Sunflower	Asteraceae	*Helianthus annuus*	LC	NP	-	-
3.	Bunga kenop / Globe amaranth	Amaranthaceae	*Gomphrena globosa*	-	NP	-	-
4.	Cabai / Chili	Solanaceae	*Capsicum annuum*	LC	NP	-	-
5.	Adas hutan / Dogfennel	Asteraceae	*Eupatorium capillifolium*	-	NP	-	-
6.	Bambu kuning / Golden bamboo	Poaceae	*Bambusa vulgaris*	-	NP	-	-
			Shrub				
7.	Pucuk merah / Red lip	Myrtaceae	*Syzygium myrtifolium*	LC	NP	-	-
8.	Sinyo nakal /Golden Dewdrop	Verbenaceae	*Duranta erecta*	LC	NP	-	-
			Palm				
9.	Palem raja / King palm	Arecaceae	*Archontophoenix cunninghamiana*	LC	NP	-	-
10.	Palem manila / Manila Palm	Arecaceae	*Adonidia merrillii*	VU	NP	-	-
11.	Palem phinis / Pygmy date palm	Arecaceae	*Phoenix roebelenii*	-	NP	-	-

No.	Local name	Family	Scientific Name	IUCN	IP	MIGR	END
			Trees				
12.	Kemboja / Frangipani	Apocynaceae	*Plumeria rubra*	LC	NP	-	-
13.	Cemara lilin / Mediterranean cypress	Cupressaceae	*Cupressus sempervirens*	LC	NP	-	-
14.	Karet merah / Rubber Plant	Moraceae	*Ficus elastica*	LC	NP	-	-
15.	Ketapang / Madagascar almond	Combretaceae	*Terminalia mantaly*	LC	NP	-	-
16.	Anting putri / Water jasmine	Apocynaceae	*Wrightia Religiosa*	-	NP	-	-

Source: Field Survey, 2026
Note: Vu= Vulnerable, LC=Least Concern, IP=Indonesia Protected Species, NP=Not Protected, Migr=Migratory, End=Endemic

4.7.2 Fauna

The fauna baseline identifies wildlife species utilizing the project area and provides an understanding of the site's ecological value and habitat function. The baseline contributes to the impact assessment by enabling the identification of species and habitats that may be affected by construction activities, increased human presence, noise, lighting, and habitat modification. The information supports the evaluation of ecological impact significance, the identification of sensitive species, and the development of biodiversity management and habitat protection measures where required.

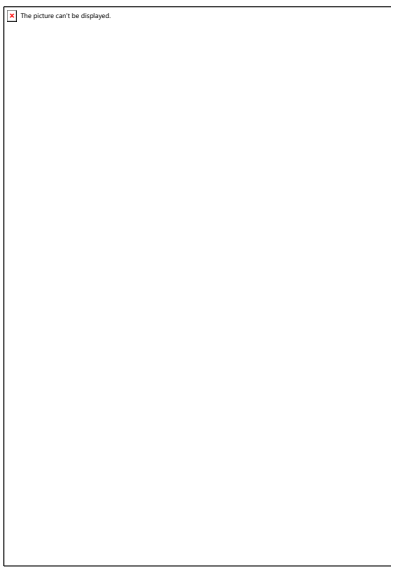
Based on a field survey conducted at three hospital development sites, namely the New Central Surgical Installation (IBS), the New Integrated Oncology Center, and the New Neurology & Urology Center, as well as the Green Open Space area, four fauna species were identified: the Eurasian Tree Sparrow (Passer montanus), the Brown Locust (Locustana pardalina), the Honey Bee (Apis mellifera), and the Wandering Glider (Pantala flavescens). These species are common fauna found in urban environments and in areas modified by human activities. The presence of this fauna is supported by the availability of green open spaces and vegetation within the hospital grounds, which provide food sources, perching sites, shelter, and movement corridors for various urban fauna. Based on a conservation status assessment under the IUCN Red List, two species are classified as Least Concern (LC) and one as Data Deficient (DD), while none of the identified fauna species are listed as protected species in Indonesia. The list of fauna identified within the hospital grounds is presented in

Table 23.

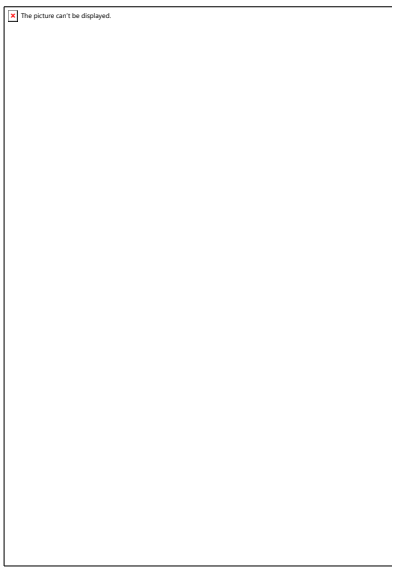
Table 23 Fauna identified in The Sitanala Hospital area

No.	Local name	Family	Scientific Name	IUCN	IP	MIGR	END
Location of New Central Surgical Installation (IBS)							
1.	Eurasian Tree Sparrow	Passeridae	*Passer montanus*	LC	NP	-	-
2.	Capung / Wandering Glider	Libellulidae	*Pantala flavescens*	LC	NP	-	-
Location of New Integrated Oncology Center, and the New Neurology & Urology Center							
1.	Eurasian Tree Sparrow	Passeridae	*Passer montanus*	LC	NP	-	-
2.	Belalang cokelat / Brown locust	Acrididae	*Locustana pardalina*	-	NP	-	-
3.	Lebah / Honey bee	Apidae	*Apis mellifera*	DD	NP	-	-
4.	Capung / Wandering Glider	Libellulidae	*Pantala flavescens*	LC	NP	-	-
Location of Green Open Space							
1.	Eurasian Tree Sparrow	Passeridae	*Passer montanus*	LC	NP	-	-
2.	Lebah / Honey bee	Apidae	*Apis mellifera*	DD	NP	-	-
3.	Capung / Wandering Glider	Libellulidae	*Pantala flavescens*	LC	NP	-	-

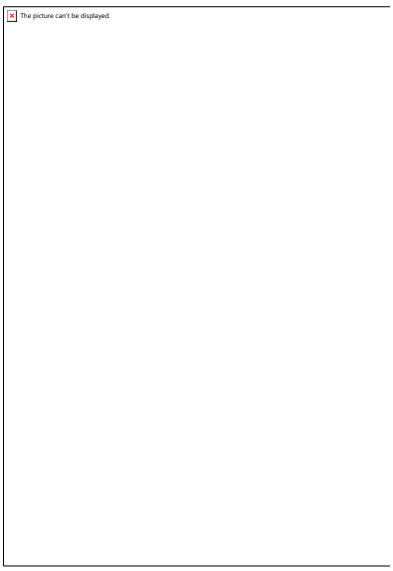
Source: Field Survey, 2026
Note: LC=Least Concern, DD=Data Devicient, IP=Indonesia Protected Species, NP=Not Protected, Migr=Migratory



Location of the New Central Surgical Installation (IBS)



Location of the New Integrated Oncology Center, and the New Neurology & Urology Center



Location of Green Open Space

Figure 30 Location of biodiversity sampling for flora and fauna

4.8 Land Use and Spatial Compliance

The land-use status of The Sitanala Hospital site is consistent with its century-long operational footprint as a public healthcare facility. The Sitanala Hospital does not require the conversion of any land outside the existing 142,000 m² compound, and is consistent with the public-services / healthcare-facility designation under the RTRW Tangerang City and the applicable RDTR for Neglasari District.

Spatial-compliance instruments material to The Sitanala Hospital are:

132. PKKPR : to be confirmed at the preconstruction stage with the Dinas Penataan Ruang Tangerang City.

133. KDB (*Koefisien Dasar Bangunan*), KLB (*Koefisien Lantai Bangunan*), and KDH (*Koefisien Dasar Hijau*) compliance with the applicable spatial-zoning envelope.

134. Sectoral compliance with Permenkes 40/2022 on hospital building requirements.

4.8.1 Spatial Utilization Conformity (KKPR)

The Sitanala Hospital site project has obtained Spatial Utilization Conformity Approval (PKKPR) through Online Single Submission (OSS) System No. 21082310213671011 issued on 18 August 2023 for BLU The Sitanala Hospital Tangerang under KBLI 86101 (Government Hospital Activities) and confirms the activity is located at Jalan Dr. Sitanala No. 99, Karangsari Village, Neglasari District, Tangerang City, Banten. The approved KKPR serves as the spatial-planning basis for subsequent permitting and development activities within the approved project area.

Feasibility study result stated that the proposed development plan consists of the construction and upgrading of the Central Surgical Installation (IBS), Oncology Center, and Neurology & Urology Center. The proposed development remains consistent with the historical and existing function of the area as a government healthcare-service facility. All proposed development components are located entirely within the permitted spatial-planning boundary and existing operational compound of The Sitanala Hospital, and therefore do not involve expansion into undeveloped land outside the approved KKPR area.

Based on the approved Spatial Utilization Conformity Approval (KKPR) with a total area of 533,427.51 m² or 53.34 Ha, there is a difference between the approved KKPR boundary and the existing Sitanala Hospital boundary (14.2 Ha). Overlay analysis result indicates there are other facilities located outside existing hospital boundary but still inside approved hospital KKPR boundary shown in light blue area). Other hospital area that located outside approved KKPR shown in light green area. The details can be seen in Figure 31.

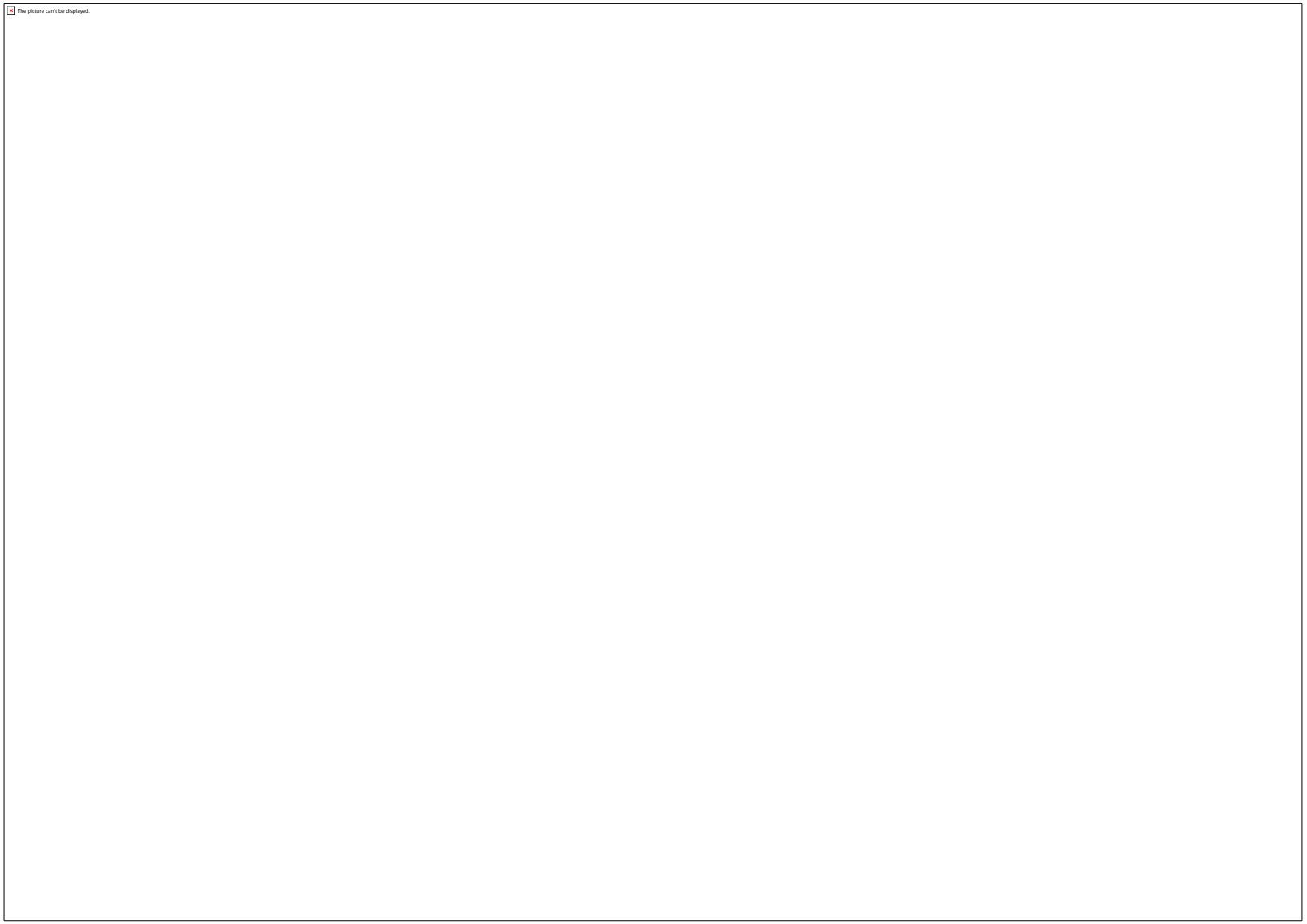


Figure 31 Map of Approval Spatial Utilization Conformity (PKKPR)

4.8.2 Existing Building Intensity and Green Open Space Compliance

In accordance with the applicable RDTR provisions under Regulation of Tangerang City Mayor No. 111 of 2023, spatial-utilization intensity within The Sitanala Hospital area is regulated through zoning-control parameters consisting of Building Coverage Ratio (Koefisien Dasar Bangunan/KDB) , Floor Area Ratio (Koefisien Lantai Bangunan/KLB), and Green Area Ratio ((Koefisien Dasar Hijau/KDH). These provisions are regulated within the RDTR intensity-control framework for Public Service Facilities Zone (Sarana Pelayanan Umum/SPU), particularly for public-service facilities at city scales.

Based on Appendix XIX of Regulation of Tangerang City Mayor No. 111 of 2023 concerning the Table of Spatial Utilization Intensity Provisions, the applicable provisions for Sub-Zona SPU City Scale (SPU-1) establish the following zoning-intensity limits:

Table 24 Sub Zone Public Services Facilities (SPU) Scale

Description	Scale
Building Coverage Ratio (KDB)	Maximum 60 %
Floor Area Ratio (KLB)	Maximum 4.8
Green Area Ratio (KDH)	Minimum 15%

The existing hospital land area is approximately 142,000 m², while the existing building footprint area is approximately 31,025 m² based on the feasibility-study documentation. Accordingly, the existing KDB value of approximately 21.85% indicates that the current building coverage remains below the maximum KDB limit regulated under the applicable SPU zoning provisions of the RDTR Tangerang City. For existing KLB and KDH, based on the overall existing land-use characteristics documented within the DELH and other available planning documents, The Sitanala Hospital area remains predominantly occupied by low-rise healthcare facilities, circulation networks, open operational spaces, and supporting non-built areas. The purposed phase I development building include the Central Surgical Building, Oncolgy Center, and Neurology-Urology have total Floor Area approximately 55,170 m². Therefore, the development building plan contributes an additional Floor Area Ratio (KLB) of approximately 0.39.

4.8.3 Conformity with RDTR Tangerang City

Based on the applicable Detailed Spatial Plan (Rencana Detail Tata Ruang / RDTR) of Tangerang City regulated under Peraturan WaliTangerang City Nomor 111 Tahun 2023, The Sitanala Hospital area is located within an urban zone designated for Public Service Facilities (SPU) Zone with most of the zone are City Scale (SPU-1). Existing and proposed hospital activities are considered generally consistent with the designated spatial pattern and land-use allocation of the area.

The existing land use within The Sitanala Hospital area include operational hospital buildings, supporting medical facilities, internal circulation roads, utility infrastructure, parking areas, wastewater-treatment facilities, and landscaped green open spaces supporting hospital operations. While surrounding area is predominantly characterized by urban residential settlements, public-service facilities, local road networks, and supporting urban infrastructure within Neglasari District, the proposed development will remain within the existing hospital footprint and focuses primarily on upgrading healthcare-service capacity, The Sitanala Hospital is not expected to result in significant land-use conversion or substantial alteration of the surrounding urban spatial structure.



Figure 32 Map of Hospital Overlay with Tangerang City Detailed Spatial Plan 2023-2043

4.9 River Water quality

The river water quality baseline establishes the existing condition of surface water bodies that may receive stormwater runoff, treated effluent, or indirect discharges associated with the Project. This baseline contributes to the impact assessment by providing reference data against which potential changes in water quality can be evaluated during both construction and operation. The information supports the assessment of impacts related to sedimentation, erosion, accidental spills, wastewater discharges, and stormwater management performance, while also enabling the evaluation of compliance with applicable water quality standards and the effectiveness of mitigation measures.

The Cisadane River is the primary raw-water source for PDAM Tirta Benteng, Tangerang City, and serves as the receiving water body (receiving water body) for all wastewater discharges and urban run-off along its course. The river's water quality directly affects the clean-water supply to The Sitanala Hospital and the environmental health risk for communities surrounding The Sitanala Hospital site.

4.9.1. Cisadane River Water Quality Conditions

Based on data from the Ministry of Environment and Forestry (KLHK, 2018), the baseline water quality of the Cisadane River was classified as Class IV (the lowest class under PP 22/2021 Annex VI on National Water Quality Standards). KLHK's pollution-control programme targeted improvement to Class III during 2015–2019 and to Class II during 2020–2024. Pollution sources in the Cisadane River are dominated by domestic waste (83.99%), followed by industrial waste (8.39%) and livestock waste (3.94%).

A physical water-quality study of the Cisadane River in the Tangerang City segment (Laksanawati, 2018) found that physical parameters still met Class II under PP 22/2021 Annex VI refers to the national water quality standard for water designated for recreation, freshwater aquaculture, livestock, and irrigation - it is not specifically the raw drinking water standard (which is Class I). The Cisadane River is designated for Class II beneficial uses, with values of: average temperature 28,57 °C; TDS 55,67 mg/L; TSS 26,33 mg/L. However, dissolved Iron (Fe) and Manganese (Mn) concentrations significantly exceeded the quality standards. Pollution-load modelling using QUAL2Kw indicates that BOD values along the Cisadane River have exceeded the Class II beneficial-use benchmark.

DLH Tangerang City monitoring (Period 1, 2024) showed that 90% of tested parameters for the Cisadane River raw-water source met the quality standards, while 9.1% of parameters did not comply. Parameters exceeding the standards include: TSS, colour, BOD_5, COD, DO, ammonia, total detergent, faecal coliform, and total coliform. All non-compliant parameters originate from domestic activities.

4.9.2. River Water Threshold (PP 22/2021 Annex VI)

The UKL-UPL and RKL-RPL reports include routine monitoring of Saluran Induk Sitanala at upstream and downstream points of The Sitanala Hospital's outfall. Evaluations in all reporting periods (S1-2023, S2-2024, S1-2025) conclude that the trend is "positif" - surface water quality at the monitoring points has not deteriorated beyond the applicable benchmark (PP 82/2001 Kelas II, now superseded by PP 22/2021 Kelas II). The parameters monitored include pH, TDS, E. Coli, Total Coliform, heavy metals (Fe, Mn, Cr, Cd, Hg, Pb), and nutrients.

Two key observations emerge from the operational data: (a) the receiving watercourse (Saluran Induk Sitanala → Saluran Mookervart → Sungai Cisadane) already carries elevated organic and

microbiological loads from upstream urban sources, limiting its assimilative capacity for additional hospital wastewater; and (b) the existing IPAL operates at only 19–23% of its installed hydraulic capacity (actual debit 37–46 m³/day versus 200 m³/day design), providing substantial headroom for The Sitanala Hospitaled increase during construction and post-expansion operation. The adequacy of this headroom and the need for IPAL upgrade or parallel treatment capacity will be assessed in Section 7 (Water Resources and Stormwater impact).

4.9.1 Pollution Incident of February 2026

On 9 February 2026, a fire at the PT Biotek Saranatama pesticide warehouse in Taman Tekno Industrial Area, Kecamatan Setu, Tangerang City Selatan, caused pesticide liquid contamination of the Jaletreng River, which flows into the Cisadane River, with an impact extent of approximately 22.5 km covering Tangerang Selatan, Tangerang City, and Kabupaten Tangerang. The incident resulted in mass mortality of aquatic biota and a temporary ban on river-water use by the public.

DLH Tangerang City reported that as of 17 February 2026, laboratory test results showed that the Cisadane River water quality had returned to compliance with quality standards following recovery. However, this incident underscores the vulnerability of the PDAM raw-water supply and the importance of water-source redundancy for critical healthcare facilities such as The Sitanala Hospital.

4.10 Wastewater Quality and Management

The wastewater quality and management baseline characterizes existing wastewater generation, treatment processes, effluent quality, treatment capacity, and discharge practices within The Sitanala Hospital. This baseline provides a critical foundation for assessing whether the proposed expansion may increase wastewater volumes or pollutant loads beyond the capacity of existing treatment infrastructure. The information supports the evaluation of impacts on receiving water bodies, treatment system performance, public health, and regulatory compliance, while also informing the design and management requirements for future wastewater treatment facilities.

Wastewater generated from hospital operational activities originates from various sources, including domestic activities, inpatient wards, kitchen operations, laundry facilities, medical service rooms, laboratories, and other supporting facilities. The characteristics and quality of wastewater generated from each source vary considerably; therefore, proper management and monitoring through the Sewage Treatment Plant (STP) are required to ensure effective wastewater treatment and environmental protection.

Wastewater quality monitoring is conducted at the WWTP inlet and outlet points to evaluate the effectiveness of the implemented wastewater treatment processes. The monitoring activities aim to ensure that the effluent quality discharged into the environment complies with the applicable wastewater quality standards and regulatory requirements, as well as to ensure that the WWTP system operates effectively, optimally, and sustainably. The following section presents the wastewater quality monitoring results for the period of 2021–2025.

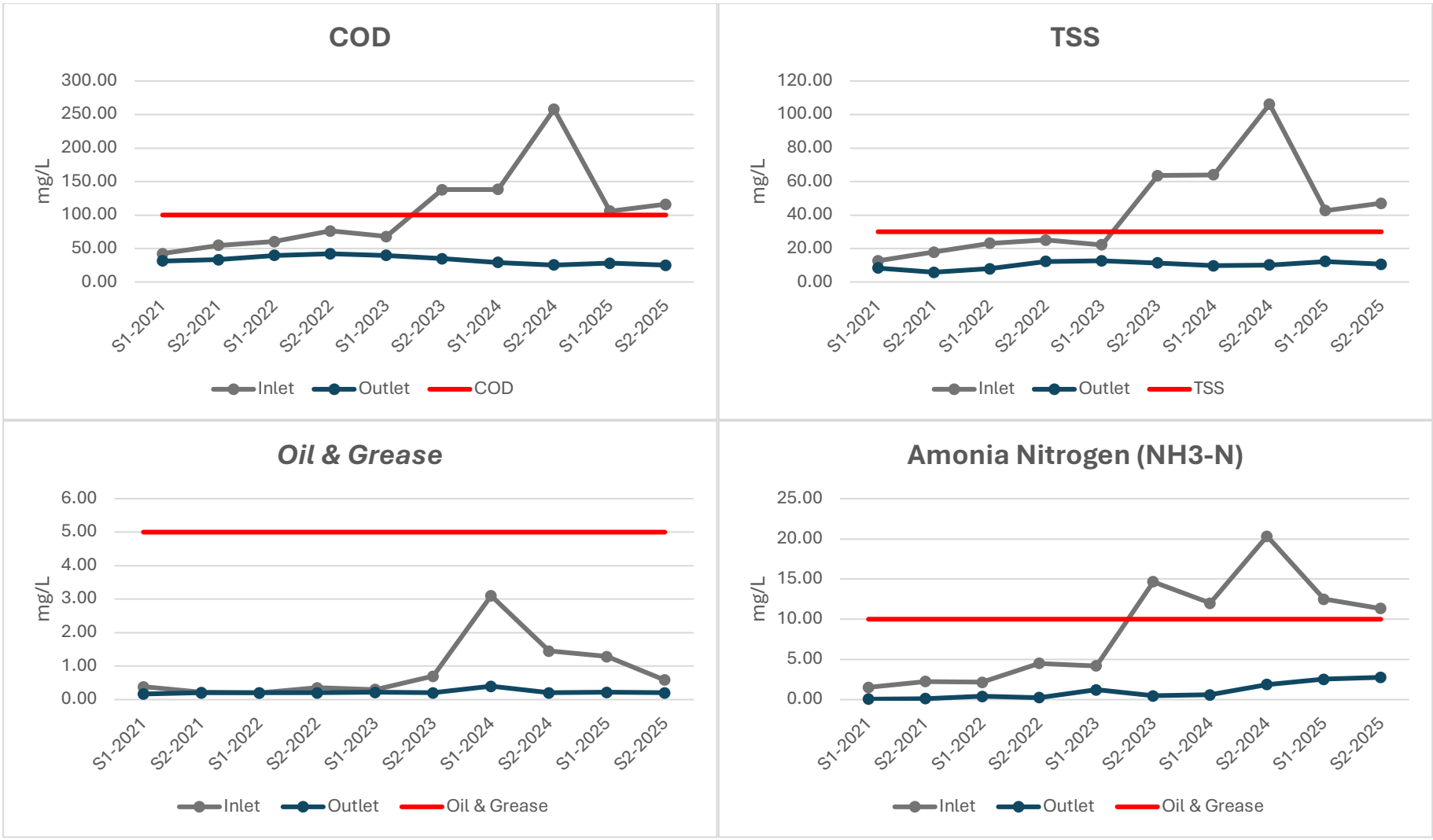


Figure 33 Wastewater Quality Monitoring Chart for the 2021-2025 Period

Based on the wastewater quality monitoring results from Semester 1 of 2021 to Semester 2 of 2025, the wastewater quality parameters at both the inlet and outlet of the STPshowed fluctuating patterns influenced by hospital operational activities. In general, the monitoring results indicate that the STP is capable of significantly reducing pollutant concentrations, thereby ensuring that the effluent quality consistently complies with the applicable wastewater quality standards..The pH parameter showed relatively stable conditions throughout the monitoring period. The inlet pH values ranged from slightly acidic to neutral conditions, while the outlet pH values remained within a stable neutral range. These results indicate that the neutralization and treatment processes within the STP operated effectively in maintaining the stability of wastewater acidity levels prior to discharge into the environment.

The BOD5 parameter at the inlet showed a significant increase, particularly during Semester 2 of 2024, indicating an increase in organic matter content associated with hospital operational activities. Nevertheless, the BOD5 concentration at the outlet remained relatively low and stable compared to the inlet concentration. This condition demonstrates that the biological treatment units of the STP effectively reduced organic pollutant concentrations and maintained effluent quality below the applicable regulatory standards.

The Chemical Oxygen Demand (COD) parameter showed a similar pattern to BOD5, where COD concentrations at the inlet fluctuated and increased during several monitoring periods, particularly in Semester 2 of 2024. This increase indicates a higher load of organic and inorganic pollutants entering the STP. However, COD concentrations at the outlet remained significantly lower than those at the inlet and continued to comply with the applicable wastewater quality standards, indicating that the treatment processes operated effectively.

The Total Suspended Solids (TSS) parameter at the inlet showed increased concentrations during certain monitoring periods, particularly in Semester 2 of 2024, which was likely influenced by increased suspended solids generated from hospital operational activities. However, TSS concentrations at the outlet remained relatively low and stable. This condition indicates that the sedimentation and filtration units within the STP functioned effectively in reducing suspended solids concentrations prior to effluent discharge into the environment.

The oil and grease parameter showed relatively low concentrations at both the inlet and outlet throughout the monitoring period. Although slight increases were observed at the inlet during several monitoring periods, outlet concentrations consistently remained well below the applicable wastewater quality standards. These results indicate that the oil and grease separation system within the STP operated effectively in reducing oil and grease content in the wastewater.

The Ammonia Nitrogen (NH3-N) parameter at the inlet showed fluctuations and increased concentrations during several monitoring periods, particularly from Semester 2 of 2023 to Semester 2 of 2024. The increase indicates elevated nitrogen compound concentrations originating from hospital medical and domestic activities. Nevertheless, NH3-N concentrations at the outlet remained low and consistently complied with the applicable standards, indicating that the biological treatment processes within the STP effectively reduced nitrogen compounds in the wastewater.

Meanwhile, the Total Coliform parameter at the inlet showed a significant increase until Semester 2 of 2025, indicating elevated microbiological content originating from domestic and healthcare service activities. However, monitoring results at the outlet showed relatively low and stable Total Coliform concentrations compared to the inlet values. This condition demonstrates that the disinfection and

biological treatment processes within the WWTP operated effectively in reducing microbiological contaminants prior to discharge into the receiving water body.

Overall, the wastewater quality monitoring results indicate that The Sitanala Hospital SWTP operated effectively in reducing pollutant concentrations. In general, all monitored outlet parameters remained below the applicable wastewater quality standards, indicating compliance with environmental regulations.

The estimation of wastewater by using 602-bed hospital approximately 207.86 m^3/day. The project will build additional STP as 250 m^3/day to manage the wastewater. By considering the existing STP capacity as 250 m^3/day, the total STP capacity both from existing and additional is 500 m^3/day. Therefore, the STP capacity is sufficient to manage the wastewater from the exising and the project.

4.11 Solid waste Quantity and Management

The solid waste baseline establishes existing waste generation rates, waste composition, segregation practices, storage arrangements, collection systems, and disposal methods. The baseline contributes to the impact assessment by identifying current waste management capacities and potential constraints that may be affected by increased waste generation during construction and operation. The information supports the assessment of impacts related to waste handling, resource consumption, nuisance conditions, public health risks, and landfill demand, while also informing waste minimization and recycling strategies.

Routine housekeeping and sanitation activities are implemented throughout both the indoor and outdoor areas of The Sitanala Hospital to maintain environmental cleanliness and hygiene standards. Cleaning activities are conducted twice daily and are managed by a qualified third-party contractor under an annual service agreement, ensuring the continuity and consistency of cleaning operations across The Sitanala Hospital premises. Based on field observations, segregated waste bins have been adequately provided in areas associated with patient, visitor, and employee activities, including clinical areas, waiting rooms, offices, and public spaces. The availability and distribution of these waste receptacles are considered sufficient to accommodate the current waste generation rate and support proper waste segregation practices at the source, thereby minimizing the potential for waste accumulation at generation points.

The Sitanala Hospital operates a domestic temporary waste storage facility (TPS Domestik) with an existing capacity of approximately 48 m^3, consisting of dimensions of 4,5 m × 4,5 m × 3 m (Volume approximately 60,75 m^3). Based on the current volume of non-medical solid waste generated from hospital activities, the available storage capacity remains adequate to accommodate waste prior to collection and off-site transportation. Visual inspections conducted during the site assessment further indicated that The Sitanala Hospital environment was generally maintained in a clean and orderly condition. No significant waste accumulation, scattered litter, or unmanaged waste spillages were observed within The Sitanala Hospital premises, demonstrating that the existing housekeeping and waste management practices are functioning effectively and are sufficient to support current operational activities.

Based on studies conducted in 100 hospitals across Java and Bali, each inpatient generates approximately 3.2 kg of solid waste per day, of which 76.8% is classified as domestic waste, equivalent to approximately 2.46 kg/day (rounded to 2.5 kg/day). Therefore, the estimated domestic solid waste generation for a hospital with 602 beds is approximately 2.5 kg/day × 602 beds = 1,505.0 kg/day. Based

on waste generation estimates and a 2-day storage capacity, the required storage areas are approximately 16 m² for domestic solid waste.

Based on the waste generation estimates, the dimension of the existing Temporary Waste Storage Facility (TPS) is 4.5 m x 4.5 m x 3 m with volume as 60.75 m^3. It has sufficient capacity to accommodate waste generated from both current operations and the planned development activities. In terms of available area, the existing TPS is adequate to accommodate the projected increase in waste generation.

4.12 Hazardous Waste Management

The hazardous waste management baseline identifies existing hazardous waste streams, storage facilities, handling procedures, transportation arrangements, and disposal practices. This baseline is essential for evaluating risks associated with hazardous materials used within hospital operations and construction activities. The information contributes to the impact assessment by enabling the identification of potential impacts on human health, soil, groundwater, surface water, and air quality resulting from accidental releases, improper storage, transportation incidents, or disposal failures. It also provides the basis for assessing compliance with hazardous waste regulations and international good practice.

4.12.1 Non-Medical Hazardous Waste

Non-medical hazardous waste is generated from operational and maintenance activities of hospital facilities, utilities, and infrastructure. The waste consists of used oil, used fluorescent lamps, used oil filters, contaminated rags, and sludge from the wastewater treatment plant (WWTP). Waste segregation and identification are conducted at the source before being transported to the licensed Temporary Hazardous Waste Storage Facility (*TPS Limbah B3*). The waste is stored, labelled, and managed in accordance with applicable hazardous waste management procedures and regulations. The dimension of *TPS Limbah B3* is 3 m x 4 m x 3 m with volume approximately 36 m^3. Temporary storage duration does not exceed 90 days. Sitanala Hospital has engaged Prasadha Pamunah Limbah Industri (PPLI) as a licensed third-party contractor for the transportation, treatment and disposal of hazardous and toxic waste (B3 waste), specifically wastewater treatment plant (WWTP) sludge. The WWTP sludge is transported periodically, in accordance with the Hospital's Standard Operating Procedures (SOPs) and applicable regulatory requirements.

4.12.2 Medical Hazardous Waste Management

Medical hazardous waste generated from hospital activities includes infectious waste, sharps waste, pathological waste, cytotoxic waste, and chemical and pharmaceutical waste originating from medical services, laboratories, pharmacies, and other healthcare activities. Waste segregation is carried out at the source, where sharps are collected in safety boxes and infectious clinical waste is placed in yellow plastic bags. The waste is collected twice daily and transported to the licensed Temporary Hazardous Waste Storage Facility (*TPS Limbah B3*). The validity of TPS LB3 is until 12 February 2025. The dimension of *TPS Limbah B3* is 6 m x 4 m x 3 m with volume approximately 72 m^3. All waste containers are labelled with waste identification, source, and collection date.. Transportation and treatment of medical hazardous waste are conducted by licensed third-party contractors, namely Prasadha Pamunah Limbah Industri (PPLI), with a daily transportation frequency. The management system is

supported by standard operating procedures (SOPs) and the use of personal protective equipment (PPE) for workers handling hazardous waste.

Based on the evaluation of hazardous and toxic waste (B3 waste) generation records for the period 2021–2025, the highest recorded waste generation rate was approximately 178.66 kg/day. Assuming an average density of healthcare hazardous waste of 150 kg/m³, the corresponding waste volume is estimated at approximately 1.19 m³/day. Under the current waste management arrangement, where healthcare infectious waste is collected and transported by a licensed hazardous waste contractor everyday in accordance with applicable Indonesian regulatory requirements, the maximum volume accumulated within the Temporary Hazardous Waste Storage Facility (TPS B3) is estimated to range between 1.19 m³. Compared with the available TPS B3 storage capacity of 72 m³, the projected occupied volume represents only approximately 1.65% of the total storage capacity. Consequently, more than 90% of the storage capacity remains available under normal operating conditions.

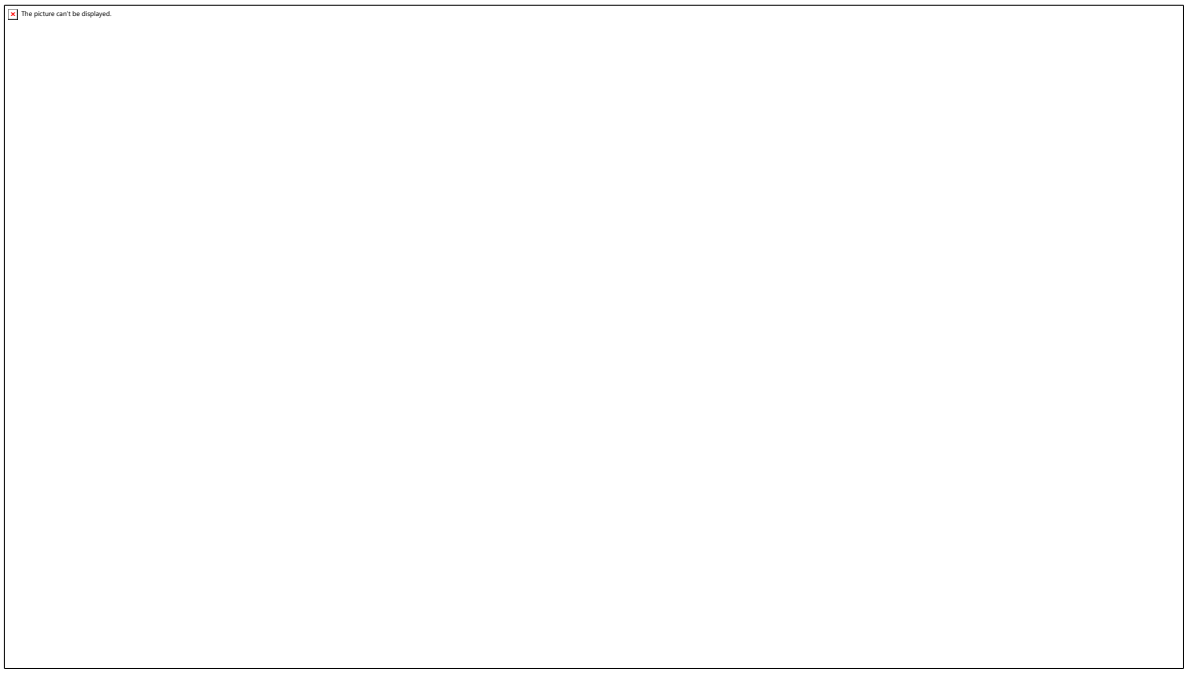


Figure 34 Medical and Non-Medical Hazardous Waste Generation (kg/day)

4.12.3 Analysis of Hazardous Waste Storage Capacity for Existing Activities and Proposed Development (“The Project”)

Based on the Project masterplan, which includes an inpatient capacity of 602 beds, and assuming a healthcare waste generation rate of approximately 1.89 kg/bed/day for a Class A General Hospital, the Project is expected to generate approximately 1,137.8 kg of healthcare waste per day. For the purpose of estimating storage and transportation requirements, a bulk density of 150 kg/m³ for uncompacted medical waste has been applied, consistent with values commonly referenced in international healthcare waste management guidance (WHO, 2014). Accordingly, the projected healthcare waste generation rate is estimated at approximately 7.6 m³/day. In addition, non-medical hazardous waste generation is estimated at approximately 56.9 kg/day, equivalent to approximately 0.29 m³/day. Therefore, the total hazardous waste generation associated with the proposed development is estimated at approximately 7.89 m³/day. Considering the existing hospital operations, which currently

generate approximately 1.19 m³/day of hazardous waste, the combined hazardous waste generation from both the existing activities and the proposed development is estimated at approximately 9.08 m³/day.

The existing Temporary Hazardous Waste Storage Facility (TPS B3) has a total storage volume of 72 m³. Based on the projected hazardous waste generation rate from both existing operations and the proposed development activities, the total hazardous waste volume is estimated at approximately 9.08 m³/day. Assuming that hazardous waste is collected and transported by a licensed hazardous waste contractor every day, the maximum volume of waste accumulated within the TPS B3 is estimated as 10.27 m^3. Compared with the available TPS B3 capacity of 72 m³, the facility utilization rate is estimated at 14.26 % of total capacity. Accordingly, the remaining available storage capacity is estimated at 61.73 m³. The assessment indicates that the existing 72 m³ TPS B3 facility is sufficient to accommodate the projected hazardous waste generation from both existing and proposed hospital operations (The Project), provided that off-site transportation is maintained at least everyday in accordance with applicable Indonesian healthcare waste management requirements.

Based on the desktop review, PPLI appears to have adequate technical capability and specialised facilities for the management of hazardous waste (LB3) and healthcare waste, including dedicated waste transportation systems, refrigerated trucks for medical waste, incineration facilities, solidification/stabilisation treatment, liquid waste treatment, and engineered landfill disposal. Its incineration system is reported to include air pollution control and continuous emission monitoring systems, which are important for managing emissions from the treatment of infectious and hazardous waste. However, the review also identified previous environmental, social, and occupational health and safety incidents associated with PPLI operations, including community impacts from odor/vapor release and a fatal worker incident. Therefore, while PPLI may be considered a technically capable waste management service provider, its engagement for the Project should be subject to further due diligence in line with AIIB Environmental and Social Framework requirements. This should include verification of valid permits and licenses, waste manifest and chain-of-custody procedures, emission monitoring records, stack test results, incident investigation and corrective action reports, emergency response procedures, occupational health and safety performance, and community grievance records. Ongoing monitoring and periodic audits should also be required during implementation to ensure that healthcare waste and LB3 are transported, treated, and disposed of safely and in compliance with national regulations, GIIP, and AIIB requirements.

4.13 Ground Water Quality and Ground Water Quantity

4.13.1 Ground Water Quality

Groundwater quality monitoring was conducted at four locations, namely the Security Post, Nutrition Installation, Operating Room/Surgery Unit, and Ground Tank. Sampling activities were carried out from Semester 1 of 2023 through Semester 1 of 2025.

The monitoring results were evaluated against the applicable national standard, namely the Minister of Health Regulation Number 2 of 2023 concerning the Implementing Regulation of Government Regulation Number 66 of 2014 on Environmental Health, as well as relevant international reference standards, including WHO Guidelines for Drinking-water Quality (WHO, 2022), IFC Environmental, Health, and Safety (EHS) Guidelines (IFC, 2007), and US EPA Drinking Water Standards. The groundwater quality analysis for the four monitoring locations is presented as follows:

Security Post

The maximum-value analysis for clean water quality at the Security Post of The Sitanala Hospital Tangerang during Semester 1 2023, Semester 2 2023, and Semester 1 2024 indicates that most physical and chemical parameters remained below the applicable limits established by national and international standards.

The only recurring non-compliance was observed for Total Coliform, which exceeded the allowable limit at the Security Post Exit Faucet during:

135. Semester 1 2023 (maximum: 29 MPN/100 mL),

136. Semester 2 2023 (maximum: 36 MPN/100 mL), and

137. Semester 1 2024 (maximum: 36 MPN/100 mL).

These results indicate intermittent microbiological contamination within the water distribution system at the monitoring location. Meanwhile, *E. coli* concentrations consistently complied with the required standards in all monitored semesters, suggesting that no significant fecal contamination was identified at the Security Post during the monitoring period.

Nutrition Installation

The maximum-value analysis for clean water quality at the Nutrition Installation during Semester 1 2023, Semester 2 2023, Semester 1 2024, Semester 2 2024, and Semester 1 2025 indicates that most physical and chemical parameters consistently complied with the applicable limits established by national and international standards.

The only parameter that exceeded the applicable standard was Total Coliform during:

138. Semester 1 2023 (maximum: 44 MPN/100 mL); and

139. Semester 2 2023 (maximum: 24 MPN/100 mL).

These results indicate intermittent microbiological contamination within the water distribution system during 2023. However, monitoring results during 2024 and Semester 1 2025 showed full compliance for microbiological parameters, indicating improved water quality management and distribution system conditions at the Nutrition Installation.

Operating Room / Surgery Unit

The maximum-value analysis for clean water quality at the of The Sitanala Hospital Tangerang during Semester 1 2023, Semester 2 2023, Semester 1 2024, Semester 2 2024, and Semester 1 2025 indicates that most physical and chemical parameters consistently complied with the applicable limits established by Permenkes No. 2 of 2023 and international standards (WHO/IFC/EPA). The only parameter exceeding the applicable standards was *E. coli* during:

140. Semester 1 2023 (maximum: 24 MPN/100 mL); and

141. Semester 2 2023 (maximum: 24 MPN/100 mL).

These results indicate temporary microbiological contamination within the water distribution system during 2023. However, all microbiological parameters complied with the applicable standards during

2024 and Semester 1 2025, indicating improved water quality management and sanitation control within the Operating Room / Surgery Unit.

Ground Tank

The maximum-value analysis for clean water quality at the Ground Tank during Semester 1 2023, Semester 2 2023, Semester 1 2024, Semester 2 2024, and Semester 1 2025 indicates that most physical and chemical parameters complied with the applicable limits established by national and international standards.

Non-compliance was identified for:

142. Total Coliform during:

- Semester 1 2023 (maximum: 31 MPN/100 mL); and
- Semester 2 2023 (maximum: 32 MPN/100 mL);

143. Iron (Fe) during:

- Semester 1 2023, Semester 2 2023 and Semester 2 2025 (maximum: 2 mg/L), exceeding both the Indonesian standard (1 mg/L) and WHO guideline value (0.3 mg/L).

These findings indicate intermittent microbiological contamination and elevated iron concentration likely associated with corrosion, sediment accumulation, or insufficient maintenance of the ground tank and water distribution system during 2023. Monitoring results during 2024 and Semester 2 2025 showed significant improvement, with all evaluated parameters complying with both national and international standards.

4.13.2 Groundwater Abstraction and Seawater Intrusion Context

In addition to water quality, the groundwater quantity and regional hydrogeological setting are relevant to the baseline. The site lies within the Jakarta Groundwater Basin (CAT Jakarta), a regionally stressed multi-aquifer system in which decades of over-abstraction across Jabodetabek have produced piezometric drawdown and land subsidence of approximately 1–5 cm/year (BIG, 2020). Seawater (saline) intrusion within this basin is documented mainly along the northern coastal belt of Tangerang Regency and Jakarta and is driven primarily by deep-aquifer overdraft. The hospital is located inland in Neglasari, Tangerang City, upgradient of the Java Sea coastline (the Cisadane discharges to the sea at Tanjung Burung), and is therefore outside the active intrusion front.

To support the assessment on the groundwater abstraction to the seawater intrusion, the project has conducted the groundwater sampling at the exisiting groundwater well. The key parameters commonly used to assess the potential for seawater intrusion in groundwater include chloride, electrical conductivity (EC), total dissolved solids (TDS), salinity, sodium, and ionic ratios such as Na/Cl and Cl/HCO_3. Chloride is an important indicator because it is relatively conservative and is one of the dominant ions in seawater (Barlow, 2003; Moore, 2000). Meanwhile, EC and TDS are used to identify increased groundwater mineralization; however, their interpretation should be confirmed together with chloride and ionic ratios to distinguish seawater influence from geochemical processes or other anthropogenic sources (Barlow, 2003; Klassen & Allen, 2014). In terms of salinity, freshwater generally has a salinity of ≤0.5 ppt, while values above this range may indicate a transition towards brackish or

saline conditions (USEPA, 2009). Therefore, where laboratory results show low chloride, low salinity, and EC and TDS values that remain within the freshwater range, the indication of seawater intrusion can be assessed as low (Barlow, 2003; USEPA, 2009; Klassen & Allen, 2014). Table 25 shows the groundwater quality assessment for seawater intrusion potential.

Table 25 Groundwater Quality Assessment for Seawater Intrusion Potential

Parameter	Laboratory Result	National Standard	International Standard	Interpretation in Relation to Seawater Intrusion Potential
Electrical Conductivity / EC	580 µS/cm	Groundwater quality is classified as safe where EC is <1,000 µS/cm. The "vulnerable" category starts at 1,000–1,500 µS/cm *(Ministry of Energy and Mineral Resources, 2018).*	Chloride, EC, and TDS are commonly used as key indicators for assessing potential saltwater intrusion. An increase in EC should be interpreted together with chloride and TDS trends *(Klassen & Allen, 2014).*	The EC value of 580 µS/cm remains below the national threshold of 1,000 µS/cm and does not indicate elevated salinity. Since chloride is also very low, this parameter does not indicate significant seawater intrusion.
Total Dissolved Solids / TDS	342 mg/L	Groundwater quality is classified as safe where TDS is <1,000 mg/L for groundwater conservation assessment *(Ministry of Energy and Mineral Resources, 2018).*	Freshwater is generally classified as water with TDS <1,000 mg/L, while brackish water is typically within the range of 1,000–35,000 mg/L *(Barlow, 2003).*	The TDS value of 342 mg/L is well below the brackish water threshold. Although it may slightly exceed the drinking water criterion shown in the laboratory report, it remains within the freshwater range and does not provide sufficient evidence of seawater intrusion.
Salinity	0.3 ppt	No specific numerical salinity threshold is provided under MEMR Regulation No. 31/2018; however, groundwater quality monitoring includes physical and chemical parameters relevant to seawater intrusion assessment *(Ministry of Energy and Mineral Resources, 2018).*	Freshwater generally has salinity of ≤0.5 ppt; oligohaline water ranges from 0.5–5 ppt; mesohaline from 5–18 ppt; polyhaline from 18–30 ppt; and euhaline/seawater is >30 ppt *(USEPA, 2009).*	The salinity value of 0.3 ppt is still within the freshwater category. This parameter does not indicate brackish or saline conditions and therefore does not support evidence of seawater intrusion.
Chloride / Cl^-	6 mg/L	Monitoring of seawater intrusion is carried out through the analysis of chloride concentration in groundwater and other supporting elements *(Ministry of Energy and Mineral Resources, 2018).*	The secondary drinking water standard for chloride is 250 mg/L *(USEPA, 2024).* Seawater contains chloride at concentrations far higher than freshwater, approximately 19,000 mg/L *(Barlow, 2003).*	The chloride concentration of 6 mg/L is very low and far below the 250 mg/L reference level. Since chloride is one of the most important indicators of seawater intrusion, this result strongly suggests that the sample

Parameter	Laboratory Result	National Standard	International Standard	Interpretation in Relation to Seawater Intrusion Potential
				has not been enriched by seawater-derived chloride.
Sodium / Na^+	95 mg/L	Sodium is included as one of the groundwater chemical parameters monitored together with chloride, bicarbonate, sulfate, nitrate, and TDS *(Ministry of Energy and Mineral Resources, 2018).*	Seawater contains sodium at concentrations far higher than freshwater, approximately 10,500 mg/L *(Barlow, 2003).*	Sodium at 95 mg/L is far below typical seawater concentrations. Since elevated sodium is not accompanied by elevated chloride, the observed sodium level is not characteristic of seawater intrusion and may be related to local geochemical processes or non-marine dissolved minerals.
Na/Cl Ratio	16	There is no specific national numerical standard for the Na/Cl ratio. However, ionic ratios may be used as supporting indicators to interpret salinity sources, together with sodium, chloride, EC, and TDS *(Ministry of Energy and Mineral Resources, 2018).*	Chemical indicators such as chloride, EC, TDS, and ionic ratios are used to assess potential saltwater intrusion. Chloride, EC, and TDS are among the most useful indicators for identifying saltwater intrusion *(Klassen & Allen, 2014).*	The Na/Cl ratio of 16 does not reflect a typical seawater intrusion pattern, as seawater influence would normally increase both sodium and chloride. With chloride only 6 mg/L, the high ratio does not support evidence of seawater intrusion. The ratio should also be verified using molar or equivalent units if required for detailed hydrochemical interpretation.

Based on the comparison with national and international references, the AT.1 groundwater sample does not show strong evidence of seawater intrusion. The key seawater intrusion indicators, particularly chloride, salinity, EC, and TDS, remain within freshwater or non-saline ranges. Chloride is very low at 6 mg/L, salinity remains within the freshwater category at 0.3 ppt, EC is below the national "safe" threshold at 580 µS/cm, and TDS remains far below the brackish water range. Therefore, the AT.1 groundwater sample can be interpreted as fresh groundwater / non-saline groundwater, with a low indication of seawater intrusion at the time of sampling. Nevertheless, periodic monitoring of groundwater level, EC, TDS, salinity, chloride, sodium, and Na/Cl ratio is recommended, particularly during the dry season or during periods of increased groundwater abstraction.

Communities around RS Sitanala that use bore wells or pumped wells are generally estimated to abstract groundwater from shallow to intermediate aquifers. Based on the technical characteristics of pumps and groundwater conservation guidelines, shallow domestic pumped wells are generally associated with groundwater depths of approximately 6–25 meters, while abstraction from unconfined aquifers for household use generally occurs at depths of less than 40 meters.

Therefore, community wells are likely to be shallower than the RS Sitanala well, which has a total depth of 100 meters and abstracts groundwater from an aquifer interval of 60–100 meters. Groundwater abstraction by RS Sitanala is not expected to directly affect shallow community wells, provided that the pumping is used only as a backup source, the abstraction rate is controlled, and the well construction is properly maintained. However, monitoring of groundwater levels and water quality remains necessary to ensure that there is no decline in aquifer pressure or increase in salinity-related parameters such as TDS, electrical conductivity (EC), and chloride.

4.14 Traffics

4.14.1 Existing Traffic Condition at Sitanala Road

The traffic baseline characterizes existing traffic volumes, traffic composition, access routes, parking conditions, road capacity, and transportation patterns in and around the project area. This baseline contributes to the impact assessment by providing the foundation for evaluating construction-related traffic, workforce movements, material deliveries, ambulance access, and operational traffic increases resulting from The Sitanala Hospital expansion. The information supports the assessment of traffic congestion, road safety risks, emergency access, community disturbance, and transportation infrastructure requirements, while informing traffic management and mitigation measures.

Based on the review of the Environmental Evaluation Document (DELH, 2019), the current activities of The existing Sitanala Hospital have contributed to traffic impacts, particularly along Dr. Sitanala Road, with a traffic generation value of 65.93 passenger car units (PCU)/hour. Analysis of the field survey data indicates that the performance of this road segment during the afternoon peak hours is poor, with a V/C ratio of 1.23. Referring to the Regulation of the Minister of Transportation Number 96 of 2015, the current condition of Dr. Sitanala Road is categorized as Level of Service (LOS) F, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.

The poor volume-to-capacity ratio on Dr. Sitanala Road is primarily due to its function as a major arterial road connecting Tangerang City with the northern part of Tangerang Regency. In addition, the road serves as an access route to Soekarno-Hatta International Airport through both the northern and

southern perimeter roads, as well as access to the Sedyatmo Toll Road. Furthermore, both ends of Dr. Sitanala Road consists of several intersections, including the seven-leg intersection located at the northern end of the road and the three-leg Buroq Road intersection located at the southern end. These intersections are not equipped with traffic signals, resulting in restricted vehicle movement during peak traffic periods.

The implementation of a boom gate positioned within The Sitanala Hospital site, together with the separation of entry gates for two-wheeled and four-wheeled vehicles, has enabled vehicle queues entering The Sitanala Hospital to be contained within The Sitanala Hospital premises, thereby minimizing additional traffic burden on Dr. Sitanala Road. In addition, the separation of entry and exit gates reduces the concentration of crossing movements between vehicles entering/exiting The Sitanala Hospital and vehicles traveling along Dr. Sitanala Road, thereby minimizing traffic disturbances caused by crossing activities.

4.14.2 Existing Parking Area Conditions

Based on the baseline data, the existing parking area at RS Sitanala has a capacity of 246 car parking space units (*Satuan Ruang Parkir -SRP*) and 650 motorcycle parking space units (SRP). The existing parking land area is 7,339.10 m². Under the existing condition, the minimum required parking bay area is 4,050 m²; therefore, approximately 3,289.10 m² remains available for vehicle circulation and manoeuvring. This indicates that the existing parking provision is adequate for the current hospital operation. Existing Parking Capacity And Minimum Parking Area Requirement is shown in Table 26.

Table 26 Existing Parking Capacity and Minimum Parking Area Requirement

Component	Value	Basis of calculation / notes
Existing car parking	246 SRP	Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/2000/2024 on the Master Plan for the Development of Dr. Sitanala Central General Hospital Tangerang
Existing motorcycle parking	650 SRP	Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/2000/2024 on the Master Plan for the Development of Dr. Sitanala Central General Hospital Tangerang
Minimum car parking bay area	3,075 m²	246 × 12.5 m²/SRP*) for cars
Minimum motorcycle parking bay area	975 m²	650 × 1.5 m²/SRP*) for motorcycles
Total minimum parking bay area	4,050 m²	Minimum car parking bay area + minimum motorcycle parking bay area
Existing parking land area	7,339.10 m²	Including circulation/manoeuvring space
Existing circulation/manoeuvring space	±3,289.10 m²	7,339.10 - 4,050 m²

Source : Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/2000/2024 on the Master Plan for the Development of Dr. Sitanala Central General Hospital Tangerang
Note: *) Technical Guidelines for the Provision of Parking Facilities, Directorate General of Land Transportation No. 272/HK.105/DRJD/96.

4.14.3 Parking Capacity Estimation for the project

The proposed development will consist of three main buildings: the Central Surgical Building, the Oncology Building, and the Neurology/Urology Building. The total floor area of the proposed development is 55,950 m². The floor area is summarised in the Table 27.

Table 27 Summary of Proposed Development Buildings and Key Parking Demand Drivers

Building	Floor Area (m²)	Main function	Key capacity drivers for parking demand
Central Surgical Building	19,150	Central surgical services, inpatient wards, ICU/PICU/MCU/burn unit/perinatology, radiology, laboratory, outpatient clinic, and medical education	±206 bed-equivalent, 7 operating room, and recovery area
Oncology Building	20,650	Oncology inpatient wards, chemotherapy day care, oncology surgery, radiotherapy/nuclear medicine, and oncology outpatient services	±67 bed-equivalent and 24 chemotherapy treatment chairs
Neurology/Urology Building	16,150	Neurology/urology inpatient wards, ICU/NICU/simulation, diagnostics, rehabilitation, haemodialysis, endoscopy, biopsy, and ESWL	±66 bed-equivalent and 30 haemodialysis stations
Total	**55,950**	**-**	**±339 bed-equivalent; or ±393 bed-equivalent if chemotherapy chairs and haemodialysis stations are counted as equivalent service units**

Source : Pre DED of Sitanala Hospital Development (2026)

Based on the Table 27, the total additional capacity is estimated at 393 bed-equivalent, taking into account the number of beds in each building and service units such as chemotherapy chairs and haemodialysis stations, which will generate repeated patient and companion trips. The parking demand is calculated using a ratio of 37.5-50 m² per bed under Minister of Health Regulation No. 24 of 2016 on the Technical Requirements for Hospital Buildings and Infrastructure. Accordingly, the required parking area is estimated to range from 14,737.50 m² to 19,650 m². Considering the remaining surplus area within the existing parking provision of 3,289.10 m², the parking area shortfall is estimated to range from 11,448.40 m² to 16,360.90 m².

4.14.4 Parking Adequacy Evaluation

Parking Adequacy Assessment for Existing and with the proposed Development is shown in Table 28.

Table 28 Parking Adequacy Assessment for Existing and with the proposed Development

Condition	Condition / result	Adequacy assessment
Existing condition	Parking area of 7,339.10 m² is greater than the minimum parking bay requirement of 4,050 m²; approximately 3,289.10 m² is available for circulation.	Adequate for existing activities, provided that peak-hour occupancy does not exceed capacity and emergency access remains unobstructed.
With the proposed development	Parking demand of 14,737.50-19,650 m² for approximately 393 bed-equivalent.	Not adequate. The demand exceeds the available surplus area within the existing parking provision and indicates the need for additional integrated parking design.

Based on the parking adequacy evaluation, the recommendations for the RS Sitanala development are as follows:

144. Provide an additional parking area/parking building of at least 14,737.50 m² to serve the proposed development. This value should be treated as an initial minimum requirement and should be further verified during the detailed engineering design (DED), parking occupancy survey, and traffic impact analysis.

145. Use the range of 14,737.50 m^2 -19,650 m² as a more conservative design target (±393 bed-equivalent capacity) is adopted as the planning basis.

146. If land availability is constrained, prioritise a multi-storey parking building, basement parking, or other structured parking options so that parking needs do not reduce green open space, pedestrian routes, evacuation routes, or emergency response areas.

147. Maintain the existing parking capacity of 246 cars and 650 motorcycles during both the construction and operational phases. Construction worker parking areas should be separated from patient/visitor parking and must not use ambulance routes, patient drop-off areas, or emergency care areas.oProvide priority parking for ambulances, persons with disabilities, elderly users, pregnant women, patients with limited mobility, and patient drop-off areas near priority services.oPrepare an internal traffic management plan that separates the flows of patients/visitors, staff, logistics vehicles, ambulances, fire trucks, and construction vehicles.

148. Conduct parking occupancy surveys at minimum during peak outpatient clinic hours, visiting hours, staff shift changes, and high-demand service days such as haemodialysis/chemotherapy service days.

149. Equip parking areas with traffic signs, pavement markings, lighting, pedestrian access that is protected from vehicle traffic, drainage systems, CCTV, and one-way traffic arrangements where required.

4.15 Asbestos Containing Material

The Asbestos Audit Report was prepared to identify the potential presence of Asbestos Containing Materials (ACM) or suspected ACM within the RSUP Dr. Sitanala Tangerang facility. The audit was conducted as part of occupational health and safety risk management, environmental protection, and the prevention of potential asbestos fibre exposure to workers, patients, visitors, and surrounding communities.

The audit was carried out through field inspection, visual identification of suspected ACM, selective material sampling, site documentation, laboratory analysis using Scanning Electron Microscope (SEM), SEM-EDS, elemental mapping, and X-Ray Diffraction (XRD), as well as risk assessment based on the physical condition of the materials and the potential for disturbance during operation, maintenance, renovation, or demolition activities.

The inspected areas included the main hospital buildings, medical service buildings, inpatient wards, clinics, warehouses, utility areas, WWTP, waste treatment facilities, staff housing areas, corridors, roofing, ceilings, panels, pipes, insulation, and older buildings. The asbestos distribution map in the report identifies suspected ACM locations and sampling points within the hospital area.

Three main samples were collected and analysed. Sample #1, taken from the demolition area/roof corridor area, showed fine, elongated, interlinked fibre structures and contained C, O, Mg, Al, Si, and Ca. This sample is strongly indicated as suspected ACM and requires further confirmation. Sample #2, taken from an old building/material component, showed elongated structures resembling fibre bundles or rods, with rough surfaces, cracks, and detected elements including C, O, Mg, Al, Si, and Ca. This sample is also strongly indicated as suspected ACM, particularly if it originated from old roofing, panels, or similar building materials. Sample #3, taken from a building material surface, appeared more compact and did not show dominant long fibres, although thin elongated fragments and elements such as C, N, O, Mg, Al, and Si were detected. This sample cannot yet be confirmed as ACM but should continue to be treated as suspected ACM until further laboratory confirmation is obtained.

Overall, Sample #1 and Sample #2 show the strongest indication of suspected asbestos-containing material, mainly due to the fibrous morphology observed under SEM and the detection of Si and Mg, which may be associated with silicate minerals. However, the report notes that SEM, SEM-EDS, and visual XRD interpretation alone are not sufficient to definitively confirm the presence of asbestos. Further confirmation using Polarized Light Microscopy (PLM), XRD phase matching, or Transmission Electron Microscopy (TEM) is recommended.

The key risks are associated with fibrous materials that are damaged, friable, weathered, exposed, or likely to be disturbed by activities such as cutting, drilling, rough cleaning, maintenance, renovation, or demolition. If disturbed without proper controls, these materials may release fibres or fine particles into the air, potentially exposing workers, patients, visitors, and nearby communities.

The report recommends that all materials with fibrous characteristics, particularly those represented by Sample #1 and Sample #2, be treated as suspected ACM until final confirmation is available. Recommended control measures include preparing and maintaining an ACM inventory, labelling

suspected ACM areas, restricting access to risk areas, securing damaged materials, implementing safe work procedures and permit-to-work controls, providing training and awareness for relevant staff and contractors, applying appropriate PPE and dust-control measures, and ensuring proper hazardous waste management if ACM is removed or demolished.

The audit also notes certain limitations, as sampling was conducted selectively and does not necessarily represent all similar materials across the hospital site. Therefore, the audit findings should be used as an initial basis for asbestos risk management, and further inspection or confirmatory testing should be undertaken before any renovation, demolition, or major maintenance works involving old building materials.

In conclusion, The Project should implement a systematic and precautionary asbestos management approach. Materials represented by Sample #1 and Sample #2 should be prioritized as suspected ACM, while Sample #3 should continue to be monitored and managed cautiously until confirmatory laboratory results are available. These measures should be integrated into the ESMP, bidding documents, contractor requirements, and construction supervision arrangements to ensure compliance with applicable national regulations and AIIB environmental and social requirements.

5 SOCIAL BASELINE

5.1 Demographic Profile of the area of Influence

Tangerang City, located in Banten Province and forming part of the Greater Jakarta metropolitan area (Jabodetabek), exhibits a relatively advanced socio-economic profile characterized by stable population growth and a diversified urban economy. As of 2025, the total population is estimated at approximately 1.98 million (BPS of Tangerang City, 2025). The city benefits significantly from its strategic proximity to Jakarta and the presence of key national infrastructure, including Soekarno-Hatta International Airport, which is situated within the administrative boundary of Tangerang. The local economy is primarily driven by manufacturing, trade, transportation, warehousing, and service sectors. Poverty levels have shown a gradual decline from approximately 5.22% in 2020 to around 4.5% in 2025, indicating improving socio-economic conditions supported by urban employment opportunities and public service expansion (Based on Statistical Bureau of Tangerang City 2025, it is stated that poverty levels have continued to decrease alongside economic growth trends).

The primary Area of Influence (AoI) includes Neglasari District and surrounding urban neighborhoods, with an estimated population of approximately 140,000–160,000 people. This area is characterized by mixed land use, including residential settlements, small-scale commercial activities, and proximity to airport-related economic zones. The broader primary catchment extends to Tangerang City as a whole, with a population approaching 2 million. The secondary AoI reflects the hospital's function as a referral healthcare facility and includes the wider Tangerang Raya region (Tangerang City, South Tangerang City, and Tangerang Regency), with a combined population exceeding 6 million, as well as linkages to Greater Jakarta and the Banten Province (BPS of Tangerang City, 2025).

Demographically, the population structure in the primary AoI reflects an urban profile, with approximately 70–72% of residents in the working-age group (15–64 years), a dependency ratio of around 42–45, and a relatively balanced gender composition. Educational attainment levels are higher than the national average, with most residents having completed senior secondary education and an estimated 12–15% of the working-age population holding tertiary qualifications. Neglasari District, as part of the urban core influenced by airport-related economic activity, shows relatively favorable human development indicators compared to more peripheral or densely populated informal settlements (Based on Statistical Bureau of Tangerang City 2025, it is stated that education attainment and labor force participation rates in urban districts remain comparatively high).

From an ESIA-ESMP perspective, these demographic and socio-economic characteristics highlight the need for inclusive benefit-sharing mechanisms in the development or expansion of Sitanala Hospital. The primary AoI is expected to experience direct impacts from construction activities, including increased traffic congestion, noise, and temporary disruption to local mobility, particularly given the site's proximity to major transport corridors and airport access routes. At the same time, the relatively high proportion of working-age and semi-skilled to skilled labor presents an opportunity for local employment absorption. Therefore, the ESMP should incorporate inclusive labor management strategies, including gender-equitable employment practices, targeted recruitment of local workers, and consideration of vulnerable groups, particularly those residing in dense settlements or engaged in informal economic activities within the project vicinity.

5.1.1 Social Area of Influence (AoI)

The social Area of Influence (AoI) encompasses Mekar Sari Village (RW 001 and RW 002) **and** Karang Sari Village (RW 001, RW 002, RW 003, RW 012, and RW 013)**.** Mekar Sari Village is predominantly characterized by small-scale commercial activities and micro, small, and medium enterprises (MSMEs) operating along the sidewalks and road corridor surrounding the hospital, particularly along Dr. Sitanala Street (Jl. Dr. Sitanala). In contrast, Karang Sari Village exhibits a more diverse land use pattern, comprising residential neighborhoods, educational facilities, official housing for RSUP Dr. Sitanala staff, and a community of former leprosy patients with long-standing historical and social ties to the hospital.

Based on their proximity to and interaction with the Project, communities within the AoI demonstrate varying levels of social sensitivity. Communities located adjacent to the hospital are considered higher-sensitivity social receptors due to their greater exposure to potential changes in access, mobility, traffic conditions, and construction-related activities. Communities located further from the Project footprint nevertheless maintain functional linkages with the hospital through the use of healthcare services, participation in local economic activities, and daily travel patterns.

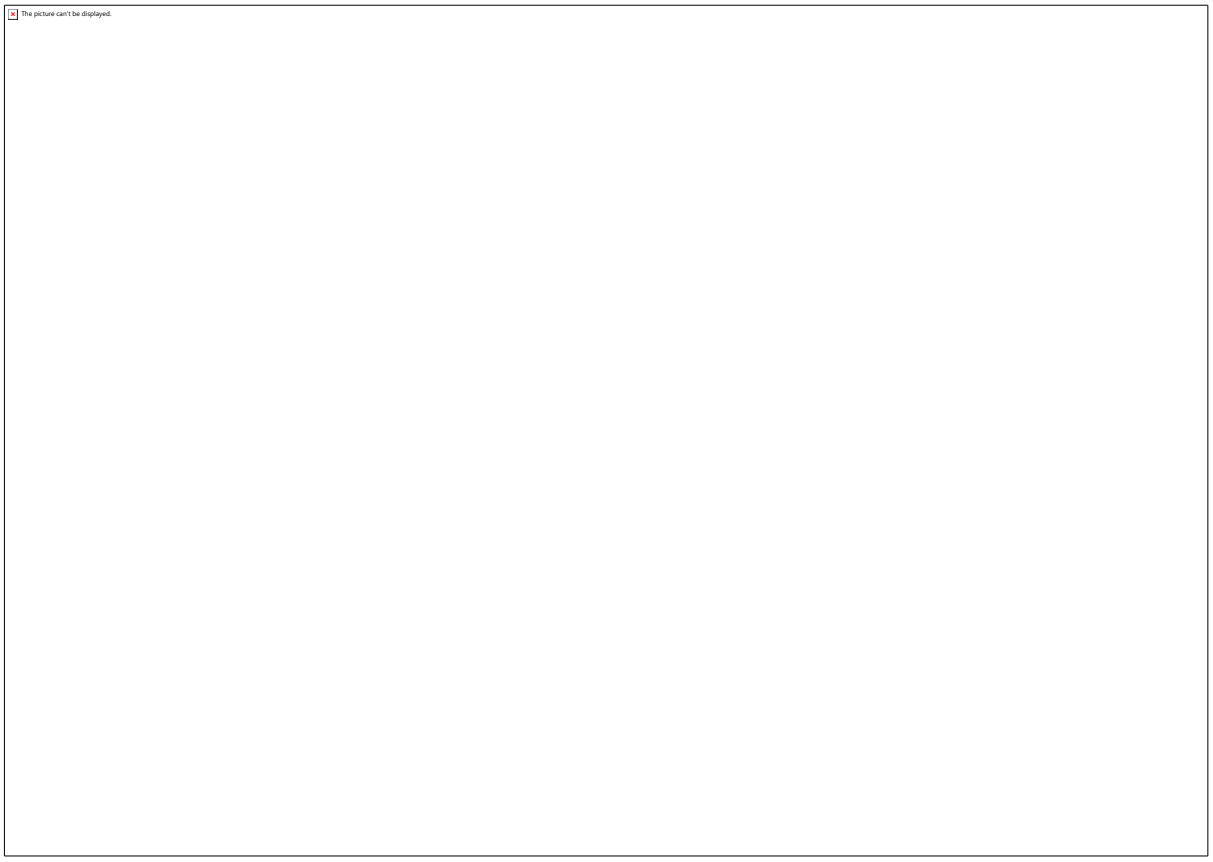


Figure 35 Social Area of Influence of RSUP Dr. Sitanala

The principal social receptors within the AoI include households surrounding the Project site, affected neighborhood associations (RT/RW), women, children, older persons, persons with disabilities, low-income households, and the community of former leprosy patients. Institutional receptors include schools, places of worship, healthcare facilities, village administrative offices, community organizations, and other public service facilities.

Overall, Mekar Sari and Karang Sari Villages constitute the primary social receptors for the Project and form the focus of the social baseline assessment, social impact identification, stakeholder engagement

activities, and the management of Project impacts and benefits throughout both the construction and operational phases of RSUP Dr. Sitanala.

5.1.2 Population Presence and Distribution

The RSUP Dr. Sitanala development area is situated within an established urban environment surrounded by residential communities, primarily in Mekar Sari Village and Karang Sari Village. These villages form part of the Project's social Area of Influence (AoI) and maintain direct functional relationships with hospital activities, serving both as residential areas and as access corridors to healthcare services and other public facilities. Residential neighborhoods are located immediately adjacent to the hospital boundary, resulting in long-established and continuous interactions between the hospital and the surrounding communities as part of everyday life. Population density in both villages is relatively high, resulting in a substantial concentration of social receptors within the Project's surrounding area.

In addition to residential settlements, the AoI includes various public facilities utilized by local communities, including educational institutions, places of worship, healthcare facilities, elderly care foundations, and other public service facilities. The presence of these facilities indicates that the Project surroundings are characterized by a high intensity of community activities and public use. The immediate spatial proximity between the Project site and surrounding residential areas, together with the distribution of settlements and public facilities along the boundary and within the vicinity of the proposed hospital development, reflects a strong spatial and functional interrelationship between the hospital and the surrounding urban communities. Daily community activities take place alongside public service facilities, creating a closely integrated socio-spatial environment in which the Project and neighboring communities are intrinsically interconnected.

5.1.3 Population Characteristics

The population within the Project's Area of Influence (AoI) exhibits diverse social characteristics representative of an urban community. In addition to residents living in the vicinity of the Project site, the area serves as a focal point for daily activities undertaken by patients, hospital visitors, healthcare personnel, hospital employees, users of public facilities, and individuals engaged in economic and social activities. The area surrounding the hospital is occupied and utilized by a wide range of community groups with varying characteristics, including vulnerable groups that require particular consideration with respect to accessibility and the provision of public services. These groups include children, older persons, persons with disabilities, hospital patients, pregnant and breastfeeding women, and households with specific socio-economic vulnerabilities.

The diversity of these population groups indicates that the area surrounding RSUP Dr. Sitanala comprises a complex social environment with a broad range of service needs and varying levels of sensitivity to potential Project impacts.

5.1.4 Community Mobility Patterns and Accessibility

Community mobility within and around the RSUP Dr. Sitanala area occurs on a daily basis. Roads surrounding the hospital are shared by local residents, patients, visitors, healthcare personnel, hospital service vehicles, public transport, and other road users. The access corridors leading to the hospital also function as primary transportation routes connecting surrounding residential areas with educational institutions, places of worship, commercial areas, and other public service facilities. Consequently, the road network surrounding the hospital serves a dual function, providing access to

healthcare services while supporting the daily mobility needs of the surrounding communities. In addition to motorized traffic, these corridors are regularly used by pedestrians, including children, older persons, persons with disabilities, and other community members who require safe, convenient, and accessible pedestrian infrastructure. The observed mobility patterns indicate that the hospital is an integral component of the surrounding urban transport network, with relatively high levels of daily movement and interaction among different user groups.



Figure 36 Community Access Routes and Daily Mobility Patterns in the Vicinity of the Project Site

5.1.5 Public Facilities and Essential Services

The Project's Area of Influence (AoI) is served by a range of public facilities and essential services that are used by local communities on a daily basis. These include:

150. Educational facilities (kindergartens, primary schools, and a polytechnic institution)

151. Places of worship (mosques and a Chinese temple)

152. Healthcare facilities and an elderly care foundation; and

153. Other public service facilities.

RSUP Dr. Sitanala is one of the principal healthcare providers in the area, serving communities both within the surrounding neighborhoods and from other regions. Accordingly, reliable access to the hospital constitutes a critical component of the local public service system and healthcare delivery network. In addition to healthcare services, surrounding communities depend on the local road

network to access educational institutions, places of worship, commercial areas, government services, and other essential public facilities.

5.1.6 Existing Accessibility Conditions

The existing accessibility conditions indicate that access to the hospital is highly dependent on the local road network connecting surrounding residential areas with nearby public facilities. These roads are shared by local residents, hospital users, healthcare service vehicles, public transport, and vehicles involved in the delivery of goods and services.

The area's accessibility is characterized by a high degree of dependence on efficient traffic circulation and connectivity among key public facilities. Access to the hospital forms an integral part of the broader public service network that supports the continued provision of healthcare services to the surrounding population. In addition to motorized traffic, the area experiences substantial pedestrian activity, including use by vulnerable groups such as children, older persons, and persons with disabilities. This highlights the importance of maintaining safe, accessible, and uninterrupted access as a key component of the social baseline within the Project's Area of Influence.

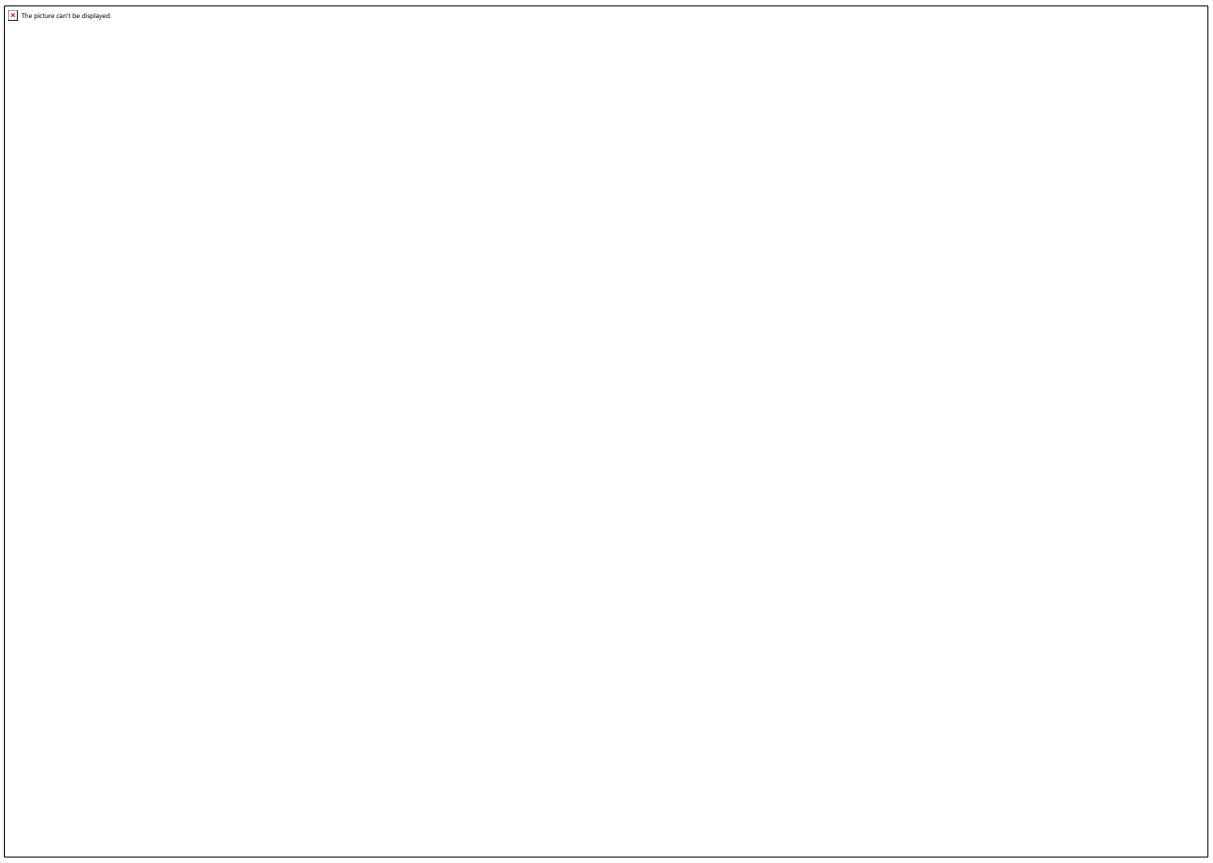


Figure 37 Existing Road Access Conditions in the Vicinity of the Project Site

5.1.7 Social Baseline Context

Based on the existing conditions, the proposed development area of RSUP Dr. Sitanala is characterized as an established institutional healthcare complex that has been developed and utilized for hospital services and their supporting functions over an extended period. The key baseline characteristics of the project area include:

154. All land within the proposed development area is owned and managed by the Ministry of Health of the Republic of Indonesia;

155. No privately owned land is located within the project footprint;

156. No informal land occupation or informal land use by surrounding communities has been identified within the project area;

157. The site has long functioned as an active healthcare service area;

158. The project area previously included official staff housing as part of the hospital's institutional facilities; and

159. Several operational support facilities, including the Prosthesis Building, the Procurement Unit (ULP) Building, and parking areas, are located within the development area.

These baseline conditions indicate that the proposed Project primarily involves the reorganization and redevelopment of existing institutional functions within the hospital compound rather than changes in land ownership, land tenure, or community land use. Consequently, from a social baseline perspective, the Project does not alter community land ownership patterns or existing land use in the surrounding area.

The relocation of staff housing occupants and the relocation of several operational facilities represent institutional asset reorganization undertaken within the existing hospital complex. These conditions provide the baseline context for assessing potential social impacts during subsequent stages of the ESIA.

5.1.8 Existing Relocation Status

As part of the hospital's institutional asset restructuring programme, several internal functions were relocated prior to commencement of the proposed development. Based on available information, the occupants of 26 official staff housing units were relocated in 2024 to alternative residential facilities located on land owned by the Ministry of Health. This relocation was completed prior to the preparation and implementation of the proposed AIIB-financed Project.

In addition, several operational functions, including the Prosthesis Building, the Procurement Unit (ULP) Building, and parking facilities, are planned to be relocated to suitable replacement facilities as part of the hospital redevelopment programme before construction activities commence. The relocation activities involve only institutional assets and operational functions of RSUP Dr. Sitanala. They do not involve the displacement of surrounding communities, acquisition of privately owned land, changes in land ownership or tenure, or loss of community livelihoods.

The relocation of the official staff housing and associated institutional facilities was undertaken independently of the proposed AIIB-financed Project as part of the hospital's internal asset restructuring programme completed in 2024. Consequently, the proposed Project does not trigger

land acquisition or involuntary resettlement under AIIB ESS5. Nevertheless, a due diligence review has been undertaken to confirm that no outstanding legacy social issues associated with the previous institutional relocation remain that could affect the implementation of the proposed Project.

5.2 Economic and Livelihood Context

Tangerang City's economy is characterized by a strong urban industrial base supported by manufacturing, trade, logistics, and service sectors. As part of the Greater Jakarta metropolitan area, the city plays a strategic role in national and regional economic systems, with Gross Regional Domestic Product estimated at approximately IDR 310 to 330 trillion at current prices in 2024. The economic structure is dominated by processing industries at around 30 to 35 percent, followed by wholesale and retail trade at around 15 to 20 percent, and transportation and warehousing at around 10 to 15 percent. Construction and other services also contribute significantly. Agriculture plays only a minor role due to the urban character of the city. The presence of Soekarno Hatta International Airport strengthens the logistics and trade sectors and connects Tangerang to national and global value chains. Industrial estates and commercial areas further support the city's role as a production and distribution hub. This structure supports Tangerang as a mature urban growth center, although disparities remain between formal economic zones and densely populated settlements with limited access to stable employment and services. Based on Statistical Bureau of Tangerang City 2025, it is stated that the economy is dominated by manufacturing, trade, and logistics sectors with minimal agricultural contribution.

Economic growth in Tangerang City has remained stable during the post pandemic recovery period, reaching approximately 5.0 to 5.3 percent in 2024. This shows a slight improvement compared to previous years. Growth has been driven by transportation and warehousing, recovery in manufacturing, and increasing domestic consumption. The transportation and logistics sector benefits from high mobility, airport related activities, and the expansion of e commerce. Service sectors such as health, education, and business services also contribute to employment and demand. Early 2025 trends indicate continued growth at around 5.1 percent, which is in line with or slightly above the Banten provincial average. This reflects resilience during national economic recovery. Based on Statistical Bureau of Tangerang City 2025, it is stated that transportation, warehousing, and manufacturing are key drivers of regional economic growth.

Income levels in Tangerang City reflect its urban economic advantage, with GRDP per capita estimated at approximately IDR 160 to 180 million in 2024. This indicates relatively strong average welfare, although income distribution remains uneven. Urban households typically earn between IDR 6 to 12 million per month depending on employment type, while lower income and informal workers may earn below IDR 4 to 5 million per month. Poverty has declined to approximately 4.5 percent in 2025, yet a portion of the population remains vulnerable. This includes informal workers, daily wage laborers, and small scale service providers. These groups are sensitive to shocks such as rising living costs, health issues, and job instability. Spatial inequality is still present, with higher income groups concentrated in planned residential and industrial areas, while lower income communities are often located in dense settlements with limited access to infrastructure and services. Based on Statistical Bureau of Tangerang City 2025, it is stated that although poverty levels are relatively low, income inequality and urban vulnerability remain key challenges.

5.2.1 Local Businesses Surrounding project Location

The Project provides opportunities for local employment, business participation, and support for mitigation measures, yet the presence of vulnerable groups and low income households creates a risk of unequal distribution of project benefits and heightened exposure to environmental and social impacts, including pollution, increased cost of living, and competition for jobs. In the two kelurahan surrounding Sitanala Hospital, many local businesses rely strongly on accessibility and daily mobility flows, with the stream of customers passing the hospital gates and surrounding streets forming the main basis for business sustainability, particularly for food vendors, small traders, and service providers located opposite the main entrance and behind the hospital area. Within the hospital grounds, the canteen and the Roti'O outlet also operate as economic receptors whose viability is closely tied to footfall generated by patients, their families, hospital staff, and visitors on a daily basis.

Against this backdrop, project development such as the expansion of Sitanala Hospital should prioritize inclusive employment, targeted support for these local businesses, and improved access and safe mobility conditions for vulnerable communities and economic receptors, recognizing that changes in traffic patterns, construction activities, and hospital operations can directly influence customer flows and local income generation. Measures may include maintaining safe and convenient pedestrian routes, managing construction related disruptions to minimize reduced accessibility, and engaging with business owners to identify practical ways the project can help sustain or enhance their livelihoods during and after implementation. Continuous monitoring of traffic, pedestrian safety, and local economic activity is essential to ensure that development does not exacerbate existing inequalities or undermine the resilience of small enterprises that depend on hospital related customer flows, but instead contributes to a more inclusive and sustainable urban economy in the Sitanala area of Tangerang City.

5.3 Livelihood and Local Economy

5.3.1 Livelihoods

The study area, covering **Mekar Sari** and **Karang Sari** Subdistricts, exhibits predominantly urban socio-economic characteristics, with livelihoods largely concentrated in the informal sector, particularly micro-enterprises, small-scale trade, daily wage labor, and service-related activities. The livelihood structure reflects a relatively high dependence on local economic activities and daily mobility within the surrounding area.

In **Mekar Sari Subdistrict**, the majority of residents are engaged as micro-enterprise operators and small traders (77.8%), primarily in the food and beverage sector, including daytime and nighttime street food vendors and small retailers. These livelihood activities are closely linked to customer flows, accessibility, and the dynamics of economic activities within the surrounding service area.

In **Karang Sari Subdistrict**, the livelihood structure is more diverse, with the dominant sectors comprising micro, small, and medium enterprises (MSMEs) (28.9%), daily wage labor (26.3%), and service-related occupations. This indicates that household livelihoods are highly influenced by daily economic activities and the mobility of the local workforce. MSME operators, particularly those engaged in the food and beverage sector, are more dependent on business location and visitor traffic, while daily wage workers rely heavily on the availability of employment requiring daily labor mobility.

5.3.2 Household income Vulnerability

Low-income households demonstrate a higher level of vulnerability to income fluctuations. In **Karang Sari Subdistrict**, this vulnerability is reflected by the presence of households earning less than IDR 5.1 million per month, as well as economically inactive households that are more susceptible to changes in economic conditions. This indicates that household economic stability is strongly influenced by the continuity of daily economic activities and the availability of local employment opportunities.

5.3.3 Operational Sensitivity of Local Businesses

Local businesses in both subdistricts are highly dependent on accessibility and community mobility. Daily customer traffic is a key factor in sustaining business operations, particularly for food and beverage vendors, small retailers, and service providers located opposite the main entrance of **Dr. Sitanala Central General Hospital (RSUP Dr. Sitanala)**, as well as those situated behind the hospital premises. Consequently, business continuity is closely influenced by traffic conditions, ease of access, pedestrian movement, and the overall intensity of economic activities in the surrounding area.

Based on the map below, the **café/canteen and hospital tenants** are located within the hospital premises (highlighted in yellow) and are therefore likely to be affected by changes to internal circulation during the construction phase.

Based on the information presented on the map, no vendors appear to be located directly within the footprint of the proposed new buildings. The more likely impacts are temporary access restrictions and a temporary reduction in customer numbers rather than physical displacement or demolition of business assets. However, under AIIB ESS2, temporary loss of access to informal economic activities may still constitute economic displacement. The Project must therefore verify the vendor baseline and assess whether access restrictions could cause loss of income or livelihood; where economic displacement is confirmed, proportionate compensation/livelihood-restoration measures and any Bank-required instrument must be in place before the restriction occurs.

5.3.4 Potential Economic Dynamics and benefit Opportunities

Mobile street vendors (green triangles) are concentrated along the western boundary of the hospital site, adjacent to the main access road. When this main access road is used for the mobilization of heavy equipment and construction materials, mobile street vendors are likely to be the group most vulnerable to temporary disruptions to their economic activities due to reduced customer accessibility and pedestrian movement. In addition to the potential business disruptions described above, the Project is also expected to generate opportunities for increased local economic activity, particularly through higher demand for goods, services, and labour during the construction phase.

5.3.5 Potential Local Employment Opportunities

The development of **RSUP Dr. Sitanala** has the potential to create employment opportunities for local communities, particularly during the construction phase. In **Mekar Sari Subdistrict**, these opportunities are primarily associated with construction labour and project support activities. In **Karang Sari Subdistrict**, local daily wage workers and informal workers may also have opportunities to participate in project-related activities, although such employment is expected to be temporary and predominantly on a daily or casual basis.

5.3.6 Community Expectations Regarding Local Employment

Communities in both subdistricts expressed strong expectations that local residents would be prioritised in the recruitment process. This expectation was consistently identified through household questionnaires and public consultation meetings, reflecting an important aspect of the social dynamics associated with urban development projects.

5.3.7 Capacity Building and Workforce Skills Development

The Project also presents opportunities to enhance the basic skills of the local workforce through participation in construction activities. Skills development is expected to be primarily practical in nature and limited to basic construction-related competencies. Nevertheless, this provides an opportunity for informal knowledge and skills transfer from contractors to local workers through on-the-job experience

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5.4 Community Health and Safety

5.4.1 Community Safety Perception

The screening results indicate that community safety is a relevant issue for the implementation of the Project. Community perceptions of environmental disturbances with the potential to affect safety are relatively high, particularly with respect to dust, which was reported by 77.8% of respondents in **Mekar Sari Subdistrict** and 82.8% of respondents in **Karang Sari Subdistrict**. In addition, noise disturbance was reported by 62.1% of respondents in Mekar Sari and 66.7% of respondents in Karang Sari. The high level of concern indicates that local communities are sensitive to changes in environmental conditions surrounding the Project area.

From a risk perception perspective, some community members also expressed concerns regarding potential construction-related impacts, including accident risks, disruption to daily activities, and environmental conditions perceived as unsafe. In **Karang Sari Subdistrict**, approximately 41.4% of respondents identified the presence of children who regularly play along local roads or in open spaces within residential areas, indicating the presence of vulnerable groups that may be more exposed to community safety risks during Project implementation.

Overall, the baseline conditions indicate that the study area is an active residential environment with frequent public interaction and extensive use of surrounding roads and public spaces. Consequently, community safety represents a key issue requiring careful consideration throughout Project planning and implementation.

5.4.2 Traffic Risks

The community identified traffic-related risks as a relevant issue because the Project site is directly connected to residential neighbourhoods and access routes to healthcare facilities. Community perceptions indicate concerns regarding increased traffic volumes, congestion, road deterioration, and the potential for traffic accidents resulting from Project activities.

Approximately 20.7% of respondents in **Mekar Sari Subdistrict** and 33.3% of respondents in **Karang Sari Subdistrict** identified traffic accidents as an issue requiring particular attention. In addition, respondents expressed concerns regarding traffic congestion and reduced accessibility, which could affect both daily community mobility and access to the hospital.

The vulnerability of local communities to traffic-related risks is further heightened by the presence of children who regularly use roads and surrounding public spaces for recreational activities. Survey results indicate that 41.4% of respondents in **Karang Sari Subdistrict** reported that children frequently play along neighbourhood roads or in nearby open areas. This condition suggests that increased vehicle movements during the construction phase could elevate safety risks for vulnerable groups.

Overall, the baseline assessment indicates that traffic and accessibility are sensitive issues for the surrounding communities and should therefore be carefully considered in the planning and management of Project-related vehicle mobilisation.

5.4.3 Construction Disturbance

The household survey results indicate that construction-related disturbance is a highly sensitive issue for communities surrounding the Project site. Dust was identified as the most significant concern, with

77.8% of respondents in **Mekar Sari Subdistrict** and 82.8% of respondents in **Karang Sari Subdistrict** reporting that existing environmental conditions are already affected by dust. This indicates that ambient air quality is a highly sensitive environmental parameter that may be further affected by construction activities.

In addition to dust, noise was also identified as a significant concern, with 62.1% of respondents in Mekar Sari and 66.7% of respondents in Karang Sari reporting that they already experience noise disturbance under existing conditions. These findings suggest that local communities have a relatively low tolerance for additional noise that may be generated during the construction phase.

Community concern regarding potential Project impacts is also relatively high. Approximately 55.6% of respondents in Mekar Sari and 69.0% of respondents in Karang Sari expressed concerns about potential disturbances associated with Project activities. This level of concern indicates a relatively high degree of social sensitivity to changes in environmental conditions and construction activities in the vicinity of the hospital.

As the Project will be implemented within an operational hospital, construction-related disturbances have the potential to affect not only neighbouring communities but also patients, visitors, and healthcare personnel who use the hospital facilities on a daily basis.

5.4.4 project Security Perception

The survey results indicate that Project security is a relevant issue, given that the Project site is located adjacent to residential communities and public service facilities. The relatively high level of concern regarding potential Project impacts-reported by 55.6% of respondents in **Mekar Sari Subdistrict** and 69.0% of respondents in **Karang Sari Subdistrict**-suggests that local communities are attentive to the various risks that may arise during Project implementation.

Respondents also perceived certain areas surrounding the Project site as being less secure at particular times, especially during the evening, due to relatively quiet roads and access routes leading to the hospital. These conditions indicate that Project security management should take into account the close interaction between Project workers, security personnel, hospital users, and surrounding communities.

The presence of vulnerable groups is another important consideration for Project security management. Survey results indicate that 41.4% of respondents in **Karang Sari Subdistrict** identified children who regularly use public spaces within residential areas. This finding suggests that Project security measures should not only focus on protecting Project assets but should also safeguard surrounding communities, particularly vulnerable groups located near the Project site.

Overall, Project security should be managed through a transparent, communicative, and responsive approach that incorporates effective community engagement and grievance management to maintain positive relationships between the Project and surrounding communities.

5.5 Indigenous Peoples

The screening assessment indicates that no **Indigenous Peoples**, as defined under **ESS3**, have been identified within or surrounding the Project's **Area of Influence**. The communities residing in **Mekar Sari Subdistrict** and **Karang Sari Subdistrict** are urban populations integrated into the formal

government administrative system, public service provision, and the broader socio-economic structures that characterize the urban area of **Tangerang City**.

Based on the assessment findings, no community groups were identified as possessing social, cultural, economic, or political characteristics that are distinct from those of the dominant society, as commonly used to identify Indigenous Peoples under ESS3. Furthermore, no customary institutions, traditional leadership structures, or customary decision-making systems were identified as continuing to perform distinct social or governance functions within the local communities.

With respect to land tenure and natural resource use, the assessment did not identify any customary land rights (*hak ulayat*), customary ownership, or traditional collective tenure arrangements over land or natural resources within the Project area or its surrounding Area of Influence. The Project is located within a well-established urban environment governed under the formal land administration system. Accordingly, no evidence was found of a collective attachment by Indigenous Peoples to lands, territories, or natural resources within the Project's Area of Influence.

The screening also did not identify any sites, objects, cultural landscapes, or locations of cultural or spiritual significance specifically associated with Indigenous Peoples. The social and cultural activities observed within the study area are generally representative of a heterogeneous urban community and do not indicate the presence of traditional cultural practices associated with any distinct Indigenous Peoples group.

Overall, the social baseline indicates that the Project's Area of Influence does not exhibit the characteristics associated with the presence of Indigenous Peoples as defined under ESS3. The local population is representative of an urban community integrated into the prevailing formal social, economic, and institutional systems. Consequently, there is no indication that any groups requiring the specific protections afforded to Indigenous Peoples under ESS3 are present within the Project's Area of Influence.

5.6 Cultural Heritage

This section presents the existing baseline conditions relating to cultural resources and cultural heritage within the Project's **Area of Influence (AoI)** and does not constitute an assessment of Project impacts. The baseline assessment indicates that the **RSUP Dr. Sitanala** Project site does not contain any identified historical sites, designated cultural heritage buildings, known archaeological resources, or tangible cultural heritage assets within the proposed development footprint. However, the assessment identified the presence of **Tjong Tek Bio Temple**, located approximately 1.2 km from the Project site, as a cultural and religious heritage receptor.

5.6.1 Cultural Heritage and Community Identity

Tjong Tek Bio Temple is a living cultural heritage site located in **Mekar Sari Subdistrict, Neglasari District, Tangerang City**. In addition to serving as a place of worship, the temple functions as an important centre of social, cultural, and community life for the **Cina Benteng** community, which has a long-established presence in the Tangerang area.

The temple is believed to have been established around **1830** and represents an important historical record of the Chinese community that developed along the **Cisadane River**. Its heritage value derives not only from the age of the structure but also from its association with the history of migration,

settlement development, and the processes of cultural interaction and assimilation that have contributed to shaping the identity of the local community.

As a living cultural heritage site, **Tjong Tek Bio Temple** continues to be actively used for religious ceremonies, traditional rituals, cultural celebrations, and a range of community activities. These ongoing functions make the temple an important venue for preserving cultural traditions, strengthening social cohesion, and maintaining the collective memory of the local community.

Although **Tjong Tek Bio Temple** has not been formally designated as a protected cultural heritage property, it is widely recognised by the local community as having significant cultural heritage value. From an environmental and social management perspective, the temple is considered a **cultural heritage receptor** with important social, historical, and cultural significance for the surrounding communities.

5.6.2 Spatial Context of the Cultural heritage Receptor

Tjong Tek Bio Temple is located in **Mekar Sari Subdistrict, Neglasari District, Tangerang City**, to the east-southeast of the proposed **RSUP Dr. Sitanala** development area. Based on the mapping of the Project's **Area of Influence (AoI)**, the temple is situated approximately **1.2 km** from the proposed hospital development site.

The area between the Project site and the temple is characterised by urban residential neighbourhoods, local road networks, and other developed land uses, which collectively provide a physical buffer between the Project and the cultural heritage receptor. The temple is accessible via local and neighbourhood roads that are integrated with the surrounding residential areas.

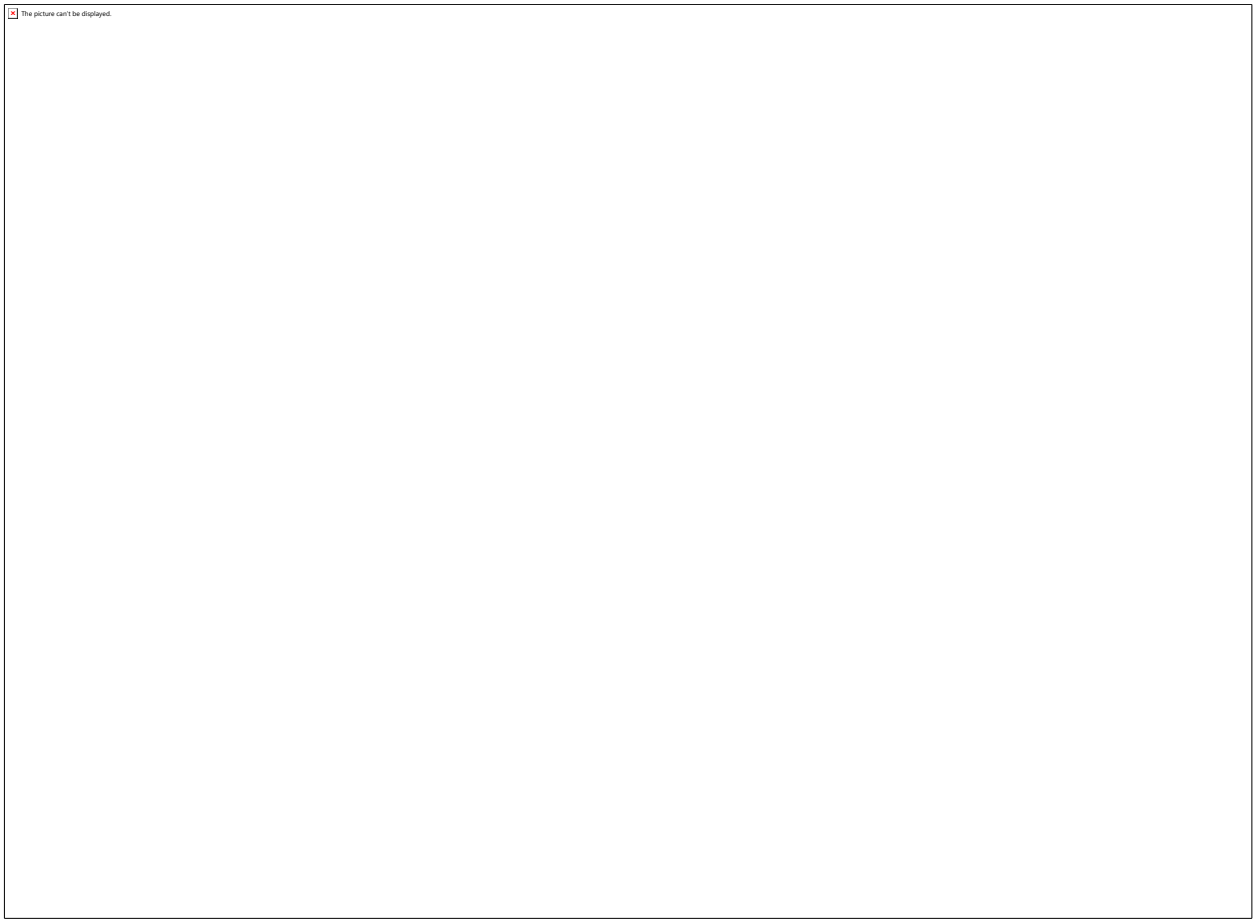


Figure 38 Location of Tjong Tek Bio Temple Relative to the RSUP Dr. Sitanala Development Site

Within the context of the Project's social Area of Influence, **Tjong Tek Bio Temple** is recognised as a cultural heritage receptor representing an important community cultural asset that continues to be actively used by local residents.

Although no known archaeological resources have been identified within the Project area, construction activities involving ground disturbance may result in the unexpected discovery of previously unidentified artefacts, structures, or other archaeological materials. Accordingly, the implementation of a **Chance Finds Procedure** will be an important component of cultural heritage management during Project implementation.

Overall, the cultural heritage baseline within the Project's Area of Influence is characterised primarily by the presence of local cultural and religious assets that hold social, spiritual, and historical significance for surrounding communities. These assets constitute living cultural heritage that continues to be actively used and valued by the local community. Accordingly, the presence of these cultural heritage receptors is an important consideration in the assessment of social impacts and the management of cultural heritage throughout the Project lifecycle.

5.7 Gender Equality

This section aims to understand differences in the conditions, needs, access, participation, and benefits experienced by women and men in the context of the Project. The assessment is based on workforce data obtained from **RSUP Dr. Sitanala**, household questionnaire surveys, and a gender screening assessment.

5.7.1 Hospital Workforce Composition by Gender

Based on hospital workforce data (N = 1,081 employees), the overall gender distribution is relatively balanced, comprising **558 female employees (51.6%)** and **523 male employees (48.4%)**. However, when analysed by occupational category, the workforce composition reveals patterns of occupational segregation that continue to reflect traditional gender roles.

5.7.1.1 Gender Roles and Occupational Segregation

The workforce data indicate a degree of gender-based occupational segregation. Female employees predominate in professions traditionally associated with healthcare delivery and patient care, including nursing (77.1%), midwifery (100%), other health professionals (72.5%), and medical practitioners (60.4%). In contrast, male employees are more strongly represented in occupations related to security, technical services, and operational support, including security personnel (86%), technical and support staff (76.9%), and a proportion of general service personnel (56.8%).

These patterns suggest that, while employment opportunities are available to both women and men, the distribution of occupations continues to reflect gender norms and occupational preferences commonly observed within Indonesia's healthcare and public service sectors.

Table 29 Hospital Workforce Composition by Gender

No.	Occupational Category	Male		Female		Total
		Person	(%)	Person	(%)	
1	Medical Personnel (General Practitioners, Dentists, and Specialists)	44	39.6%	67	60.4%	111
2	Nursing Personnel	57	22.9%	192	77.1%	249
3	Midwifery Personnel	0	0.0%	15	100.0%	15
4	Other Health Professionals (Pharmacists, Laboratory Analysts, Radiographers)	19	27.5%	50	72.5%	69
5	Rehabilitation and Physiotherapy Personnel	4	28.6%	10	71.4%	14
6	Management and Administrative Personnel	149	62.3%	90	37.7%	239
7	Technical and Support Personnel (IT and Medical Equipment Technicians)	10	76.9%	3	23.1%	13
8	General Service Personnel (Cleaning, Laundry, Kitchen Services)	154	56.8%	117	43.2%	271
9	Security Personnel	86	86.0%	14	14.0%	100
Total		**523**	**48.4%**	**558**	**51.6%**	**1,081**

Source: RSUP Dr. Sitanala, May 2026.

5.7.1.2 Access to Employment Opportunities

With respect to employment opportunities, the data indicate that both women and men have broad access to employment within the hospital. Female employees are not only concentrated in nursing and midwifery professions but are also strongly represented among medical practitioners (general practitioners, dentists, and specialists), accounting for **67 individuals (60.4%)** of all medical personnel. This suggests that women have relatively good access to higher education, professional qualifications, and employment opportunities within the healthcare sector. Conversely, male employees continue to predominate in technical, security, and operational positions that require specialised technical skills.

5.7.1.3 Decision-Making

Although the workforce composition indicates that male employees are more highly represented in administrative and management functions, an assessment of gender equality in organisational decision-making would require additional information on senior management positions, structural leadership roles, heads of departments, managers, and other strategic decision-makers within **RSUP Dr. Sitanala**. Accordingly, the available data are insufficient to determine whether gender disparities or gender equality exist in relation to organisational leadership and decision-making.

5.7.1.4 Women's Participation

Women's participation in the hospital workforce is relatively high. Female employees account for more than half of the total workforce and constitute the majority within the hospital's core healthcare professions. Their predominance among medical practitioners, nurses, midwives, and other healthcare professionals demonstrates the critical role of women in delivering healthcare services. This reflects a strong level of female participation in both clinical services and healthcare support functions.

5.7.1.5 Gender Disparities

Overall, the available data do not indicate significant gender disparities in access to employment, as the overall representation of male and female employees is relatively balanced across the organisation. Nevertheless, the workforce composition demonstrates evidence of **horizontal occupational segregation**, whereby women and men tend to be concentrated in different occupational categories.

Women predominate in healthcare and patient care professions, whereas men are more strongly represented in security, technical, and certain management functions. This pattern should not necessarily be interpreted as evidence of discrimination; rather, it reflects gender-based occupational distributions that remain common within Indonesia's healthcare sector and broader labour market.

5.7.2 Gender Roles and Participation in the Study Area

5.7.2.1 Primary income Earners

The household survey indicates that men remain the primary income earners in most households within the study area. In Mekar Sari Subdistrict, 55.6% of households identified the father as the principal income earner, while 33.3% reported a dual-income arrangement in which both husband and wife contribute to household income. Similarly, in Karang Sari Subdistrict, 55.2% of households identified the father as the primary income earner, whereas 27.6% relied on joint economic contributions from both spouses and 17.2% identified women as the primary income earners. These

findings indicate that traditional household livelihood patterns remain predominant, although women make a substantial contribution to household income in a significant proportion of households.

5.7.2.2 Household Economic Decision-Making

Household economic decision-making patterns vary between the two subdistricts. In **Mekar Sari**, the majority of households (66.7%) reported that financial and economic decisions are made jointly by men and women. In comparison, 22.2% indicated that women are the principal decision-makers, while 11.1% reported that decisions are primarily made by men.

In **Karang Sari**, household economic decision-making remains more commonly dominated by men (48.3%), although joint decision-making is also relatively common, accounting for 41.4% of households. These findings suggest that women's participation in household economic decision-making is relatively stronger in Mekar Sari than in Karang Sari.

5.7.2.3 Division of Domestic and Care Responsibilities

Women continue to assume the primary responsibility for domestic work and caregiving in both study areas. In **Mekar Sari**, 44.4% of households reported that domestic responsibilities are primarily undertaken by women, while 55.6% indicated that these responsibilities are shared between men and women. In **Karang Sari**, women remain the primary providers of domestic work and childcare in 48.3% of households, whereas responsibilities are shared in 34.5% of households and primarily undertaken by men in 17.2%. These findings indicate that although a more balanced sharing of household responsibilities is emerging in some families, domestic responsibilities continue to fall predominantly on women.

5.7.2.4 Women's participation in Employment and Business Activities

Women's participation in economic activities is relatively high across both study areas. In **Mekar Sari**, 55.6% of households reported that at least one female household member is employed or operates a business. In **Karang Sari**, the corresponding proportion is 48.3%. These findings demonstrate that women make an important contribution to household livelihoods, either as primary income earners or as contributors to household income.

5.7.2.5 Women's Employment Profile

The employment characteristics of women differ between the two subdistricts. In **Mekar Sari**, women's economic activities are primarily concentrated in self-employment and micro, small, and medium enterprises (MSMEs), representing 44.4% of households, while a smaller proportion (11.1%) are employed in the formal sector. While in **Karang Sari**, women's employment is more diversified, with the largest proportion working as wage labourers (31.0%), followed by formal employment (10.3%), MSME operators (10.3%), and informal workers (10.3%). These findings indicate that women in Mekar Sari are more actively engaged in entrepreneurship, whereas women in Karang Sari participate more extensively in wage employment and informal economic activities.

5.7.2.6 Women's Participation in MSMEs

MSMEs constitute an important avenue for women's economic participation, particularly in **Mekar Sari Subdistrict**. The survey indicates that 44.4% of households include women engaged in self-employment or MSME activities. In **Karang Sari**, women's participation in MSMEs is lower (10.3%), with female economic activity more commonly concentrated in wage labour and informal

employment. These findings suggest that MSMEs provide an important mechanism through which women participate in the local economy, particularly in Mekar Sari.

5.7.2.7 Joint Household Decision-Making

Gender relations within households indicate an emerging trend towards more participatory decision-making, particularly in **Mekar Sari**. Joint economic decision-making by both men and women was reported by 66.7% of households in Mekar Sari and 41.4% of households in Karang Sari. Similarly, shared responsibility for domestic work was reported by 55.6% of households in Mekar Sari and 34.5% of households in Karang Sari. These findings suggest that while traditional gender roles remain evident, there is a growing trend towards greater collaboration in household management.

5.7.2.8 Women's participation in Economic Activities

Overall, women demonstrate relatively active participation in economic activities throughout the study area. More than half of households in **Mekar Sari (55.6%)** and nearly half of households in **Karang Sari (48.3%)** reported that women are engaged in paid employment or business activities. Women's economic participation spans MSMEs, formal employment, informal employment, and wage labour. These findings demonstrate that women contribute not only through domestic responsibilities but also through household income generation and the broader local economy.

5.8 Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH)

The screening assessment indicates that the construction of the three multi-storey buildings, with an anticipated duration of approximately one year, will require a substantial construction workforce. This is expected to increase interactions between Project workers and surrounding communities, including hospital patients, visitors, and hospital personnel operating within the same site. A proportion of the construction workforce may be recruited from outside the local area, potentially requiring temporary worker accommodation or a construction workers' camp (base camp). This is expected to increase workforce mobility throughout the construction phase.

The social baseline also identifies the presence of vulnerable groups within and around the Project area, including women, children, older persons, persons with disabilities, and patients with particular health conditions. The presence of these groups within an operational hospital environment increases the sensitivity of potential social interactions between Project workers and hospital users. The increased interaction between construction workers and surrounding communities is an inherent consequence of construction activities taking place within an operational hospital. Consequently, the Project presents a higher level of social exposure than construction projects located in isolated or restricted-access areas.

From a social protection perspective, the existing grievance mechanism does not specifically address the reporting and management of cases involving gender-based violence (GBV), sexual exploitation and abuse (SEA), or sexual harassment (SH). In particular, it does not currently include provisions relating to confidentiality, survivor protection, or referral pathways for survivor support services. In addition, no information has been identified regarding the implementation of a mandatory **Code of Conduct** governing worker behaviour and the prevention of SEA/SH.

Given these baseline conditions, there is a need to establish a more comprehensive social risk management framework that includes clear standards of worker conduct, safe and confidential

reporting mechanisms, and appropriate protection measures for vulnerable groups who may be affected during the construction phase.

5.9 Gender-based Violence (GBV)

The screening assessment indicates that Project activities may increase the risk of **gender-based violence (GBV)** affecting both community members and Project workers, primarily as a result of the presence of a large construction workforce and the increased level of social interaction during the construction phase. Although no specific GBV incidents have been identified during the baseline assessment, these conditions may increase exposure to gender-related social risks.

The household survey identified the presence of vulnerable groups within the study area, including female-headed households, women in vulnerable circumstances, older persons, persons with disabilities, and other socially vulnerable groups with limited access to social protection services. These groups may have heightened sensitivity to adverse social impacts, including GBV risks. The assessment also identified the potential for unequal power relationships between Project workers, surrounding communities, and hospital users. Differences in social status, economic conditions, and access to public spaces may create circumstances that increase vulnerability to gender-based violence if not appropriately managed. At present, no Project-specific policies or procedures have been established to explicitly address the prevention, reporting, investigation, and response to GBV incidents. Similarly, the existing grievance mechanism has not yet been designed to provide confidential, safe, and **survivor-centred** handling of GBV-related complaints.

Furthermore, no documented referral mechanism has been identified to facilitate access to appropriate survivor support services, including healthcare, psychosocial support, legal assistance, or other social protection services. The absence of these arrangements indicates that institutional capacity to respond effectively to potential GBV incidents remains limited at the current planning stage. Based on these baseline conditions, there is a need to strengthen the Project's social risk management framework with specific measures to address GBV. These should include the implementation of a mandatory worker **Code of Conduct**, safe and confidential grievance mechanisms, and clearly defined referral pathways to appropriate survivor support services as integral components of social risk management during the construction phase.

5.10 Vulnerable and Disadvantaged Groups

The social assessment indicates that the Project's **Area of Influence (AoI)** includes several vulnerable and disadvantaged groups that require particular attention in ensuring equitable access to public facilities and basic services. The identified vulnerable groups include:

160. Persons with disabilities
161. Elderly persons
162. Low-income households
163. Children

These groups form part of the local community that regularly relies on healthcare facilities, road networks, and public infrastructure surrounding the hospital area. Therefore, their presence represents an important social characteristic within the Project's Area of Influence.

5.10.1 Persons with Disabilities

The screening assessment identified the presence of persons with physical disabilities in both subdistricts within the Project's Area of Influence. In **Mekar Sari Subdistrict**, 11.1% of households reported having at least one household member with a disability, while the proportion is significantly higher in **Karang Sari Subdistrict**, where 34.5% of households reported the presence of a household member with a disability.

These findings indicate that persons with disabilities represent a significant component of the local social structure, particularly in Karang Sari. Project activities may affect the accessibility of persons with disabilities to facilities, services, and information, particularly due to changes in environmental conditions during the construction phase.

Potential disturbances, including increased dust levels, the presence of heavy machinery, and changes to road access patterns, may restrict mobility for persons with disabilities. This risk is expected to be more significant in Karang Sari due to the higher proportion of households with members with disabilities.

In addition, access to consultation processes and grievance mechanisms requires specific consideration to ensure that persons with disabilities can participate in an inclusive manner, taking into account potential mobility limitations and specific communication needs.

Considering these conditions, the application of **universal design principles** is considered relevant and necessary, particularly in Karang Sari, where the proportion of persons with disabilities is higher. This approach will help ensure equal accessibility to the Project environment, services, and facilities throughout both the construction and operational phases.

5.10.2 Elderly Persons

The screening assessment identified the presence of elderly persons in both subdistricts within the Project's Area of Influence. In **Mekar Sari Subdistrict**, 22.2% of households reported having elderly household members, while the proportion is considerably higher in **Karang Sari Subdistrict**, where 65.5% of households reported the presence of elderly persons.

This indicates that elderly persons represent a significant social group, particularly in Karang Sari. Elderly community members may be more vulnerable to Project-related activities, particularly with respect to traffic disturbances, accessibility constraints, and construction-related impacts such as noise and dust, which may affect comfort, mobility, and daily activities.

These conditions are particularly sensitive in Karang Sari due to the high proportion of households with elderly members. In addition, elderly persons' access to healthcare services and public facilities, including **RSUP Dr. Sitanala** as a key healthcare facility in the study area, may potentially be affected by changes in access routes and mobility patterns during the construction phase.

Therefore, communication and consultation approaches tailored to the needs of elderly persons are considered important. Engagement methods should adopt simple, accessible, and community-based approaches to ensure effective participation.

At the same time, the Project also has the potential to provide direct benefits to elderly groups, particularly through improved accessibility and enhanced quality of healthcare services at RSUP Dr. Sitanala, which serves as a primary referral healthcare facility for the surrounding area.

5.10.3 Low-Income Households

The screening assessment identified the presence of low-income households in both subdistricts within the Project's **Area of Influence (AoI)**. In **Mekar Sari Subdistrict**, 22.2% of respondents reported experiencing economic difficulties, while 33.3% stated that their household income is not fully sufficient to meet daily needs. In **Karang Sari Subdistrict**, the proportion of households experiencing similar conditions is higher, with 44.8% reporting economic difficulties and 41.0% indicating that household income is insufficient.

In addition, reliance on a single source of income is relatively common, particularly in Karang Sari. These households have strong linkages with local economic activities, including small-scale trading, informal services, and home-based businesses, which may interact with hospital-related activities and daily mobility patterns in the surrounding area.

Project activities may generate two concurrent types of effects for low-income households. On one hand, construction activities may temporarily disrupt access and mobility, potentially affecting small businesses and informal economic activities operating around the Project area. On the other hand, construction activities may generate increased local demand for goods and services, including labour requirements, daily consumption needs, and supporting services, which may contribute to local economic stimulation.

Therefore, low-income households represent a socially sensitive group that may be affected by both temporary economic disruption risks and potential economic benefits arising from the Project. An inclusive approach will be required to ensure that Project benefits are distributed more equitably, including through local employment opportunities, MSME participation opportunities, and access management measures that minimise disruption to surrounding community economic activities.

5.10.4 Children

The screening assessment identified the presence of children in a significant proportion of households in both subdistricts within the Project's **Area of Influence**. In **Mekar Sari Subdistrict**, 77.8% of households reported having children or toddlers, while the proportion in **Karang Sari Subdistrict** was 48.3%. These findings indicate that children represent an important demographic group within the social structure of the study area.

Children may be exposed to safety risks associated with Project activities, including exposure to dust, noise, and interaction with construction traffic and vehicle movements. These risks arise due to the proximity of construction activities to residential areas and spaces commonly used by children for daily activities. In addition, increased construction activity and changes in traffic patterns may affect children's safety, particularly considering that children have been identified as frequently playing along roads or in open spaces with potential safety risks. This condition was reported by approximately 41.4% of respondents in the study area, indicating a heightened sensitivity to child safety risks.

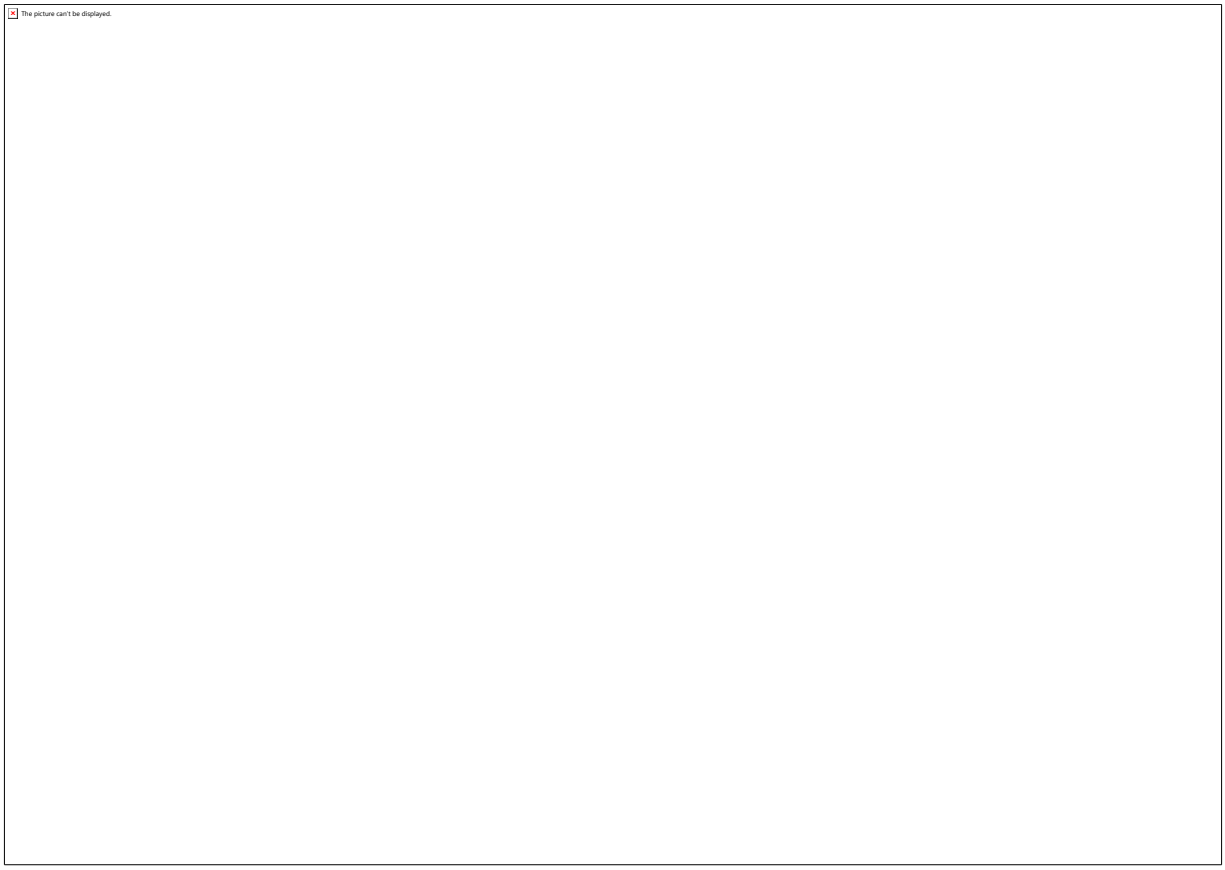


Figure 39 Proximity of Construction Activities to Community Activity Areas

Project activities may also affect children's access to education, healthcare services, and public spaces due to mobility disruptions and changes in road accessibility during the construction phase. Therefore, specific measures are required to address child safety, including traffic management arrangements, securing construction areas, and implementing safety awareness programmes within surrounding communities.

5.10.5 Protection of Vulnerable and Disadvantaged Groups

Project activities may affect vulnerable and disadvantaged groups' access to public facilities and basic services, particularly due to changes in traffic patterns and temporary access disruptions during construction.

Accordingly, an inclusive social protection approach will be required to ensure the participation and protection of vulnerable groups throughout Project implementation. This should include strengthening the **Grievance Redress Mechanism (GRM)**, implementing community-based consultation approaches, and ensuring universal accessibility principles are incorporated into Project planning and implementation.

6 RISK/IMPACT ASSESSMENT

The risk/impact analysis method is conducted using both quantitative and qualitative approaches. The quantitative approach applies a scoring method for four parameters, namely Nature & Duration of Risks/Impacts, Impact Likelihood, Impact Scope, and Spatial Scale. Subsequently, the impact magnitude is determined by summing the total scores obtained from these four parameters. Finally, the qualitative approach for the impact significance is determined based on the interaction matrix between impact magnitude and receptor sensitivity (IFC. 2012; IFC. 2013; AIIB. 2024; IAIA. 2018; Equator Principles Association. 2023).

6.1 Area of Influence

6.1.1 Environmental Boundaries

1) Air Pollution

In the development plan for Dr. Sitanala Central General Hospital, the potential for ambient air quality degradation is estimated to stem from equipment and material mobilization, land clearing, construction work, heavy equipment operation, and the movement of project vehicles, which generate exhaust emissions and dust. The magnitude of the impact is influenced by the type and quantity of equipment used, activity intensity, operating duration, meteorological conditions, and the distance between the emission source and the receptor.

Pollutant concentration analysis was performed using Gaussian Line Source and Point Source models. The calculations also included the amount and type of fuel used, the number of heavy equipment/vehicles used, emission factors, source characteristics, operating conditions, and wind speed. The distribution of gas emissions in the air from stationary heavy equipment was estimated using the Gaussian Plume model, while emissions from vehicle movements were estimated using the Gaussian Line Source model (USEPA, 2004).

The distribution of pollutant concentrations from stationary emission sources (Point Source) was estimated using the Gaussian Point Source model as follows (USEPA, 2004):

$$\mathrm{Cj} = \frac{Qj}{\pi \sigma_y \sigma_z U}$$

The distribution of pollutant concentrations from vehicle movements along transportation routes (Line Source) was estimated using the Gaussian Line Source model as follows (USEPA, 2004):

$$C_{(x,0,0,H)} = \frac{2q}{\sqrt{2\pi}\ \sigma_z\ u}\left[e^{-\frac{1}{2}\left(\frac{H}{\sigma_z}\right)^2}\right]\int_{p1}^{p2}\frac{1}{\sqrt{2\pi}}e^{-\frac{1}{2}p^2}dp$$

where:

$$p_1 = \frac{y1}{\sigma_y(x)} \qquad p_2 = \frac{y2}{\sigma_y(x)}$$

Cj = concentration of gas or dust (grams/m^3)

Qj = gas emission load/dust emission load (grams/second)

q = emission rate of the Gaussian line source (g/m·s)

σ_y = horizontal dispersion parameter (m)

σ_z = vertical dispersion parameter (m)

U = average wind speed (meters/second)

y = receptor distance from the source centerline (m)

μ = average wind speed (m/s)

H = emission source height (m)

The predicted ambient air pollutant concentrations were derived by combining the baseline ambient air quality concentrations with the modelled incremental pollutant concentrations generated by each construction activity (mobilization of equipment and materials, land clearing, and building construction). The incremental concentrations were estimated using the Gaussian Point Source and Line Source dispersion models based on fuel consumption, emission factors, source characteristics, equipment and vehicle operations, and local meteorological conditions. Therefore, the resulting values represent the projected ambient air pollutant concentrations under each construction scenario and were subsequently compared with the applicable air quality standards stipulated in Government Regulation No. 22 of 2021 and the IFC Environmental, Health, and Safety (EHS) Guidelines. The results are presented in **Table 32.**

The modelled incremental pollutant concentrations generated by construction equipment and vehicle activities during equipment and material mobilization, land clearing, and building construction are presented in **Table 31.**

Table 30 Modelled Pollutant Concentrations Generated by Construction Equipment and Vehicles

Impact Source	Types of Impact Sources	Pollutant Concentration (μg/m³)				
		NO_2	SO_2	CO	PM_{10}	TSP
Mobilization of Equipment and Materials	Line Sources	0,061	0,020	0,030	0,006	57,471
Land Clearing	Line Sources	0,018	0,006	0,009	0,002	16,637
	Point Sources	11,9	4,0	5,9	36,3	39,1
Building Construction	Line Sources	0,02	0,01	0,01	0,00	21,12
	Point Sources	4,5	1,5	2,3	13,9	24,1

Table 31 Predicted Ambient Air Pollutant Concentrations under Construction Activity Scenarios (Baseline + Modelled Incremental Concentrations)

Impact Source	Pollutant Concentration (μg/m³)				
	NO_2	SO_2	CO	PM_{10}	TSP
Air quality baseline	36	42	3074	53	142
Mobilization of Equipment and Materials*	36,1	42,0	3074,0	53,0	199,5

Impact Source	Pollutant Concentration (µg/m³)				
	NO_2	SO_2	CO	PM_{10}	TSP
Land Clearing*	47,9	46,0	3079,9	89,3	197,7
Building Construction *	40,5	43,5	3076,3	66,9	187,2
PP 22/2021 Threshold (µg/m³)	65	75	4000	75	230
IFC EHS Guideline (µg/m³)	40	20	10.000	50	-

** **Note:** Predicted ambient air pollutant concentrations = baseline ambient air quality concentration + modelled incremental pollutant concentration generated by the respective construction activity.*

The air quality study area boundaries were determined based on pollutant dispersion modeling results using a Gaussian approach at a receptor distance of up to 300 meters from the activity location. The determination of this distance was based on modeling results indicating that within a 300-meter radius there are still additional pollutant concentrations due to project activities, especially during the land clearing stage which is the source of the greatest impact. At this distance, the predicted additional concentrations reach 11.92 µg/m³ for NO_2, 4.01 µg/m³ for SO_2, 5.91 µg/m³ for CO, 36.30 µg/m³ for PM_{10}, and 55.74 µg/m³ for TSP.

When added to the existing air quality conditions, the projected ambient concentrations are 47.92 µg/m³ for NO_2, 46.01 µg/m³ for SO_2, 3,079.91 µg/m³ for CO, 89.30 µg/m³ for PM_{10}, and 197.74 µg/m³ for TSP. These results indicate that PM_{10} is the most sensitive parameter to construction activities, while other parameters are still below the national ambient air quality standards.

Based on the modeling results, the ecological boundary of air quality impacts is set up to a radius of 300 meters from the project area because at that distance there is still potential for changes in air quality that can affect environmental components and sensitive receptors around the activity location. This ecological boundary includes residential areas, health facilities, educational facilities, commercial areas, urban vegetation, and community activities around the project. Thus, the 300-meter radius is considered to represent the relevant air quality impact influence zone for assessing potential changes in environmental conditions due to the development activities of Dr. Sitanala Central General Hospital.

2) Noise Pollution

Determination of the limits of noise influence on the development activities of Sitanala Hospital was carried out to identify areas that have the potential to experience increased noise levels due to construction activities at the mobilization and land preparation stages (*land clearing*), and building construction. Noise level calculations are carried out by considering the number and intensity of noise sources operating at each stage of the activity. The total noise level is obtained by adding the logarithms of all operating noise sources, then conducting a noise propagation analysis to determine changes in noise levels at various distances from the activity location.

Noise propagation analysis is carried out by differentiating the characteristics of noise sources into moving sources (*line source*) and stationary sources (*point source*). The propagation of line source is calculated using the equation (Beranek, L. L., & Vér, I. L. (Eds.), 1992):

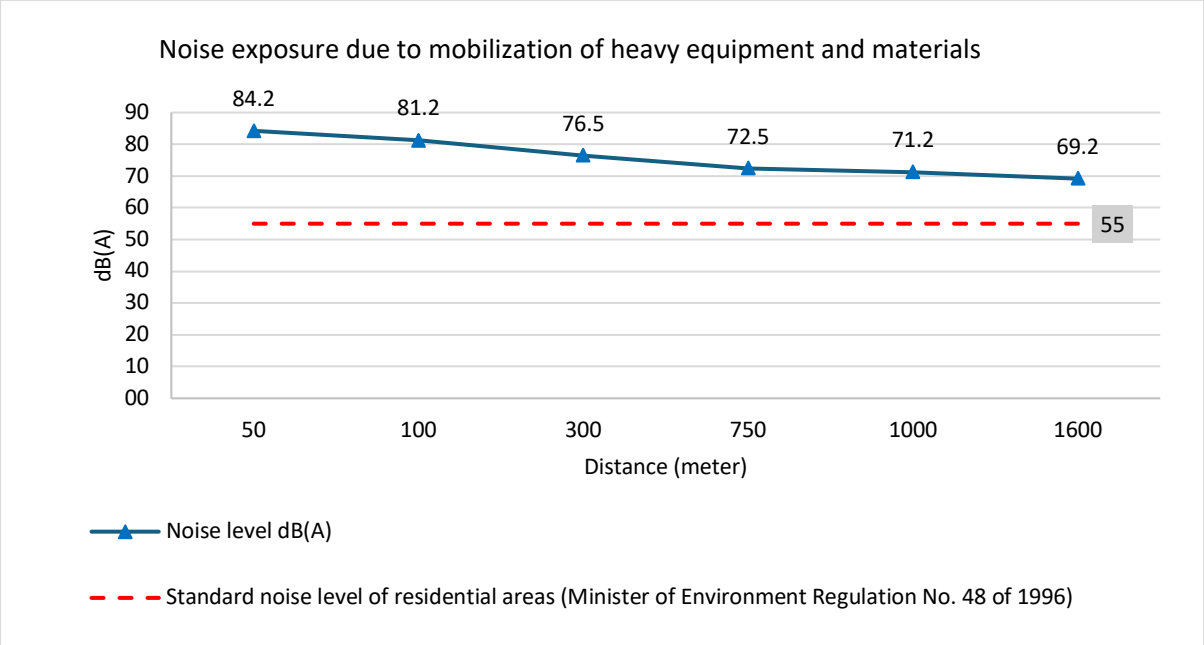
$$\mathbf{LP_2 = LP_1 - [10.Log\ (r_2/r_1)]}$$

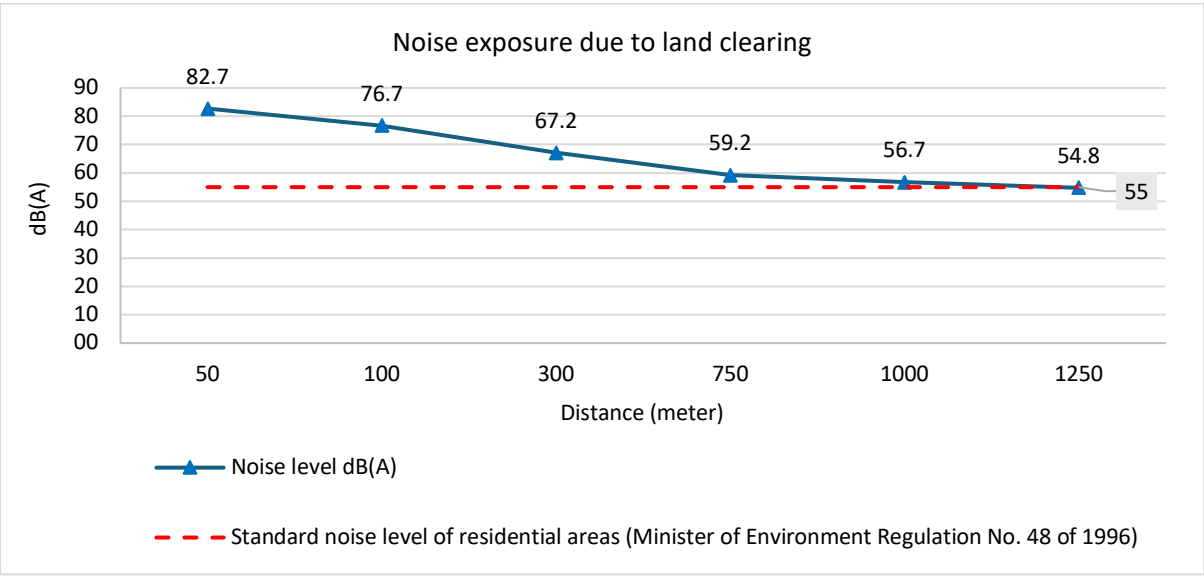
while point source are analyzed using the equation:

$LP_2 = LP_1 – [20.Log (r_2/r_1)]$

where LP_2 is the noise level at the receiver distance, LP_1 is the noise level at the reference distance, R_1 is the reference distance of 15 m, and R_2 is the receiver distance. The propagation results from the two types of sources are then combined logarithmically to obtain the total noise level at each observation distance.

Noise exposure from these activities is presented in the graph below.





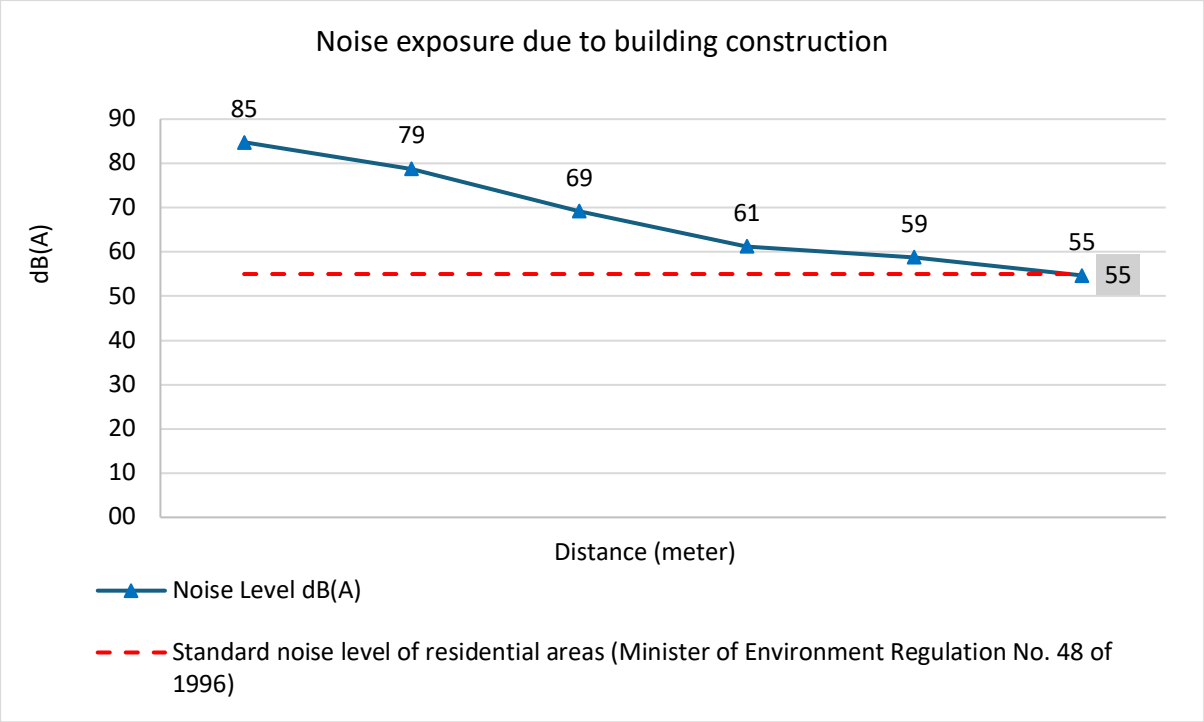


Figure 40 Noise exposure after activity

The graph/data were developed based on the estimated number and types of construction equipment and vehicles operating during the mobilization, land clearing, and building construction phases of the Rumah Sakit Sitanala development project. Noise levels from individual sources were logarithmically combined, and noise propagation was assessed using line source and point source approaches. The predicted noise levels were then compared against the applicable residential noise standard of 55 dB(A) to determine the project's noise impact boundary.

Based on the calculation results, the noise level at the mobilization stage is estimated to meet the noise quality standard for residential areas of 55 dB(A) at a distance of approximately 1,600 m from the activity location.*land clearing*, the noise level meets the quality standards at a distance of approximately 1,250 m, while during the building construction phase it meets the quality standards at a distance of approximately 1,600 m. Taking into account the worst conditions (*worst case scenario*), then the noise influence limit is determined based on the building construction stage with the furthest distance to meet the quality standards, which is around 1,600 m from the activity location.

In environmental impact studies, the ecological noise boundary is the boundary of the area where the noise level originating from activities still has the potential to cause changes to the quality of the acoustic environment around the activity location. Based on the results of propagation calculations, the ecological noise boundary for the Sitanala Hospital development activity is set to a radius of approximately 1.6 km from the project location, namely at a distance where the noise level has decreased to meet the noise quality standard for residential areas of 55 dB(A). Thus, the area within this radius is an area that theoretically still has the potential to experience an increase in noise levels due to construction activities.

Based on these ecological boundaries, areas potentially impacted by noise include residential areas surrounding the activity site, including the Karangsari and Mekarsari sub-districts as the closest social

receptors. These two areas were designated as the boundaries of the social influence of the noise component because they are within an area that theoretically still has the potential to receive additional noise from the Sitanala Hospital development activities. Therefore, the communities residing in these two sub-districts will be the focus of noise impact management and monitoring during the construction phase.

It should be noted that the ecological noise limit of 1.6 km is greater than the ecological limit of the air quality component, which is set at 300 m. This difference is caused by differences in the methods and characteristics of the distribution of each environmental component. The ecological air quality limit is determined based on the results of dust dispersion and emission analysis, which shows that the impact of the activity has decreased significantly at a distance of approximately 300 m from the project site. Meanwhile, the ecological noise limit is determined based on the results of the propagation of sound pressure levels until they reach the noise quality standards for residential areas. Therefore, the difference between the ecological air quality limit and the ecological noise limit does not indicate a discrepancy in determining the impact area, but rather reflects the different distribution characteristics of each environmental component.

Although the theoretical ecological noise limit is approximately 1.6 km, the actual and potentially significant noise impacts are expected to be more prevalent in areas close to the activity site. This is because actual conditions on the ground are influenced by various factors that can dampen the propagation of sound, such as the presence of buildings, vegetation, urban traffic activity, and pre-existing background noise. Therefore, noise impact management and monitoring are focused on the closest receptors, specifically the communities in Karangsari and Mekarsari Sub-districts, which have the highest potential exposure to the Sitanala Hospital development activities.

The impact radius of air quality and noise is shown in …. The impacts radius is smaller than the existing hospital area since the impacts come from the development area which is IBS, Oncology and Neuro-Urology buildings. Those development area which are located within the existing area have a smaller area than the existing area.

6.1.2 Social Boundary

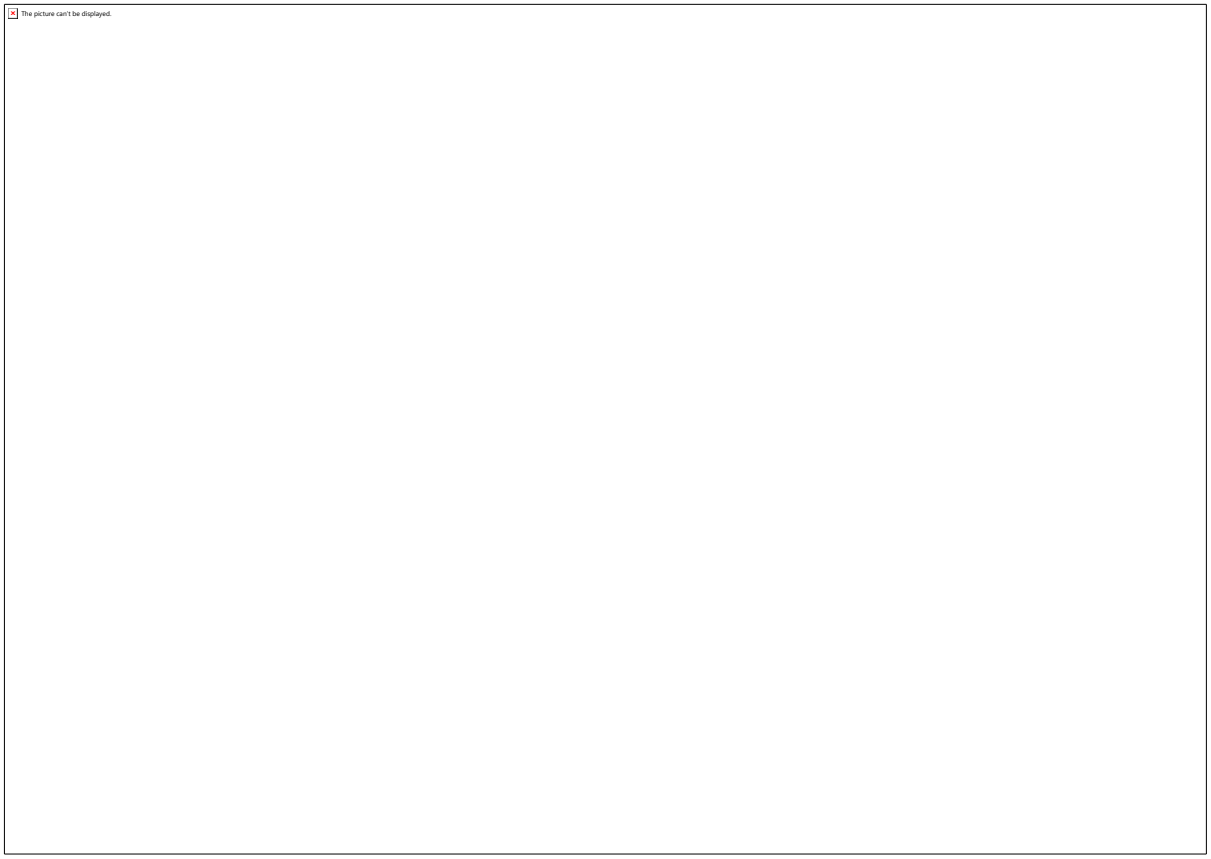


Figure 41 **Social Boundary AoI**

Social Area of Influence and Social Receptors

The Social Area of Influence (AoI) was established through a combination of spatial and social-functional assessments to identify communities and stakeholder groups that may interact with, benefit from, or experience direct and indirect effects associated with the Project.

Initially, a distance-based assessment was undertaken to define the broader area within which Project-related interactions may occur. Two influence zones were identified: (i) a Primary Influence Zone extending approximately 0–500 m from the Project site, and (ii) a Secondary Influence Zone extending approximately 0.5–3 km from the Project site. These influence zones encompass the surrounding urban environment, including Kelurahan Karang Sari and Kelurahan Mekarsari, and provide an understanding of the wider social setting within which The Sitanala Hospital operates and delivers healthcare services.

To ensure that the assessment focused on communities with the strongest relationship to the Project, the broader influence area was subsequently refined using administrative boundaries at the RW and RT levels. This approach enabled the identification of neighbourhoods that maintain the closest spatial proximity and functional connections to the hospital and therefore represent the primary social receptors for the Project.

Within the delineated Social AoI, the primary social receptors comprise communities located in Kelurahan Karang Sari, particularly RW 001, 002, 003, 012, and RW 013, and communities located in Kelurahan Mekarsari, particularly RW 001. These neighbourhoods are situated within the immediate urban environment surrounding The Sitanala Hospital and maintain regular interactions with hospital activities through healthcare utilization, employment opportunities, access and mobility networks, community engagement, and long-standing social and historical associations with the hospital. In addition, residents occupying hospital employee housing constitute a distinct receptor group because they are directly associated with the Project footprint and are subject to separate assessment under the Resettlement Action Plan (RAP) process.

The social receptors identified within the AoI are characterized by high-density urban residential settlements and mixed land use patterns comprising residential, commercial, institutional, and community facilities. These communities demonstrate strong dependence on local road networks and public transportation systems and maintain close relationships with hospital services and facilities. They also exhibit diverse raphic

raphic and socioeconomic characteristics, including the presence of vulnerable groups requiring particular consideration during impact assessment and stakeholder engagement processes.

The identified social receptors include households, community organizations, local businesses, religious institutions, educational facilities, vulnerable populations, hospital employees and their families, and residents of hospital employee housing. These receptors represent the groups most likely to experience social, economic, accessibility, health, community, and livelihood-related effects associated with the Project.

The identification of social receptors was not based solely on geographic distance from the Project site. Consideration was also given to the functional relationships between surrounding communities and The Sitanala Hospital, including utilization of healthcare services, employment and livelihood linkages, access and mobility patterns, historical associations with the hospital, community interaction with hospital facilities, and social and institutional networks established within the surrounding urban area.

Accordingly, the Social AoI reflects both spatial proximity and social-functional connectivity, providing a robust and representative basis for stakeholder identification, social baseline characterization, impact assessment, mitigation planning, and ongoing stakeholder engagement throughout the Project lifecycle.



Figure 42 Area of Influence

6.2 Risk/Impact Assessment Methodology

The risk/impact analysis method is conducted using both quantitative and qualitative approaches. The quantitative approach applies a scoring method for four parameters, namely Nature & Duration of Risks/Impacts, Impact Likelihood, Impact Scope, and Spatial Scale. Subsequently, the impact magnitude is determined by summing the total scores obtained from these four parameters. Finally, the qualitative approach for the impact significance is determined based on the interaction matrix between impact magnitude and receptor sensitivity (IFC. 2012; IFC. 2013; AIIB. 2024; IAIA. 2018; Equator Principles Association. 2023).

6.2.1 Nature & Duration of Risks/Impacts

The Nature & Duration of Risks/Impacts parameter evaluates the intrinsic characteristics of an environmental or social impact and assesses how long the impact will persist over time. This parameter is one of the most important determinants of impact magnitude because it reflects the severity, permanence, and recoverability of the change caused by The Sitanala Hospital activity. Table 32 shows the scoring, description and typical characteristics for Nature & Duration of Risks/Impacts.

Table 32 The scoring, description and typical characteristics for Nature & Duration of Risks/Impacts.

Score	Description	Typical Characteristics
1	Very Short-Term / Fully Reversible	Impact lasts days to weeks with rapid recovery and no lasting change.
2	Short-Term / Reversible	Impact lasts weeks to months and recovery occurs naturally within a short period.
3	Medium-Term/ Partially Reversible	Impact persists for months to several years with moderate recovery effort required.
4	Long-Term / Difficult to Reverse	Impact continues for several years and significantly alters environmental or social conditions.
5	Permanent/ Irreversible	Impact causes permanent change or irreversible loss of environmental/social function.

6.2.2 Risks/Impacts Likelihood

Risk/Impact Likelihood refers to the probability that a predicted environmental or social impact will occur as a result of project activities. In ESIA practice, likelihood is a fundamental component of risk assessment because it evaluates how probable it is that a receptor will actually experience the predicted impact. Table 33 shows The scoring, description and Probability Interpretation for Risks/Impacts Likelihood.

Table 33 The scoring, description and Probability Interpretation for Risks/Impacts Likelihood.

Score	Description	Probability Interpretation
1	Rare	Highly unlikely to occur under normal conditions.
2	Unlikely	Could occur occasionally but not expected.
3	Possible	May occur under certain operational conditions.
4	Likely	Expected to occur regularly during project activities.
5	Almost Certain	Expected to occur frequently or continuously.

6.2.3 Risks/Impacts Scope

Risk/impact Scope refers to the extent or breadth of receptors affected by a project-related impact. It evaluates how many people/ecosystems/habitats/resources, or stakeholder groups experience the impact and how broadly the consequences are distributed across the receiving environment. Table 34 shows The scoring, description and Typical Scale of Affected Receptors for Risks/Impacts Scope.

Table 34 The scoring, description and Typical Scale of Affected Receptors for Risks/Impacts Scope.

Score	Description	Typical Scale of Affected Receptors
1	Very Limited	Affects isolated individuals or a very small area.
2	Limited	Affects a small group or localized habitat.
3	Moderate	Affects several communities, habitats, or receptor groups.
4	Extensive	Affects large populations or multiple ecosystems.
5	Widespread	Affects regional-scale receptors or extensive populations/ecosystems.

6.2.4 Spatial Scale

Spatial Scale refers to the geographical extent or physical area over which an environmental or social impact occurs. It evaluates how far the impact spreads from The Sitanala Hospital source and the size of the area influenced by The Sitanala Hospital activity. Table 35 shows The scoring, description and Geographic Extent for Spatial Scale.

Table 35 The scoring, description and Geographic Extent for Spatial Scale.

Score	Description	Geographic Extent
1	Site-Specific	Restricted entirely within project footprint.
2	Immediate Local Area	Limited to adjacent project surroundings.
3	Local Area	Affecting nearby villages, waterways, or ecosystems.

Score	Description	Geographic Extent
4	Regional Scale	Affecting districts, watersheds, or multiple administrative areas.
5	National / Transboundary	Affecting national-scale systems or crossing international boundaries.

6.2.5 Risks/Impacts Magnitude

Impact magnitude is commonly determined by combining four parameters (Nature & Duration of Risks/Impacts, Impact Likelihood, Impact Scope and Spatial Scale) into a single integrated score. The purpose of this method is to provide a transparent, systematic, and consistent approach for evaluating the severity of environmental and social impacts. Table 36 shows the total scoring and risk/impact magnitude category.

Table 36 Total scoring and risk/impact magnitude category.

Total Score	Risk/Impact Magnitude Category
4–6	Negligible
7–9	Low
10–13	Moderate
14–17	High
18–20	Very High

6.2.6 Risk/Impact Significance

Risk/Impact Significance is the overall importance or acceptability of an environmental or social impact after considering:

164. Risk/impact magnitude, and

165. Receptor sensitivity/value of the affected receptor.

Table 37 Receptor sensitivity category

Description	Typical Receptor Characteristics
Very Low Sensitivity	Disturbed or highly modified environment with low ecological/social value.
Low Sensitivity	Common habitats or populations with high resilience.
Moderate Sensitivity	Productive ecosystems or stable communities with moderate vulnerability.
High Sensitivity	Protected areas, vulnerable livelihoods, or sensitive social receptors.
Critical Sensitivity	Critical habitat, endangered species, Indigenous Peoples, or world heritage areas.

Table 38 Impact Significance Interaction Matrix

Impact Magnitude	Receptor Sensitivity				
	Very Low	Low	Moderate	High	Critical
Negligible	Negligible	Negligible	Low	Low	Moderate
Low	Negligible	Low	Low	Moderate	Moderate
Moderate	Low	Moderate	Moderate	High	Very High
High	Moderate	Moderate	High	Very High	Critical
Very High	High	High	Very High	Critical	Critical

6.3 Summary of Environmental and Social (E & S) Risk/Impact Assessment

Table 39 Summary of Environmental and Social (E&S) Risk/Impact Assessment

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
A	**PRECONSTRUCTION**								
A.1.	**ENVIRONMENTAL**								
1.	Failure to incorporate climate change risk into project	**Engineering design of the new hospital.** Various risks identified in Climate Risks Analysis are not fully addressed and/or incorporated into engineering design which leave these risks vulnerable to impact in the future when identified risk are actualized.	**4 (long-term)**. Impacts on infrastructure resilience, operational continuity, and safety if climate risks are not integrated into the design. Impacts may persist throughout project life cycle.	**3 (Moderate)**. If climate adaptation measures are insufficiently incorporated during design stage.	**4 (Extensive)**. May affect hospital operations, patients, staff, and surrounding community during extreme climate events.	**3 (Local Area).** Primarily site-specific and surrounding urban area.	**14 (High).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**Very High**
2.	Failure to incorporate environmental and social considerations in the Detailed Engineeting Design (DED)	**Engineering design of the new hospital (functionality and operations).** Negligent in incorporating environmental and social considerations into the DED, such as the management of increased healthcare waste (both hazardous and non-hazardous), and the selection of equipment to reduce emissions, dust, noise, and vibration.	**4 (long-term)**. Operational environmental and social impacts including increased waste generation, emissions, noise, vibration, and ccupational/community health risks.	**4 (Likely).** Likely to occur without adequate integration of E&S considerations during engineering design.	**4 (Extensive)**. Impacts may affect workers, patients, nearby communities, and environmental quality.	**3 (Local Area).** Mainly within project site and adjacent receptors.	**15 (High).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**Very High**
3.	Non-compliance with the KKPR	**Licensing, administration.** Based on the results of the overlay between The Project and the KKPR, there are	**3 (Medium)**. Administrative, legal, and permitting	**3 (Moderate).** Moderate likelihood due to identified overlap	**3 (Moderate)**. Primarily affects project permitting	**2 (Immediate Local Area)**. Limited to project administrative	**11 (Moderate).**	**Low.**	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		hospital areas that are not included in the existing KKPR. In addition, there are several other activities that are not part of hospital activities, but these activities are scoped within the existing KKPR.	implications that may delay project implementation and create regulatory conflicts.	inconsistencies with KKPR.	process and institutional stakeholders.	jurisdiction and designated planning area.			
4.	Aviation safety	**Licensing, administration.** Based on the preliminary aviation safety assessment, the proposed development of an 8-Floor building with a rooftop helipad at The Project represents a project with high sensitivity to aviation operations, as the project site is located within the vicinity of the Soekarno–Hatta International Airport Aviation Operational Safety Zone (Kawasan Keselamatan Operasi Penerbangan/KKOP). The height of the building, together with rooftop facilities such as the helipad, antennas, and mechanical-electrical equipment, may potentially constitute obstacles to aircraft approach, take-off, and maneuvering paths if they exceed the applicable Obstacle Limitation Surface (OLS) thresholds. In addition, the presence of a rooftop helipad may create potential airspace conflicts with commercial air	**5 (Permanent)**. critical impact on aviation safety due to building height and rooftop helipad within the vicinity of Soekarno–Hatta Airport KKOP area. Risks may persist during both construction and operation phases.	**4 (Likely).** if building elevation, crane operation, or helipad operations exceed aviation safety limitations or are not properly coordinated.	**5 (Widespread)**. May affect aircraft operations, airport navigation safety, hospital operations, and public safety.	**4 (Regional Scale)**. Extends beyond project site to surrounding airport operational airspace and flight corridors.	**18 (Very High).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**Critical**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		traffic operating around the airport, thereby requiring strict operational control and intensive coordination with aviation authorities.							
A.2.	**SOCIAL**								
1.	Rising community expectations regarding the project and hospital services	• Project socialization activities • Information disclosure, • Public consultation, • Stakeholder engagement, and ▪ Initial project communication regarding hospital development plans and potential project benefits for surrounding communities .	**2 (Short-Term / Reversible).** The impact is temporary and generally occurs during the socialization process, project information disclosure, public consultation, and early project implementation stages. The impact is socio-perceptional in nature and can generally be controlled or reversed through effective communication, information transparency, and sustained engagement.	**4 (Likely).** The impact is highly likely to occur as hospital development projects generally raise community expectations regarding improved healthcare services, employment opportunities, social assistance, and other economic benefits. The risk increases if project information is not fully understood by the community.	**3 (Moderate).** The impact affects several receptor groups such as communities surrounding the project, local stakeholders, communities near The Project, community leaders, and healthcare service beneficiary groups.	**2 (Immediate Local Area).** The impact primarily occurs in the area surrounding The Project and communities that have a direct relationship with project activities and hospital services.	**11 (Moderate).**	**Moderate.** The surrounding community has moderate sensitivity as some community members depend on improved healthcare services, economic opportunities, and social benefits expected from The Project development.	**Moderate.**
2.	Exclusion of vulnerable groups from consultation meetings	Socialization, public consultation, and stakeholder engagement activities that	**3 (Medium-Term / Reversible)**. The risk of excluding	**3 (Possible)**. The impact is fairly likely to occur if the consultation process	**3 (Moderate).**The impact may	**2 (Immediate Local Area)**. The impact primarily	**11 (moderate).**	**High**. Vulnerable groups have limited social, economic,	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		have not fully considered accessibility, participation barriers, and inclusiveness for vulnerable groups.	vulnerable groups may occur during the socialization, public consultation, and stakeholder engagement processes. The impact is social and participatory in nature and can be remedied through more inclusive consultation approaches, improved engagement mechanisms, and enhanced participation accessibility.	does not specifically consider the needs of vulnerable groups such as women, the elderly, persons with disabilities, low-income communities, or other marginalized groups. The risk increases in consultation activities with limited access to information, time, language, or participant mobility.	affect several receptor groups, particularly vulnerable groups in the project area who have limited access to the decision-making process and expression of aspirations.	occurs in communities surrounding the project and community groups within the direct influence area of project socialization and consultation activities.		physical, and communication access, making them more susceptible to being marginalized in the consultation and project decision-making process.	
B	**CONSTRUCTION**								
B.1.	**ENVIRONMENTAL**								
1.	Air Quality	**Mobilization of materials and equipments**. Air quality will be triggered from Mobilization and transportation of piling rigs, cranes, excavators, trucks, generators and other construction plant; delivery of cement, sand, aggregate, reinforcement, formwork, precast components, pipes, cables and finishing materials; vehicle movement, queuing, idling, loading and unloading; initial operation of temporary	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Likely).** The impact will occur during the activity.	**2 (Limited).** Sensitive receptors within and surrounding the Project area include hospital visitors, hospital staff, and hospitalized patients, with	**2 (Project Surroundings).** The impact extent will only occur surrounding The Project area.	**10 (Moderate).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**High.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		generators; establishment of laydown areas; and soil or mud tracking onto hospital and public roads. These activities may generate road-dust resuspension, fugitive material dust, diesel exhaust, particulate matter, NO_2, SO_2 and CO			particular consideration given to vulnerable groups such as the elderly and children.				
		Land clearing and preparation. Sources of air emissions include vegetation clearing, topsoil stripping, excavation, earthworks, movement of heavy equipment, and transportation of materials, which may generate dust and exhaust emissions.	**2 (Short term).**	**4 (Likely).**	**2 (Limited).**	**1 (Site Specific).** The impact extent will only occur within The Project area.	**9 (Low).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**Moderate**
		Building construction. Substructure works (pile cap, tie beam, ground beam, foundation concrete works), superstructure works (reinforced concrete structure, masonry, roofing), architectural and fit-out works (partition installation, plastering, cutting, grinding, finishing, material handling and internal transportation).	**2 (Short term).**	**4 (Likely).**	**2 (Limited).**	**2 (Project Surroundings).**	**10 (Moderate).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**High**
2.	Noise	**Mobilization of materials and equipments**. Mobilization and transportation of foundation rigs, cranes, excavators, loaders, dump trucks, concrete mixers, generators and other construction equipment; delivery of reinforcing steel, formwork, precast components, pipes, cables and finishing materials; movement	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Likely).** The impact will occur during the activity.	**2 (Limited).** Sensitive receptors within and surrounding the Project area include hospital visitors, hospital staff, and	**1 (Site Specific).** The impact extent will only occur within The Project area. .	**9 (Low).**	**High.** Several Noise baseline values show above the national or international standards.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		of vehicles along public and internal hospital roads; vehicle queuing, manoeuvring and reversing; loading and unloading; material placement within laydown areas; and initial operation of temporary plant. Noise sources include vehicle engines, exhausts, horns, reversing alarms, braking, loading impacts and equipment operation.			hospitalized patients, with particular consideration given to vulnerable groups such as the elderly and children.				
		Land clearing and preparation. Noise impacts mainly originate from the operation of heavy machinery, chainsaws, earthmoving equipment, and construction vehicles during land clearing and preparation activities.	**2 (Short term).** The impact will occur during the initial construction phase and will continue temporarily throughout land clearing and site preparation activities.	**4 (Likely)**. The impact will likely occur during construction activities involving heavy equipment operation.	**2 (Limited).** The affected people will mainly occur surrounding The Project area. Untuk building cons.	**2 (Project Surroundings).** The impact extent will mainly occur within the project site and surrounding Hospital environment.	**10 (Moderate).**	**High.** workers, and nearby residents. Untuk building cons.	**High**
		Building construction and infrastructure development. High noise levels are particularly associated with piling operations, concrete works, heavy vehicle movement, and operation of generators and mechanical equipment. These activities may temporarily affect nearby sensitive receptors, including residential areas, healthcare facilities, and public facilities.	**3 (Medium term)**. The impact will occur continuously during the construction phase, particularly during piling, structural works, and heavy equipment operation activities.	**4 (Likely).** The impact will likely occur during major construction and infrastructure development activities.	**3 (Local).** The affected people may include workers, patients, hospital staff, nearby residential communities, and surrounding public facilities	**2 (Project Surroundings)**. The impact extent will mainly occur within the project site and surrounding Hospital environment.	**12 (Moderate)**	**High**. There are highly sensitive receptors, including hospital patients, elderly patients, children, healthcare workers, nearby residents, and public facility users.	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
3.	Vibration	**Building construction.** The most significant vibration sources are typically pile. These activities may temporarily affect nearby sensitive receptors, including residential areas, healthcare facilities, and existing structures.	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**3 (Possible).** The impact will occur during the pile driving.	**2 (Limited).** Sensitive receptors within and surrounding the Project area include hospital visitors, hospital staff, and hospitalized patients, with particular consideration given to vulnerable groups such as the elderly and children.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**8 (Low).**	**High.** There are existing sensitive receptor (Elderly patients and children patients).	**Moderate**
4.	Asbestos Containing Material	**Demolition of exising buildings and facilities (Protese Building, ULP Building and parking lot).** Demolition of suspected ACM in the Protese Building, ULP Building and parking lot, combined with the absence of a demolition SOP, may release asbestos fibers/fragments to soil during dismantling, handling and waste storage. Asbestos is a persistent mineral material and will not naturally biodegrade; contaminated soil/debris can remain hazardous after	**4 (Long-Term / Difficult to Reverse)**. Recovery is possible only through specialist ACM survey, controlled removal, soil clean-up and clearance verification. Therefore, the impact is long-term and difficult to reverse rather than fully reversible.	**4 (Likely)**. Suspected ACM is present and no demolition SOP is provided.	**2 (Limited)**. Affects demolition footprint, adjacent soil and nearby hospital receptors.	**1 (Site-Specific)**. Restricted within the project footprint.	**11 (Moderate)**.	**High**. Hospital patients, staff and workers are sensitive receptors.	**High**.

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		construction unless identified, segregated, removed and disposed of as B3 waste.							
		Mobilzation of materials and equipments. During equipment mobilization activities, heavy vehicles and machinery moving across exposed ground surfaces may disturb potentially contaminated soil and generate fugitive dust emissions. If residual asbestos-containing debris is present within the upper soil layer, vehicle movement, vibration, and repeated surface disturbance may contribute to the re-suspension of asbestos fibers into the ambient air. In addition, transportation activities may spread contaminated dust or small debris fragments to adjacent work areas through tire tracking and surface runoff, particularly during dry weather conditions.	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Likely).** The impact may occur regularly during project activities.	**2 (Limited).** Sensitive receptors within and surrounding the Project area include hospital visitors, hospital staff, and hospitalized patients, with particular consideration given to vulnerable groups such as the elderly and children.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**9 (Low).**	**High.** There is a potential for contamination from asbestos as a result of demolition activities that have been completed within the project area.	**Moderate**
		Land Clearing. Land clearing activities present a higher potential for disturbance of surface soils because such works generally involve vegetation removal, grading, excavation, and leveling of the	**2 (Short term)**. The impact may occur during land clearing and site preparation activities and will continue	**3 (Possible)**. The impact may occur due to improper handling of fuel, lubricants, waste materials, and poor site management practices	**2 (Limited)**. The affected area will mainly occur within the project site and nearby	**1 (Site Specific).** The impact extent will generally be limited to the construction site and temporary stockpiling areas.	**8 (Low**)	**High**. There is a potential for contamination from asbestos as a result of demolition activities that have been completed	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		site. These activities may directly expose or disturb asbestos-containing fragments that remain buried or partially embedded within the soil. Mechanical disturbance caused by bulldozers, excavators, and grading equipment can break residual asbestos materials into smaller particles, thereby increasing the likelihood of airborne fiber release. Dust generation during land clearing therefore represents one of the primary pathways for potential asbestos exposure to workers and nearby sensitive receptors.	temporarily throughout the initial construction phase.	during land clearing activities.	surrounding areas.			within the project area.	
		Building Construction. Building construction activities, including excavation, earthworks, foundation installation, handling and temporary stockpiling of excavated materials, may disturb soils potentially containing residual asbestos-containing material (ACM) fragments originating from previously demolished residential buildings within the project area. .	**3 (Medium term)**. The impact may occur throughout infrastructure development and utility installation activities during the construction phase	**3 (Possible)**. Disturbance of potentially asbestos-contaminated soil during excavation and foundation works may result in the release of asbestos fibers and ACM debris. Impacts may persist during construction activities and continue if residual ACM remains unidentified and unmanaged. .	**2 (Limited)**. The affected area will mainly occur within the project site and nearby surrounding areas.	**1 (Site Specific)**. The impact extent will generally be limited to material storage areas, utility installation zones, and active construction areas.	**9 (Low**)	**High**. There is a potential for contamination from asbestos as a result of demolition activities that have been completed within the project area.	**Moderate**
5.	Solid waste pollution	**Workers recruitment and activity.** During the	**2 (Short term).**	**4 (Likely).**	**2 (Limited).**	**1 (Site Specific).**	**9 (Low).**	**High.** Hospital patients, staff and	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		construction phase, domestic solid waste is expected to be generated from workforce activities across all stages of The Project, including worker recruitment, mobilization of materials and equipment, land clearing and preparation, building construction, infrastructure development, and commissioning activities. The waste will primarily consist of municipal-type waste such as food waste, plastic packaging, paper, cans, bottles, and other non-hazardous refuse generated from worker accommodations, offices, and daily operational activities. The volume of domestic solid waste is anticipated to increase significantly during the building construction and infrastructure development stages due to the higher number of workers involved. Improper handling and disposal of such waste may result in environmental pollution, unpleasant odors, visual impacts, and potential health and sanitation issues within and around The Project site. Therefore, proper waste segregation, collection, temporary storage, and	The impact will occur in several weeks to months. It will recover naturally within a short period.	The impact will occur regularly during normal conditions in the construction phase..	The affected people will only occur surrounding The Project area.	The impact extent will only occur within The Project area.		workers are sensitive receptors.	

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		disposal through authorized waste management services will be required to minimize environmental impacts during the construction phase.							
6.	Wastewater pollution	**Workers recruitment and activity**. Wastewater generated during the construction phase is mainly expected from workforce activities, including bathing, washing, sanitation (MCK), temporary office operations, and worker canteen activities. Additional non-domestic wastewater may also originate from equipment and vehicle washing, site runoff, and concrete casting activities.	**2 (Short Term).** The impact is expected to occur during the construction phase over a period of several weeks to months and is considered temporary in nature. Environmental conditions are anticipated to recover following the completion of construction activities and the implementation of appropriate management measures	**4 (Likely).** The potential impacts will occur during normal condition in the construction phase	**2 (Limited).** The impact is expected to be limited in the surrounding hospital area	**1 (Site Spesific).** The impact is limited to the construction area, existing drainage systems, and nearby project surroundings	**9 (Low).**	**Moderate.** Sensitive receptors identified within the potential impact area include The Project environment, existing drainage infrastructure, as well as potential disturbances to environmental sanitation quality and the comfort of surrounding communities	Low
7.	Natural disasters - Flooding	Construction of three new buildings (IBS, Oncology, Neurology & Urology) flood exposure	**1 (Very Short Term / Reversible).** Construction-phase flood events last hours to days per occurrence and the construction	**4 (Likely).** Tangerang and the Lower Cisadane experienced major flood events.	**1 (very Limited)** Impact on new buildings	**1 (Site-specific)** Impact on new buildings	**7 (Low).**	**High.** There were flooding incidents happened around The Project.	**Moderate.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
			works themselves are bounded to ~2.5 years.						
8.	Reduction of existing green/open space function	Temporary occupation of vegetated area and open spaces during construction.	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Likely).** The impact will occur regularly during normal conditions in the construction phase.	**2 (Limited).** The affected people will only occur surrounding The Project area.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**9 (Low).**	**Moderate.** Vegetation contributes to infiltration and microclimate.	**Low**
9.	Internal road damage	**Mobilization of materials and equipments**. The total number of material transport trips is approximately 11,846 trips over a construction period of 360 working days (approximately 12 months). This corresponds to an average of 33 trips per day, or approximately 4 - 5 trips per hour (assuming 8 working hours per day). The planned mobilization route for equipment and materials is expected to originate from the Ring Road and pass through local roads within the Karang Sari Village.	**2 (Short Term).** Road surface deterioration, rutting, cracking, and localized damage may occur during the construction period due to frequent movement of heavy trucks and construction equipment. The impact is temporary and can be repaired through routine maintenance and rehabilitation after construction activities are completed.	**4 (Likely).** Frequent transportation of construction materials, heavy machinery, and equipment during the construction phase is likely to increase road loading beyond normal operational conditions, resulting in localized road damage.	**2 (Limited).** The impact is mainly limited to internal hospital roads and access roads directly used by construction vehicles.	**1 (Site-Specific).** The impact is confined to the project site and immediate access routes within The Project complex.	**9 (Low).**	**Moderate.**	**Low.**
10.	Disruption to existing utilities/ service continuity	Land clearing and site preparation works for the three new buildings - including vegetation removal,	**2 (Short-Term / Reversible)**. A utility strike or disconnection typically	**3 (Possible).** Works are carried out within a dense, fully operational hospital campus where	**3 (Moderate).** Utility networks are interconnected,	**1 (Site-Specific).** The affected utilities and the resulting service	**9 (Low).**	**High**. The hospital relies on uninterrupted water, power, data,	**Moderate**.

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		demolition of obstructions, grubbing, cut-and-fill, and shallow excavation - may disturb or sever existing buried and overhead utility networks (potable water/PDAM and groundwater supply lines, electrical feeders, telecommunication and data cabling, medical gas piping, sewerage, and site drainage) that serve the operating hospital, causing temporary interruption of essential services and clinical service continuity.	interrupts service for hours to a few days and is fully recoverable through reconnection, rerouting, or temporary backup supply; no permanent change to utility function results.	buried services are not always accurately mapped; an accidental strike may occur under conditions where utility surveys, locating, and protection is incomplete.	so disruption of a trunk line (water, power, or medical gas) can affect several wards, buildings, and receptor groups - patients, medical staff, and visitors - beyond the immediate work area.	disruption are confined to the hospital complex and its project footprint. Addressed. A dedicated impact has been added to the construction-phase Risk/Impact Assessment - Item B.1(10) "Disruption to existing utilities / service continuity" - covering temporary interruption of water/PDAM and groundwater supply, electrical power, telecommunication/data, medical gas, sewerage/WWTP, and solid/medical waste collection serving the operating hospital, and the resulting risk to clinical service continuity. Corresponding mitigation measures have		and medical gas to sustain clinical operations and life-support-dependent patients, making service-continuity receptors highly sensitive to disruption.	

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
						been added to the Impact–Mitigation Matrix (Section 8.2, Table 40) and monitoring parameters to the Monitoring Matrix (Section 13, Table 60). Key measures include a pre-construction utility survey and permit-to-dig clearance, pre-installed temporary rerouting/backup for critical services cut over outside clinical peak hours, standby genset/UPS and surge protection, continuity arrangements for wastewater and waste collection, an advance-notification and coordination protocol with hospital facility management (IPSRS) and utility providers (PLN/PDAM/Telko		

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
						m), and an emergency contingency plan for accidental utility strikes.			
B.2.	**SOCIAL**								
1.	Hospital Service Continuity	Potential impacts during construction primarily relate to temporary disruption associated with circulation changes, utility adjustment, and interaction between construction activities and ongoing hospital operations.	**4 (Long-Term).** Disruptions (noise, dust, vibration, heavy machinery) persist throughout the long construction phase and cannot be entirely avoided, causing prolonged exposure during the project lifespan	**5 (Almost Certain).** Disturbances to patients are nearly unavoidable since construction activities occur within or adjacent to active healthcare service areas	**4 (Extensive).** Affects a high number of patients, medical personnel, and visitors, including inpatients and outpatients, creating a broad institutional impact.	**2 (Immediate Local Area)** Confined to The Project premises and immediate construction zones	**15 (high)**	**High** Inpatients, elderly, pediatric, and acute patients are highly sensitive to noise, dust, and vibration	**High**
2.	Community expectations regarding local hiring priority	Contractor mobilization, workforce recruitment processes, and disclosure of employment opportunities	**2 (Short-Term / Reversible).** Concentrated during early mobilization and hiring; adjusts as job allocations realize.	**4 (Likely)** Neighboring populations predictably expect localized economic benefits and priority hiring.	**3 (Moderate)** Felt by working-age residents, job seekers, and youth groups in adjacent neighborhoods.	**2 (Immediate Local Area)** Affects the host urban villages and immediate administrative zones.	**11 (Moderate)**	**Moderate** High economic sensitivity due to livelihoods and desires for increased income.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
3.	uncontrolled growing new foodstalls/kiosks	Mobilization and daily presence of up to 265 construction workers; unmet demand for affordable food and drinks; worker and delivery movements near construction gates; and inadequate controlled canteen/catering or vendor-access management.	**3 (Medium-Term / Partially Reversible).** The risk may persist throughout the multi-year construction period and may create livelihood dependence. Physical obstruction, litter and sanitation effects are reversible, but vendor relocation or transition may require consultation and structured measures.	**4 (Likely).** A peak workforce of 265 creates predictable daily demand. Spontaneous vending is expected if affordable controlled food service and access controls are not in place.	**2 (Limited).** The risk directly concerns a small group of prospective vendors and workers, with localized secondary effects on patients, visitors, hospital staff, road users and nearby residents.	**2 (Immediate Local Area).** Effects would be concentrated at hospital and construction gates, the site boundary, adjacent access roads and sidewalks, drainage edges, and worker facilities.	**11 (Moderate).**	**High**. Hospital patients (including elderly, pediatric, immunocompromised and mobility-impaired persons), ambulance users, staff and visitors are sensitive to access, foodborne-disease, fire and sanitation risks. Prospective informal vendors may also have vulnerable livelihoods.	**High.**
4.	Disease transmission	Presence of construction workforce (labor influx) inside an operating hospital compound; worker accommodation/camps; worker-community interaction in Karang Sari Village; standing water from excavations, basement works and material laydown; shared sanitation and food handling at the site. Pathways include: (a) communicable diseases (TB, ARI, COVID-19 and other respiratory pathogens)	**2 (Short-Term / Reversible).** Although disease-transmission risk may arise at any time throughout the multi-year construction phase, the duration of illness for each affected individual is typically limited to weeks or a few months (e.g., ARI,	**5 (Almost Certain).** Labor influx is itself rated Almost Certain in the preceding row and is the principal driver. Without dedicated controls, communicable disease incidents (respiratory illness clusters in camps, dengue cases, GI illness from catering) are routinely observed on large urban construction sites in	**2 (Limited).** Transmission events typically occur in clusters rather than as widespread outbreaks - affecting groups of workers sharing a camp/shift/mess facility, and groups of community	**3 (Local Area)**. Although the worker camps and worksite are site-specific, worker movement to/from the camp, contact with the surrounding community, vector flight range, and patient/visitor circulation extend the impact beyond the immediate	**12 (Moderate).**	**Moderate**. The primary receptors are construction workers, who are generally healthy adults with moderate vulnerability.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		transmitted in worker camps and between workers, patients, hospital staff and the surrounding community; (b) vector-borne diseases (notably dengue) amplified by standing water in excavations and laydown areas; (c) sexually transmitted infections and HIV from worker-community sexual contact; (d) waterborne and food-borne diseases (diarrhoeal disease, hepatitis A, typhoid) from inadequate camp wash and catering hygiene.	GI illness, dengue) and recovers without permanent sequelae once treated. Residual community-level effects (e.g., MDR-TB cases, persistent vector breeding sites) may extend longer but are exceptions rather than the typical per-case profile.	Banten/Jabodetabek and are essentially unavoidable on a multi-year hospital construction project of this scale.	members within the same household, RT/RW or village neighborhood that interact with workers. Sensitive on-site receptors (oncology, surgical, neurology, pediatric and elderly patients) are also exposed but in localized clusters within the affected ward, not facility-wide.	hospital compound to the host neighborhood and adjacent administrative zones.			
5.	Spatial disturbance to surrounding land-use activities	Construction activities near: • settlements • hospital facilities • public access roads • parking areas, utility corridors, and • community activity areas.	**3 (Medium-Te rm / Reversible).** Disturbances occur during the construction phase in the form of access barriers, mobility disruptions, noise, dust, and reduced environmental comfort. The	**4 (Likely).** The risk is highly likely to occur because construction work takes place in an area actively used by the community with direct interaction with public access and hospital operations.	**3 (Moderate).** The impact affects several receptor groups such as surrounding communities, road users, patients, hospital visitors, healthcare workers, and	**2 (Immediate Local Area).** The impact is concentrated in the project area and surrounding environment directly connected to construction activities.	**12 (Moderate).**	**High.** The affected receptors include: • hospital patients • healthcare workers • surrounding communities, and • users of public facilities who are highly dependent on accessibility and environmental comfort.	**High.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
			impacts are temporary and can generally be reversed upon completion of construction work.		local business operators.				
6.	Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH SEA/SH)	Mobilization and presence of project workforce, worker interactions with surrounding communities, patients and hospital visitors, use of worker facilities, contractor and subcontractor activities, and non-compliance with the code of ethics and work behavior during the construction phase.	**4 (Long-Term / Partially Reversible).** SEA/SH impacts may result in psychological, social, health, and reputational consequences that persist over the medium to long term for victims. Although response mechanisms and victim support are available, some psychosocial impacts may be prolonged and not fully recoverable.	**3 (Possible).** The risk is fairly likely to occur in construction projects involving labor influx, worker interactions with communities and hospital facility users, and the presence of contractors and subcontractors. The risk increases if worker behavior supervision, training, and complaint mechanisms are not effectively implemented.	**4 (Major).** The impact may affect various receptors including project workers, hospital patients, visitors, surrounding communities, women, children, persons with disabilities, and other vulnerable groups. Beyond individual impacts, SEA/SH incidents may affect the project's reputation and social relations	**3 (Local Area).** The impact may occur in the project area, worker facilities, hospital environment, project access routes, and surrounding communities that interact with the project workforce.	**14 (High).**	**High Sensitivity.** Receptors include women, children, hospital patients, vulnerable groups, surrounding communities, and workers who have a high level of vulnerability to exploitation, sexual harassment, and gender-based violence.	**Very High.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
					with the community.				
7.	Occupational Health and Safety (working at heights, electrical work, hot work, confined spaces)	Every activities in construction phase. **Working at Heights.** Scaffolding erection and dismantling. Formwork installation. Reinforcement works on upper floors. Concrete casting at elevated levels. Tower crane operation. Roof works. Façade installation. MEP installation above ceiling level.External finishing works). **Lifting Operations.** Tower crane operation. Mobile crane operation. Lifting reinforcement cages. Lifting formwork materials. Lifting HVAC units. Lifting generators and transformers. Medical equipment installation (MRI, LINAC, CT Scan). **Electrical Work.** Temporary power installation. Cable pulling. Switchgear installation. Transformer installation. Panel energization. Generator connection. Testing and commissioning.	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**3 (Possible).** Possibility happen once in a while during implementation project.	**3 (Moderate)**. Affect workers within the project area.	**1 (site specific)**. It will only happen within the project area	**9 (Low)**	**High**. Sensitivity currently to workers within the project area.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		Hot Works. Welding. Cutting. Grinding. Brazing medical gas pipes. Steel fabrication. **Heavy Equipment.** Operation. Excavator operation. Bored pile rig operation. Loader operation. Dump truck movement. Compaction works. Earthmoving activities..							
8.	Community safety	**Mobilization of Materials and Equipment**. The average of vehicle approximately 33 trips per day, or approximately 4 - 5 trips per hour (assuming 8 working hours per day).	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Possible).** The impact will occur during the mobilization.	**3 (Moderate).** The affected people not only on the surrounding The Project area but also the road user at Sitanala Road.	**1 (Site Specific).** The impact extent will only occur within The Project area especially at the entrance gate of The Project	**10 (Moderate).**	**High.** There existing traffic conditions is poor, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.	**High**
9.	Community safety	Every activities in construction phase.	**2 (Short term).** The impact will occur in several weeks to months. It will recover naturally within a short period.	**4 (Possible).** The impact will occur during the mobilization.	**3 (Moderate).** The affected people not only on the surrounding The Project area but also the road user at Sitanala Road.	**1 (Site Specific).** The impact extent will only occur within The Project area especially at the entrance gate of The Project	**10 (Moderate).**	**High.** There existing traffic conditions is poor, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.	**High**
10.	Child labor	Workforce recruitment by contractors and subcontractors, use of informal labor, construction support activities, and procurement of goods and services through	**4 (Partially Reversible).** Child laborers may potentially experience impacts on health, safety,	**2 (Possible).** The risk is relatively lower because the project is implemented through a formal contractor system with clear labor requirements. However,	**3 (Moderate).** The impact is primarily felt by children involved in labor, but may also affect the	**2 (Immediate Local Area).** The impact is generally limited to the project area, supporting facilities, and local	**11 (Moderate).**	**Moderate.**	**Modereate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		suppliers that lack adequate labor verification systems.	physical and psychological development, and loss of educational opportunities. Impacts may persist over the medium to long term and may not always be fully recoverable.	risks may still emerge through subcontractors, local suppliers, or informal labor if verification and supervision processes are not effectively implemented.	project's legal compliance, proponent reputation, stakeholder relations, and project labor management credibility.	labor chains directly related to construction and project operational activities.			
11.	Underpaid pay and unequal treatment	• Workforce recruitment and management • Wage systems • Provision of benefits and work facilities • Work hour arrangements • Job promotions • Contractor and subcontractor management, and ▪ implementation of labor policies during the construction and operational phases .	**3 (Medium-Term / Reversible).** Impacts related to unfair wages, discrimination, and unequal treatment generally persist during the employment relationship. Impacts can be addressed through improvements in the labor management system, appropriate wage payments, implementation of non-discrimination policies, and	**4 (Likely).** The risk is fairly likely to occur in projects involving many workers, contractors, and subcontractors with varying wage systems, working conditions, and different workforce management practices. The risk increases if labor supervision and contractor compliance are not effectively implemented.	**3 (Moderate).** The impact may affect a number of project workers, including contractor workforce, daily workers, female workers, migrant workers, workers with disabilities, and other vulnerable worker groups that may potentially experience unequal treatment or discrimination.	**3 (Local Area).** The impact occurs in the project work environment, worker facilities, and operational areas involving the project workforce, contractors, and related subcontractors.	**13 (High).**	**High.** The impact receptors are workers who depend on income and working conditions to meet their livelihood needs. Vulnerable worker groups such as female workers, daily workers, contract workers, migrant workers, and persons with disabilities have a higher sensitivity to the risk of discrimination and wage injustice.	**Very High Risk.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
			effective worker complaint resolution mechanisms.						
C	**OPERATION**								
C.1.	**ENVIRONMENTAL**								
1.	contamination from increased volumes of medical waste due to expanded hospital capacity	**Operational of three buildings.** Hospital operations generate medical waste from healthcare activities such as patient treatment, surgery, laboratory services, emergency care, pharmacies, and other clinical services. This waste may include infectious waste, sharps, pathological waste, contaminated personal protective equipment (PPE), and other healthcare-related materials. Improper management of medical waste may pose risks of disease transmission and environmental contamination. The existing Temporary Hazardous Waste Storage Facility (TPS B3) has a total storage volume of 72 m³. Based on the projected hazardous waste generation rate from both existing operations and the proposed development activities, the total hazardous waste volume	**4 (Long-Term / Difficult to Reverse).** The impact will persist throughout the operational life of the hospital, since medical waste is generated continuously for as long as The Project operates;	**1 (Rare).** Highly unlikely to occur under normal conditions and the medical waste management SOP reduces the likelihood of contamination.	**2 (Limited).** The affected receptors are limited to a small group, principally on-site waste handlers and patients within the hospital, rather than the wider community.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**8 (Low).**	**High.** Patients in ICU who may be exposed to medical waste if not properly managed.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		is estimated at approximately 9.08 m³/day. Assuming that hazardous waste is collected and transported by a licensed hazardous waste contractor every day, the maximum volume of waste accumulated within the TPS B3 is estimated as 10.27 m3. Compared with the available TPS B3 capacity of 72 m³, the facility utilization rate is estimated at 14.26 % of total capacity. Accordingly, the remaining available storage capacity is estimated at 61.73 m³. The assessment indicates that the existing 72 m³ TPS B3 facility is sufficient to accommodate the projected hazardous waste generation from both existing and proposed hospital operations (The Project), provided that off-site transportation is maintained at least everyday in accordance with applicable Indonesian healthcare waste management requirements.							
2.	Wastewater pollution due to expanded hospital capacity	During the operational phase, wastewater will be generated from various hospital operational activities, including medical services, inpatient care, laundry facilities, kitchen	**4 (Long Term).** The impact is expected to persist throughout The Project operational phase and will continue	**4 (Likely).** Wastewater generation will occur routinely and continuously during hospital operational activities.	**2 (Limited).** The impact is primarily expected to occur within The Project area and the receiving water	**2 (Project Surrounding).** Potential impacts may affect The Project area, existing drainage systems, and nearby	**12 (Moderate).** The volume of operational wastewater is relatively significant	**High** Sensitive receptors include hospital patients, healthcare workers, surrounding communities, and receiving water bodies that may be	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		operations, as well as domestic activities. The estimation of wastewater by using 602-bed hospital approximately 207.86 m3/day. The project will build additional STP as 250 m3/day to manage the wastewater. By considering the existing STP capacity as 250 m3/day, the total STP capacity both from existing and additional is 500 m3/day. Therefore, the STP capacity is sufficient to manage the wastewater from the exising and the project.	for as long as The Project remains in operation		bodies surrounding the project location	surroundings around the wastewater discharge points	and continuous in nature; however, it is considered manageable through the implementation of the planned wastewater treatment plant (WWTP) system	affected by WWTP failure or insufficient treatment capacity	
3.	contamination from increased volumes of hazardous waste due to expanded hospital capacity	**Operational of three buildings.** Hazardous waste is generated from hospital operational and maintenance activities involving hazardous materials and chemicals. This waste may include laboratory chemicals, pharmaceutical waste, used oil, batteries, fluorescent lamps, chemical containers, and other hazardous residues. Improper handling of B3 waste may cause soil and water contamination, air pollution, and health risks to workers and surrounding communities.	**1 (very short term).** The impact will only occur last days since The Project has already had the SOP of hazardous waste management in place.	**1 (Rare).** Highly unlikely to occur under normal conditions	**1 (Very Limited).** The affected people will only occur at isolated individual.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**4 (Low).**	**High.** Hospital patients, staff and workers are sensitive receptors.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		The existing Temporary Hazardous Waste Storage Facility (TPS B3) has a total storage volume of 72 m^3. Based on the projected hazardous waste generation rate from both existing operations and the proposed development activities, the total hazardous waste volume is estimated at approximately 9.08 m^3/day. Assuming that hazardous waste is collected and transported by a licensed hazardous waste contractor every day, the maximum volume of waste accumulated within the TPS B3 is estimated as 10.27 m3. Compared with the available TPS B3 capacity of 72 m^3, the facility utilization rate is estimated at 14.26 % of total capacity. Accordingly, the remaining available storage capacity is estimated at 61.73 m^3. The assessment indicates that the existing 72 m^3 TPS B3 facility is sufficient to accommodate the projected hazardous waste generation from both existing and proposed hospital operations (The Project), provided that off-site transportation is maintained at least everyday in accordance with applicable							

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		Indonesian healthcare waste management requirements.							
4.	Contamination from radioactive waste	**Operational of three buildings.** Occupational and patient exposure to ionising radiation, radioactive wastewater, isotope handling, shielding failure, and radioactive contamination risks associated with nuclear medicine services.	**2 (Short Term)**. Impact lasts weeks to months and recovery occurs naturally within a short period)	**3 (Possible)**. May occur under certain operational conditions.	**1 (Very Limited).** The affected people will only occur at isolated individual.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**7 (Low)**	**High**. Hospital patients, staff and workers are sensitive receptors	**Moderate**
5.	Solid waste pollution	**Operational of three buildings.** Domestic solid waste is generated from daily activities of patients, visitors, medical personnel, and administrative staff. The waste mainly consists of food waste, plastic packaging, paper, cardboard, bottles, cans, and other non-hazardous municipal waste. If not properly managed, domestic waste may create odor, visual disturbance, and sanitation issues within The Project environment	**1 (very short term).** The impact will only occur last days since The Project has already had the SOP of solid waste management in place.	**1 (Rare).** Highly unlikely to occur under normal conditions	**1 (Very Limited).** The affected people will only occur at isolated individual.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**4 (Low).**	**High.** The primary receptors include patients, healthcare workers, visitors, and nearby communities.	**Moderate**
6.	Nosocomial Infections	**Operational of three buildings.** Nosocomial infections (healthcare-associated infections) may occur during hospital operations due to exposure to pathogenic microorganisms	**2 (short-term/reversible).** Potential nosocomial infections may occur during hospital operations and may affect	**1 (Rare).** Highly unlikely to occur under normal conditions	**1 (Very Limited).** The affected people will only occur at isolated individual.	**1 (Site Specific).** The impact extent will only occur within The Project area.	**4 (Low).**	**High.** The primary receptors include patients, healthcare workers, visitors, and nearby communities. Patients, particularly	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		from patients, contaminated equipment, medical waste, wastewater, or inadequate infection control practices. These infections can negatively affect patients, healthcare workers, visitors, and the surrounding community by increasing health risks, prolonging hospitalization, raising treatment costs, and potentially causing disease transmission and outbreaks. Poor management of infectious waste and hospital wastewater may also contribute to environmental contamination and the spread of antimicrobial-resistant microorganisms.	patients, healthcare workers, or visitors for a period ranging from days to several weeks. However, the impact is generally reversible through appropriate medical treatment and the implementation of Infection Prevention and Control (IPC) measures. Therefore, the duration of the impact is considered short-term.					those with weakened immune systems, chronic illnesses, elderly individuals, infants, and other vulnerable groups, are considered sensitive social receptors and are more susceptible to healthcare-associated infections (HAIs). Therefore, receptor sensitivity is assessed as High.	
7.	Groundwater quality	**Operational of three buildings.** Hospital operational activities may affect groundwater quality through the generation of domestic wastewater, medical wastewater, and hazardous substances from healthcare services, laboratories, pharmacies, laundries, and maintenance activities. Potential impacts may occur if	**4 (Long-term).** The impact persists ovef the long term. Hospital operation is continuous throughout the facility's operational life and, assessed before mitigation, the ongoing generation of	**3 (Possible).** May occur under certain operational conditions. The hospital continuously generates domestic and medical wastewater, B3 (hazardous) waste and chemicals	**2 (Limited).** Affects on-site water users and a localized area around the discharge source within the shared aquifer.	**2 (Immediate Local Area).** Contaminant migration through groundwater may extend to the Project's immediate surroundings.	**11 (Moderate).**	**Moderate.** The underlying aquifer is a protected water resource used for water supply and has limited recharge and slow recovery capacity.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		wastewater treatment systems are not properly operated or maintained, resulting in seepage or leakage into the surrounding soil and groundwater. In addition, improper handling of hazardous and toxic waste (B3 waste), fuel, chemicals, and medical waste may also contribute to groundwater contamination. Potential pollutants may include organic matter, pathogens, detergents, nutrients, heavy metals, pharmaceutical residues, and chemical substances that could degrade groundwater quality and pose risks to human health and the environment.	domestic and medical wastewater, B3 (hazardous) waste, chemicals and pharmaceutical residues may seep into soil and the underlying aquifer if containment fails. Once contaminated, the aquifer recovers slowly and the change is difficult to reverse.						
8.	Groundwater quantity	**Operational of three buildings.** Hospital operations may increase groundwater consumption due to the continuous demand for clean water for medical services, sanitation, laundry, cooling systems, kitchens, and other supporting facilities. Excessive groundwater abstraction without proper management may reduce groundwater availability, lower groundwater tables, and potentially affect surrounding water users. In urban areas, intensive	**1 (Very Short-term/Fully reversible).** The project will use the groundwater as a back up if PDAM is having a trouble. Main water usage will be coming from PDAM.	**2 (UnLikely).** Groundwater extraction is unlikely occurred due to the groundwater usage as a back up in case PDAM is having a trouble.	**3 (Moderate).** Potential impacts may affect hospital water supply systems, nearby groundwater users, and surrounding communities relying on the same aquifer system.	**3 (Local Area).** Impacts may extend beyond The Project site to adjacent urban areas surrounding The Project due to interconnected groundwater systems.	**9 (Low).**	**Very Low**. Community wells are likely to be shallower (less than 40 meter depth) than the Sitanala Hospital well (100 meter depth). Therefore, the community wells are not disturbed by the Sitanala Hospital well.	**Negligible**.

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		groundwater extraction may also contribute to land subsidence and reduced aquifer recharge capacity, particularly where groundwater serves as a major source of water supply.							
9.	Natural disasters - Flooding	Operational of three new buildings (IBS, Oncology, Neurology & Urology) flood exposure	**1 (Very Short Term / Reversible).** Operation-phase flood events last hours to days per occurrence	**4 (Likely).** Tangerang and the Lower Cisadane experienced major flood events.	**2 (Limited).** The affected receptors are primarily limited to The Project complex, surrounding	**2 (Immediate Local Area).** The impact extent will only occur within The Project area.	**9 (Low).**	**High** Staff, patients and visitors	**Moderate**
10.	Disease transmission	Operation of three new buildings (IBS, Oncology Center, Neurology & Urology Center) within an active tertiary referral hospital. Disease transmission at operational includes: (a) community-to-hospital pathogen importation through ER triage, outpatient clinics and admission of patients with communicable diseases (TB, dengue, respiratory pathogens, emerging infectious diseases); (b) hospital-to-community spread via discharged patients, visitors, healthcare staff commuting, and improperly managed medical waste;(c)	**3 (Medium-Term / Partially Reversible).** Outbreaks of communicable disease at an operating hospital are typically controllable within weeks-to-months once detected through IPC response, contact tracing, isolation and treatment. However, antimicrobial resistance build-	**3 (Possible).** Given high patient throughput at a tertiary referral hospital, the endemic disease profile in Tangerang and Banten (dengue, TB, respiratory pathogens), and the periodic emergence of new pathogens (e.g., COVID-19, MERS), localized transmission events are reasonably expected to occur during operations. The Project already maintains IPC, medical waste and wastewater management SOPs (consistent with the Nosocomial Infections	**4 (Extensive).** Affected receptors include hospital inpatients (especially oncology, post-surgical, neurology and pediatric patients), outpatients, hospital staff (medical, nursing, support, cleaning), visitors and accompanying family,	**3 (Local Area).** Although The Project is the primary transmission node, patient/visitor/staff circulation, medical waste transport, and wastewater discharge extend the impact to the host neighborhood, the wider catchment serviced by The Project, and downstream environmental receptors.	**13 (Moderate).** Magnitude is moderated (relative to the construction-phase score) by the existing IPC and waste-management SOPs and The Project's tertiary-care clinical capacity to detect and contain outbreaks.	**High**. Sensitive receptors include immunocompromised oncology patients, post-surgical patients, elderly and pediatric inpatients, neonates, pregnant women among visitors and staff.	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		intra-facility cross-transmission in large-aggregation areas (outpatient waiting halls, oncology day-care, ER); (d) airborne transmission risk in shared mechanical ventilation pathways; (e) vector-borne disease risk on the wider hospital grounds where standing water may persist.	up, environmental contamination via wastewater/medical waste pathways, and chronic vector breeding can persist across the operational lifetime if not actively managed.	row item 5), which limits but does not eliminate likelihood.	surrounding Karang Sari Village residents, and downstream users of the receiving water body for treated effluent (Cisadane sub-catchment).		This is consistent with the downgrading rationale applied to the Nosocomial Infections row (item 5).		
11.	Seawater intrusion to the groundwater quality	**Operational of three new buildings (IBS, Oncology, Neurology & Urology).** The 100 m groundwater well is only a backup source, so continuous abstraction is expected to be limited. However, if backup use becomes frequent or prolonged during PDAM disruption, salinity indicators such as TDS, conductivity and chloride may increase and aquifer recovery can take months to several years because groundwater flushing is slow.	**3 (Medium-Term / Partially Reversible).** The impact can be reduced by limiting/pausing pumping, returning to PDAM supply and monitoring trends, but full recovery may not be immediate. Therefore, the impact is partially reversible.	**2 (Unlikely).** The 100 m groundwater well is for backup only, not the primary source.	**2 (Limited).** Mainly affects the backup well and local aquifer condition.	**2 (Immediate Local Area).** Potential influence around the well and adjacent hospital area.	**9 (Low).**	**Moderate.**.	**Low**.
C.2.	**SOCIAL**								
1.	Hospital service continuity	Phased commissioning and activation of the Central Surgical Building (IBS), Oncology Building, and	**3 (Medium-Term / Partially Reversible).** Individual	**4 (Likely).** The transfers are planned and unavoidable, and multiple relocation	**4 (Extensive).** The transfer programme may affect	**1 (Site-Specific).** The direct transfer activities and primary service	**12 (moderate)**	**High** Staff, patients and visitors	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		Neurology/Urology Building, including: (i) transfer of inpatients, outpatients, critical/non-ambulatory patients, medical records, medications, specimens, and life-support arrangements; (ii) decontamination, dismantling, packaging, transportation, reinstallation, connection, calibration, and IQ/OQ/PQ qualification of medical equipment; and (iii) reassignment, rostering, orientation, simulation, access authorization, and deployment of medical, nursing, technical, and support staff. Poor coordination may cause treatment delays or cancellations, unsafe patient movement, medication or identification errors, equipment damage or unavailability, staffing gaps, unfamiliarity with the new layout and emergency routes, overcrowding, and temporary suspension of clinical services.	transfers and service cutovers may last several hours to several days, while the overall relocation programme may extend for weeks or months. Equipment downtime, treatment backlogs, staff adaptation problems, and interrupted surgery, chemotherapy, dialysis, or inpatient care may require considerable recovery effort. Most service disruption is reversible, but deterioration of a patient's condition or a serious transfer-related incident may not be fully reversible.	waves will be required across complex clinical departments. Some temporary disruption is therefore reasonably expected, particularly because the reviewed SOP package does not identify dedicated procedures for patient relocation, medical-equipment relocation, or staff transition into the new buildings. The rating is not "Almost Certain" because detailed planning, commissioning, simulation, and phased cutovers can prevent major disruption.	multiple departments and receptor groups across the three new buildings, including surgical, intensive-care, oncology, radiotherapy, neurology, urology, haemodialysis, diagnostic, pharmacy, laboratory, and support services. Affected receptors include patients, caregivers, doctors, nurses, technicians, administrative personnel, ambulance teams, and support workers.	disruption would occur within the RS Sitanala hospital complex. Temporary referral or diversion of patients may affect nearby hospitals, but this would be a secondary consequence rather than the principal geographic extent.			

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
2.	Improvement of healthcare services	Full hospital operations, clinical capacity scaling, and optimization of medical and non-medical services.	**4 (Long-Term / Difficult to Reverse)** Permanent positive impact providing sustainable advancements in public health infrastructure.	**5 (Almost Certain)** Guaranteed to manifest as it forms the primary objective of the institutional development.	**4 (Extensive)** Systemic benefits enjoyed by patients, general public, clinical experts, and broad populations.	**4 (Regional Scale)** Benefits ripple across the regional healthcare ecosystem due to advanced referral capacities.	**17 (Very High)** Drastically optimizes regional health access, emergency response, and clinical treatment standards.	**High** The public and vulnerable populations are highly responsive to shifts in care accessibility and quality.	**Very High**
3.	Increase of employment opportunities	Core clinical staffing, administrative hiring, facility maintenance, and auxiliary outsourced service needs.	**3 (Medium-Term / Partially Reversible)** Sustained during operations; subject to institutional adaptations and market adjustments.	**4 (Likely)** Expanded modern medical facilities inherently scale up permanent and contractual staff hiring.	**3 (Moderate)** Benefits healthcare professionals, administrative workers, and local tertiary service vendors.	**3 (Local Area)** Economic multipliers heavily concentrate within the municipal and district labor markets.	**13 (Moderate)** Provides secure livelihoods and stimulates formal and informal local economic growth.	**Moderate** Local job seekers have a moderate sensitivity to stable, non-temporary institutional employment.	**Moderate**
4.	Public perception of waste management safety	Onsite sorting, treatment, and temporary storage of biohazards, medical sharps, and liquid effluents.	**3 (Medium-Term / Partially Reversible)** Evolves with operational performance; directly steered by compliance and transparency.	**4 (Likely)** Bio-medical waste streams are high-profile, sensitive targets for localized public concern.	**3 (Moderate)** Mainly influences bordering residents, environmental groups, and hospital visitors.	**2 (Immediate Local Area)** Tied directly to communities situated closest to waste infrastructure points.	**12 (Moderate)** Negative biases can weaken institutional credibility and cause	**Moderate** Moderate sensitivity to potential environmental contamination and secondary health hazards.	**Moderate**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
							community resistance.		
5.	Potential business opportunities in laundry services	Management of internal linen processing or outsourcing models to commercial laundry vendors.	**3 (Medium-Term / Partially Reversible)** Continuous throughout operations, aligned with procurement cycles and service parameters.	**4 (Likely)** Hospitals require high-volume, reliable daily laundering, ensuring steady commercial demand.	**3 (Moderate)** Opens niche business windows for local laundry SMEs and specialized service suppliers.	**3 (Local Area)** Procurement impacts are felt within the host district and adjacent urban zones.	**13 (Moderate)** Generates secondary entrepreneurship options and local micro-employment.	**Moderate** Local business networks are highly responsive to steady institutional procurement streams.	**Moderate**
6.	Improvement of patient safety	Integration of rigorous patient safety protocols, clinical risk matrices, and quality audits.	**4 (Long-Term / Difficult to Reverse)** Embedded directly into clinical workflows, fostering a long-term care safety culture.	**5 (Almost Certain)** Modern healthcare accreditation frameworks strictly dictate and guarantee safety systems.	**4 (Extensive)** Protects all admitted patients, visiting families, and clinical care teams.	**4 (Regional Scale)** Ensures top-tier clinical safety standards for all regional referral patients.	**17 (Very High)** Directly drops medical error rates, increases cure metrics, and secures clinical excellence.	**High** Patients and clinical practitioners demand absolute adherence to medical safety standards.	**Very High**
7.	Increased demand for local food supply vendors	Commercial kitchen sourcing, in-patient dietary management, and retail cafeteria supply chains.	**4 (Long-Term / Difficult to Reverse)** A permanent operational fixture requiring continuous daily bulk agricultural sourcing.	**5 (Almost Certain)** Active medical centers must run continuous daily meal programs for patients and staff.	**4 (Extensive)** Benefits regional farming networks, food distributors, and local agri-SMEs.	**3 (Local Area)** Sourcing channels heavily stimulate local and municipal food production economies.	**16 (High)** Creates a reliable, high-volume market demand for local food and logistics sectors.	**Moderate** Local food producers and vendors are highly sensitive to secure commercial supply contracts.	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
8.	Building Fire	Operational of Central Surgical Building, Oncology Building and Neurology/Urology Building. The fire risk associated with the operation of the Central Surgical Building, Oncology Building, and Neurology/Urology Building is considered significant due to the intensive use of medical equipment, complex electrical systems, medical gases, and chemical substances.	**1 (Very Short term)**. The Risk lasts days to weeks with rapid recovery and no lasting change.	**1 (Rare)**. Highly unlikely to occur under normal conditions.	**2 (Limited)**. Affects a small group or localized habitat.	**1 (Site Spesific)**. Restricted entirely within project footprint.	**5 (Negligible).**	**High.** Staff, patients and visitors	**Low.**
9.	Unequal hospital access by vulnerable group	Hospital operations, healthcare service provision, patient registration and administration systems, medical service mechanisms, provision of service information, healthcare facility design, patient complaint management, and service policies that do not yet fully accommodate the needs of vulnerable groups.	**4 (Long-Term / Partially Reversible).** Unequal access to healthcare services may persist over the long term during hospital operations if physical, economic, social, communication, or administrative accessibility barriers are not addressed. Impacts may include limited access to healthcare services, delays in	**4 (Likely).** The risk is fairly likely to occur in healthcare facilities if service design, information systems, registration mechanisms, supporting facilities, and service procedures are not fully designed in an inclusive manner to meet the needs of persons with disabilities, the elderly, women, children, low-income communities, and other marginalized groups.	**4 (Major).** The impact may affect various receptor groups that depend on hospital services. The risk does not only affect patients from vulnerable groups but also patients' families, companions, surrounding communities, and other healthcare service users. In addition, the risk may affect	**3 (Local Area).** The impact occurs within The Project service area and the service territory that constitutes the primary coverage area for hospital beneficiaries, including surrounding communities and healthcare service users who routinely access hospital facilities.	**15 (High).**	**High.** Impact receptors include persons with disabilities, the elderly, women, children, low-income communities, patients with special needs, and other marginalized groups who have high dependence on healthcare services and lower capacity to overcome access barriers independently.	**Very High.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
			obtaining medical care, reduced quality of life, and decreased opportunities for vulnerable groups to obtain equal healthcare services. Although some impacts can be addressed through improvements in a more inclusive service system, social and health impacts that have already occurred may not always be fully recoverable.		public perception, patient satisfaction levels, social acceptance, and The Project institution's reputation.				
10.	Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH SEA/SH)	Interactions among healthcare workers, support staff, administrative staff, outsourced workers, contractors, patients, patients' families, visitors, and other third parties in the healthcare service process, hospital operational activities, human resource management, and use of hospital facilities.	**4 (Long-Term / Partially Reversible).** SEA/SH impacts may cause psychological trauma, mental health disorders, a sense of insecurity, social stigma, reduced quality of life, and loss of self-confidence in	**3 (Possible).** The risk is fairly likely to occur in hospital environments with intensive interaction among various service-user groups and hospital personnel. The risk may increase if protection policies, behavioral supervision, reporting mechanisms, case-handling systems, and a work culture that	**4 (Major).** The impact may affect various receptors, including patients, patients' families, healthcare workers, administrative staff, contractor workers, visitors,	**3 (Local Area).** The impact mainly occurs within The Project operational environment, patient service areas, waiting rooms, hospital public facilities, staff work areas, and other locations involving direct interaction between service	**14 (High).**	**High.** Impact receptors include women, children, patients with certain health conditions, persons with disabilities, vulnerable groups, and workers who depend on a safe hospital environment free from violence and harassment. These	**Very High.**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
			victims. Impacts may persist over the medium to long term and, although some can be recovered through medical, psychological, and social support services, certain psychosocial consequences may be prolonged.	respects individual dignity are not yet effectively implemented.	women, children, persons with disabilities, and other vulnerable groups. Beyond impacts on individuals, SEA/SH incidents may affect public trust, service quality, institutional image, and The Project's overall reputation.	users and hospital personnel.		groups have high vulnerability to the psychological, social, and health impacts of SEA/SH.	
11.	Road and Traffic safety	**Operational of three buildings.** Hospital operations may increase traffic volume due to the movement of patients, visitors, staff, ambulances, service vehicles, and delivery vehicles entering and leaving The Project area. Increased traffic activity may contribute to congestion, reduced road performance, and elevated risks of traffic accidents, particularly during peak hours. Additional safety concerns may arise from pedestrian movements, emergency vehicle access, on-street parking, and vehicle	**4 (Long term).** The impact of road and traffic safety will continue for several years.	**5 (Almost certain).** Expected to occur frequently or continuously.	**3 (Moderate).** The affected people not only on the surrounding The Project area but also the road user at Sitanala Road.	**1 (Site Specific).** The impact extent will only occur within The Project area especially at the entrance gate of The Project	**13 (Moderate).**	**High.** There are existing traffic conditions is poor, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.	**High**

No	E & S Risk/Impact	Project activities that cause Risks/ Impacts	Nature & Duration of Risks/Impacts	Risks/Impacts Likelihood	Risks/Impacts Scope	Spatial Scale	Risks/Impacts Magnitude	Receptor Sensitivity	Risk/Impact Significance
		crossing activities at hospital access points. However, proper traffic management measures, including separate entry and exit gates, internal parking arrangements, clear traffic signage, pedestrian pathways, and adequate security personnel, can help minimize traffic disruption and improve road safety around The Project area.							

6.4 Cumulative Impact Assessment

6.4.1 Background

The Cumulative Impact Assessment (CIA) is undertaken to identify and evaluate the environmental and social impacts arising from the interaction between the proposed hospital activities and other existing, ongoing, and reasonably foreseeable activities within the study area. Given that the project area is located in a region with a high concentration of commercial, airport, and settlement area, a CIA is required to ensure that cumulative environmental and social pressures are adequately identified, assessed, and managed in a sustainable manner.

This assessment is prepared in accordance with the principles outlined in the International Finance Corporation (IFC) Performance Standard 1 and the World Bank Environmental and Social Framework (ESF), which emphasize the importance of assessing cumulative impacts on Valued Environmental and Social Components (VECs). The CIA aims to complement the project-specific impact assessment by providing a broader spatial and temporal perspective, thereby supporting informed decision-making and the implementation of effective mitigation and management measures.

This chapter presents a cumulative impact assessment (CIA) of the Project. The sections herein present details of applicable CIA guidance, the adopted CIA methodology, CIA scoping, and impact assessment. The CIA considers the existing activities in the vicinity of the Project AOI.

6.4.2 CIA Guidance

To provide guidance on undertaking a CIA, The cumulative impact assessment refers to IFC PS1, IFC GN1 dan GN37 on Definition of Cumulative Impacts, with guidance as follows:

166. IFC PS1 Paragraph 16. Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Examples of cumulative impacts include: incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways.

167. IFC GN1 Para 21: Cumulative impacts from other existing or planned projects in the area of influence may also need to be identified during this process. Where relevant, the identification of risks and impacts should also consider the role and capacity of third parties (such as local and national governments, and contractors and suppliers), to the extent that they pose a risk to the project, recognizing that the client should address these risks and impacts in a manner that is commensurate with the client's control and influence over the third party actions.

168. IFC GN37: Government concessions and/or business developments often concentrate around available natural resources (e.g., watersheds with hydro-electric potential, wind resources, coastal port zones, oil reserves, mining resources, forests), potentially leading to multiple projects in the same geographical area. Multiple environmental and social impacts from existing projects, combined with the potential incremental impacts resulting from proposed and/or anticipated future projects may

result in significant cumulative impacts that would not be expected in the case of a stand-alone project or business activity.

6.4.3 Scoping Phase I – Identifying Valued Environmental And Social Component (VECs), Spatial And Temporal Boundaries

This section is prepared with reference to the IFC Good Practice Handbook on Cumulative Impact Assessment. Cumulative Impact Assessments (CIAs) are complex processes that require adequate time, resources, and clearly defined scope. To effectively support environmental and social risk management, the scope of a CIA must be properly established at the outset. Given that it is not practical to assess every environmental and social aspect that may be subject to cumulative impacts, good practice recommends focusing the assessment and management strategies on Valued Environmental and Social Components (VECs). Valued Environmental and Social Components (VECs) are environmental and social attributes considered important in assessing risks and impacts. These may include: sphysical features, habitats, and wildlife populations, including biodiversity;

- ecosystem services;
- natural processes, such as water and nutrient cycles and microclimate;
- social conditions, such as health and economic conditions; and
- cultural aspects, such as traditional or spiritual practices.

VECs may be directly or indirectly affected by a specific development and may also be influenced by the cumulative effects of other existing, planned, or reasonably foreseeable developments. VECs are considered the ultimate receptors of impacts, as they are often located at the end of ecological, social, or environmental impact pathways. In the context of CIA, VECs refer to sensitive or valued receptors whose desired future condition forms the basis for defining assessment endpoints.

Based on the surrounding activity profile and the potential for cumulative interaction with the Project, the following VECs have been identified as most relevant for cumulative impact consideration:

- Noise;
- Groundwater;
- Air quality;
- Vibration;
- Traffic;
- Wastewater;
- Flooding; and
- Community health and safety.

These VECs will form the basis for defining the spatial and temporal boundaries of the CIA, as well as for assessing potential cumulative impacts associated with the Project and other relevant surrounding activities.

6.4.4 Scoping Phase II – Other Activities And Environmental Drivers

This step involves identifying other projects or human activities that have the potential to impact the defined Valued Environmental Components (VECs), thereby giving rise to cumulative impacts. Subsequently, an analysis is conducted to determine which development projects are included within the scope of the Cumulative Impact Assessment (CIA). This is reviewed based on their potential ability

to generate cumulative impacts associated with the Project, either through temporal or spatial interactions with the Project.

The Project is located within an area that already accommodates multiple activities in commercial and service areas, settlements area and airports. In accordance with international good practice, this Cumulative Impact Assessment (CIA) provides an indicative evaluation of the potential combined environmental and social impacts arising from the Project in conjunction with other existing and reasonably foreseeable developments in the area.

Table 40 Project Vicinities and identified VEC

Direction	Dominant Activities / Land Use	Potential Impacts on the Project and Surrounding Environment
North	Residential areas, local roads, airport, small-scale commercial activities	▪ Air Quality and Noise. ▪ Community health and safety. ▪ Vibration ▪ Traffic.
South	Cemetery, Mookervart Channel, Residential areas, small-scale commercial activities	▪ Community health and safety. ▪ Noise ▪ Vibration ▪ Flood ▪ Wastewater
West	Residential areas, public facilities, open spaces, Cisadane River	▪ Traffic generated by construction vehicles. ▪ Air quality and noise ▪ Flood
East	Commercial and service activities, residential areas	▪ Traffic ▪ Noise

6.4.5 Baseline Status Of VECS

Groundwater

Based on the baseline information, the risk of seawater intrusion associated with groundwater abstraction by RS Sitanala is considered low to moderate and manageable, provided that groundwater use remains limited to backup supply during PDAM service disruption. The hospital is located inland in Neglasari, outside the currently documented active seawater intrusion front, while the nearest indication of potential salinity influence has been recorded in Benda Subdistrict rather than at Neglasari monitoring points.

RS Sitanala abstracts groundwater from a relatively deep aquifer interval of approximately 60–100 m, whereas surrounding community wells are generally expected to draw from shallower to intermediate aquifers, commonly less than 40 m for domestic use. Therefore, the hospital's abstraction is not expected to directly affect shallow community wells, assuming the well is properly constructed, pumping remains intermittent, and the abstraction rate is controlled.

Air Quality

The monitoring results indicate that ambient air quality around The Project remains compliant with Indonesian environmental regulations, while several parameters, particularly SO_2 and PM2.5, indicate the need for continued environmental management to progressively align with stricter international air quality standards.

Noise

The monitoring results demonstrate an overall improvement in environmental noise conditions across The Project area. While historical exceedances were observed, particularly at the front yard/parking area, the latest monitoring period shows that all locations comply with the Indonesian noise standard, and most locations also comply with IFC daytime requirements. Minor exceedances of the IFC nighttime guideline remain at certain locations, particularly the front yard and back yard areas; however, the exceedances are limited in magnitude and do not indicate a significant deterioration of environmental quality.

Vibration

The existing vibration condition in the project area is generally influenced by urban transportation activities and surrounding traffic movement. The baseline vibration level is considered relatively low to moderate and is typical for urban healthcare facilities located within the Tangerang metropolitan area. Sensitive receptors include hospital patients, healthcare workers, medical equipment, and nearby residential areas.

Traffic

Based on the review of the Environmental Evaluation Document (DELH, 2019), the current activities of The Project have contributed to traffic impacts, particularly along Dr. Sitanala Road, with a traffic generation value of 65.93 passenger car units (PCU)/hour. Analysis of the field survey data indicates that the performance of this road segment during the afternoon peak hours is poor, with a V/C ratio of 1.23. Referring to the Regulation of the Minister of Transportation Number 96 of 2015, the current condition of Dr. Sitanala Road is categorized as Level of Service (LOS) F, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.

Wastewater

Overall, the wastewater quality monitoring results indicate that The Project Wastewater Treatment Plant (WWTP) operated effectively in reducing pollutant concentrations. In general, all monitored outlet parameters remained below the applicable wastewater quality standards, indicating compliance with environmental regulations.

Flood

Hospital management and on-site observation confirm that localised surface ponding occurs in parts of the compound during high-intensity rainfall events, receding within a short period once rainfall subsides. This indicates that the existing internal drainage and infiltration capacity is at or near its design limit under current rainfall regimes and will require augmentation before the additional impervious footprint of the IBS, Oncology, and Neurology & Urology buildings is introduced.

Community healCommunity heal The baseline conditions indicate that the area surrounding The Project is characterized by a relatively dense urban population with high dependence on healthcare services. Community health and safety conditions are generally well managed through existing hospital infrastructure and operational controls, while traffic, noise, and public health management remain important considerations for future hospital development and expansion projects.

6.4.6 Assessment On Significance Indicative Cumulative Impact

The CIA was undertaken to evaluate the combined effects of the proposed hospital development together with existing environmental and social stressors and other ongoing activities within the project's area of influence. The assessment follows the principles outlined in the IFC Good Practice Handbook for Cumulative Impact Assessment and Management, which emphasizes the evaluation of a project's incremental contribution to cumulative changes affecting valued environmental and social components (VECs).

A review of the project area and available planning information indicated that no major approved or publicly disclosed future developments were identified that would significantly contribute to cumulative impacts during the assessment period. Furthermore, sufficient information on reasonably foreseeable future developments was not available to support a robust quantitative assessment. Therefore, a simplified cumulative impact assessment approach was adopted, focusing on existing environmental and social conditions, ongoing activities within the area of influence, and the incremental impacts generated by the proposed project.

Under this approach, cumulative impacts are considered as the combined result of three key factors:

$$CI=EC+OA+PI$$

where:

CI (Cumulative Impact) represents the overall cumulative effect on a valued environmental or social component. The criteria for CI is shown in Table 41.

Table 41 Cumulative Impact Significance Criteria

Total Score	Significance	Interpretation
3–5	Negligible	No significant cumulative impact expected.
6–8	Minor	Low cumulative impact; standard mitigation sufficient.
9–11	Moderate	Noticeable cumulative impact requiring targeted management.
12–13	Major	Significant cumulative impact requiring enhanced mitigation and monitoring.
14–15	Severe	Potentially unacceptable cumulative impact; project redesign or additional controls may be necessary.

- EC (Existing Conditions) represents baseline environmental and social stressors already present within the study area prior to project implementation (refers to Chapter 5).
- OA (Other Activities) represents the contribution of existing activities and developments that affect the same environmental or social receptor. The criteria for OA is shown in Table 42.

Table 42 Other Activities Criteria

Score	Category	Criteria	Typical Conditions Around the Project
1	Very Low	No significant existing activities affecting the same VEC. Existing land uses contribute negligible environmental or social pressure.	Isolated open space, undeveloped land, low human activity.
2	Low	Limited existing activities contribute to the same impact pathway. Impacts are localized and infrequent. Existing environmental quality remains largely unaffected.	Low-density residential areas, minor local roads, limited commercial activities.
3	Moderate	Several existing activities contribute to the same impact pathway. Existing pressures are noticeable but generally remain within regulatory standards or infrastructure capacity.	Residential areas, local commercial activities, public facilities, moderate traffic corridors.
4	High	Multiple activities contribute substantially to the same environmental or social receptor. Existing pressures are significant and may occasionally approach environmental standards or infrastructure capacity limits.	Dense residential areas, commercial districts, airport operations, major traffic corridors, public facilities, drainage channels.
5	Very High	Numerous intensive activities already exert substantial pressure on the receptor. Existing conditions may be approaching or exceeding environmental standards, carrying capacity, or acceptable social thresholds. Any additional project contribution is likely to create significant cumulative impacts.	Congested road networks (LOS E/F), airport influence zones, densely populated urban areas, heavily utilized public infrastructure, flood-prone drainage systems.

- PI (Project Incremental Impact) represents the additional impact attributable to the proposed hospital development (Refer to Chapter 7.3.).

Based on those three key factors, the cumulative impact significance assessment is shown in Table 43. The propose mitigation measure is shown in Table 44.

Table 43 Cumulative Impact Significance Assessment

VEC	EC	OA	PI	Cumulative Impact Significance
Groundwater	3 (moderate)	3 (moderate)	1 (Very Low)	7 (Minor)
Air Quality	2(Low)	4 (High)	4 (High)	10 (Moderate)
Noise	2(Low)	4 (High)	3 (Moderate)	10 (Moderate)
Vibration	2(Low)	3 (Moderate)	3 (Moderate)	8 (Minor)

VEC	EC	OA	PI	Cumulative Impact Significance
Traffic	5(very High)	5 (very High)	4 (High)	14 (severe)
Wastewater	1(Very Low)	3 (Moderate)	4 (High)	8 (Minor)
Flood	3(Moderate)	4 (High)	3 (Moderate)	10 (Moderate)
Community health and safety	2(Low)	4 (High)	3 (Moderate)	9 (Moderate)

Table 44 Summary of Mitigation and management measures, monitoring indicators, and adaptive management measures for cumulative impacts.

VEC	Cumulative Impact Significance	Mitigation & Management Measures	Monitoring Indicators	Adaptive Management Measures
Groundwater	7 (Minor)	▪ Use PDAM as the primary water supply and limit groundwater abstraction to backup/emergency use only during PDAM disruption. ▪ Maintain groundwater abstraction at the permitted/approved rate and avoid continuous pumping. ▪ Install and maintain a water meter at the production well to record daily abstraction volume.	▪ Daily/monthly groundwater abstraction volume from the Sitanala Hospital well. ▪ Groundwater quality parameters, including TDS, electrical conductivity/EC, salinity, chloride, pH, and other relevant parameters at surrounding community well levelsand Sitanala Hospital well. ▪ Records of PDAM disruption and backup water use. ▪ Community grievance records related to reduced well yield, groundwater quality, or water availability.	▪ If groundwater levels show a declining trend, reduce pumping duration and increase reliance on PDAM, water storage, or alternative water supply. ▪ If TDS, EC, chloride, or salinity show increasing trends, conduct further hydrogeological assessment to confirm potential saline intrusion and review the groundwater abstraction regime. ▪ If community complaints related to groundwater availability or quality are received, investigate affected wells and implement corrective measures as needed. ▪ If monitoring indicates potential aquifer stress, revise the groundwater management plan, reduce abstraction, improve water conservation measures, and consult relevant authorities. ▪ If PDAM disruption becomes frequent, develop additional non-groundwater backup supply options, such as storage tanks or tanker supply from approved sources.

VEC	Cumulative Impact Significance	Mitigation & Management Measures	Monitoring Indicators	Adaptive Management Measures
Air Quality	10 (Moderate)	▪ Implement dust suppression (water spraying, covering laydown areas and trucks). ▪ Maintain construction equipment and vehicles. ▪ Minimize idling of vehicles and generators. ▪ Schedule earthworks during favorable weather conditions. ▪ Establish vegetative barriers where feasible.	▪ PM10, PM2.5 concentrations. ▪ Number of dust complaints. ▪ Visual dust observations. ▪ Vehicle maintenance records.	▪ Increase watering frequency. ▪ Install additional dust barriers. ▪ Restrict high-dust activities during dry and windy conditions. ▪ Modify traffic routing within the site.
Noise	10 (Moderate)	▪ Use low-noise construction equipment. ▪ Restrict noisy activities to daytime hours. ▪ Install temporary noise barriers near sensitive receptors. ▪ Conduct regular equipment maintenance. ▪ Notify nearby communities before major noisy activities.	▪ Ambient noise levels (Leq Day/Night). ▪ Number of noise complaints. ▪ Compliance with IFC and national standards.	▪ Modify work schedules. ▪ Install additional acoustic barriers. ▪ Relocate stationary equipment. ▪ Increase community communication.

VEC	Cumulative Impact Significance	Mitigation & Management Measures	Monitoring Indicators	Adaptive Management Measures
Vibration	8 (Minor)	▪ Use vibration-controlled construction techniques. ▪ Maintain heavy equipment. ▪ Avoid simultaneous operation of multiple high-vibration equipment near sensitive receptors. ▪ Conduct pre-construction condition surveys of nearby structures.	▪ Vibration measurements (PPV). ▪ Structural condition monitoring. ▪ Vibration-related complaints.	▪ Modify construction methods. ▪ Reduce equipment operating hours. ▪ Establish exclusion zones around sensitive receptors.
Traffic and Transportation	14 (severe)	▪ Develop and implement a Traffic Management Plan (TMP). ▪ Schedule deliveries outside peak hours. ▪ Designate construction vehicle routes. ▪ Deploy traffic marshals at key access points. ▪ Coordinate with local authorities and airport traffic management. ▪ Provide adequate parking facilities.	▪ Traffic volume. ▪ Vehicle queue length. ▪ V/C ratio and LOS. ▪ Number of traffic incidents. ▪ Community traffic complaints.	▪ Revise TMP periodically. ▪ Introduce additional traffic control personnel. ▪ Modify access arrangements. ▪ Adjust delivery schedules. ▪ Coordinate additional traffic mitigation measures with local government.

VEC	Cumulative Impact Significance	Mitigation & Management Measures	Monitoring Indicators	Adaptive Management Measures
Wastewater	8 (Minor)	▪ Maintain WWTP performance. ▪ Segregate wastewater streams. ▪ Conduct regular inspection and maintenance of sewer systems.	▪ WWTP effluent quality. ▪ Flow rates. ▪ WWTP operational performance. ▪ Regulatory compliance status.	▪ Increase treatment capacity if required. ▪ Improve WWTP process efficiency. ▪ Implement corrective maintenance programs.
Flooding and Drainage	10 (Moderate)	▪ Upgrade internal drainage systems. ▪ Increase detention and retention capacity. ▪ Install infiltration wells and permeable surfaces. ▪ Maintain drainage channels and culverts. ▪ Incorporate climate-resilient stormwater design.	▪ Surface ponding duration. ▪ Drainage performance. ▪ Rainfall records. ▪ Number of flooding incidents.	▪ Increase stormwater storage capacity. ▪ Expand drainage network. ▪ Implement additional infiltration structures. ▪ Update drainage design based on monitoring results.
Community Health and Safety	9 (Moderate)	▪ Implement Community Health and Safety Plan. ▪ Install safety signage and barriers. ▪ Manage pedestrian access around construction areas.	▪ Community complaints. ▪ Traffic accident statistics. ▪ Community incidents. ▪ GRM records. ▪ Emergency response performance.	▪ Increase community engagement activities. ▪ Enhance traffic safety controls. ▪ Revise emergency preparedness plans. ▪ Strengthen communication channels with stakeholders.

VEC	Cumulative Impact Significance	Mitigation & Management Measures	Monitoring Indicators	Adaptive Management Measures
		▪ Conduct community awareness programs. ▪ Maintain an effective grievance mechanism (GRM). ▪ Prepare emergency response procedures.		

7 MITIGATION HIERARCHY AND MEASURES

7.1 Mitigation Hierarchy Application

Mitigation is applied through the hierarchy mandated by AIIB ESS1 and consistent with national-framework expectations:

- Avoidance - eliminating impacts through siting, design, or activity choice (e.g., no greenfield expansion; tree retention; accessible Universal Design embedded from design stage).
- Minimisation - reducing impact magnitude through engineering controls, working practices, and scheduling (e.g., HEPA-filtered HVAC, water-spray dust suppression, noise barriers, off-peak haulage).
- Restoration - restoring conditions where impacts have occurred (e.g., 1:1 tree replacement with native species, post-construction landscape rehabilitation).
- Offset / compensation - providing equivalent benefit where residual impact remains (e.g., replacement-cost compensation under the RAP; livelihood-restoration support; community-benefit programming).

7.2 Impact-Mitigation Matrix Summary

The principal impacts identified in Chapter 6 are paired with their mitigation approaches and residual significance in the following matrix:

Table 45 Summary of Mitigation Measures

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
A	**PRECONSTRUCTION**						
A.1.	**ENVIRONMENTAL**						
1.	Failure to incorporate climate change risk into project	Various risks identified in Climate Risks Analysis are not fully addressed and/or incorporated into engineering design which leave these risks vulnerable to impact in the future when identified risk are actualized.	**High**	**Very High**	▪ During feasibility study for The Project and detailed engineering design stage, potential impacts of climate changes (increased temperature, extreme weather conditions, heavy rain, inundation, greenhouse effect, and so forth, will be thoroughly identified and assessed ▪ Design-stage hydrology: site-specific Hydrology & Hydraulica (H&H) modelling, 100-year Design Flood Level (DFL) with +20% climate uplift, Finished Floor Level (FFL) ≥ DFL + 0.5 m freeboard ▪ Critical-area protection: raised plinths for Operating Theatre / Ruang Operasi / Linear Accelerator / Intensive Care Unit (OT / LINAC bunker / ICU); basement watertightness with floodgates and sump pumps ▪ Drainage upgrade: internal saluran resized for 50-yr storm + 25% spare; quarterly + premonsoon cleaning ▪ Risks will be mainstreamed into engineering design to provide an optimum and physical condition for patients, hospital staff and visitors	Engineering Design stage	100
2.	Failure to incorporate environmental and social considerations in the design	Negligent in incorporating environmental and social	**High**	**Very High**	▪ The potential risks and impacts identified during	Engineering Design stage	50

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		considerations into the design, such as the management of increased healthcare waste (both hazardous and non-hazardous), and the selection of equipment to reduce emissions, dust, noise, and vibration, and/or			drafting of the ESIA should be communicated to the engineering team to ensure that environmental considerations are incorporated into the feasibility study ▪ Design radioactive waste storage, shielding. ▪ Coordinate with Radiation Protection Officer (PPR). ▪ Prepare Radioactive Waste Management Plan. ▪ Review shielding design and compliance with BAPETEN.		
3.	Non-compliance with the spatial planning	Licensing, administration. Based on the results of the overlay between The Project and the KKPR, there are hospital areas that are not included in the existing KKPR. In addition, there are several other activities that are not part of hospital activities, but these activities are scoped within the existing KKPR.	**Low**	**Moderate**	▪ Coordinate with local government and relevant authorities to revise and align project boundaries and activities with approved KKPR; ▪ ensure all project components are included in the revised spatial planning permit documentation.	Project Implementation Unit/ Hospital Management	10
4.	Aviation safety	Licensing, administration. Based on the preliminary aviation safety assessment, the proposed development of an 8-Floor building with a rooftop helipad at Dr. Sitanala General Hospital represents a project with high sensitivity to aviation operations, as the project	**High**	**Critical**	▪ Conduct detailed aviation safety assessment; ▪ Coordinate with airport authority and Directorate General of Civil Aviation; ▪ ensure building height, helipad, antenna, and rooftop equipment comply with KKOP and OLS requirements; ▪ install aviation obstruction lighting and operational procedures.	Project Implementation Unit/ Hospital Management	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		site is located within the vicinity of the Soekarno–Hatta International Airport Aviation Operational Safety Zone (Kawasan Keselamatan Operasi Penerbangan/KKOP). The height of the building, together with rooftop facilities such as the helipad, antennas, and mechanical-electrical equipment, may potentially constitute obstacles to aircraft approach, take-off, and maneuvering paths if they exceed the applicable Obstacle Limitation Surface (OLS) thresholds. In addition, the presence of a rooftop helipad may create potential airspace conflicts with commercial air traffic operating around the airport, thereby requiring strict operational control and intensive coordination with aviation authorities.					
A.2.	**SOCIAL**						
1.	Rising community expectations regarding the project and hospital services	Project information disclosure processes, public consultations, initial project communications, and	**Moderate.**	**Moderate**	▪ Prepare socialization materials that are clear, consistent, and easily understood by the community.	Project Implementation Unit/ Hospital Management	15

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		early interactions with the surrounding community regarding project benefits.			▪ Communicate the project scope, implementation schedule, benefits, and project limitations transparently. ▪ Provide public information media such as project information boards, leaflets, and official communication channels. ▪ Conduct periodic public consultations and stakeholder engagement. ▪ Manage public communication openly and responsively to community inquiries. ▪ Involve community leaders and local stakeholders in the project information dissemination process. ▪ Provide an accessible and responsive community grievance mechanism (GRM). ▪ Conduct periodic follow-up on community aspirations, inputs, and complaints.		
2.	Exclusion of vulnerable groups from consultation meetings	Socialization, public consultation, and stakeholder engagement activities that have not fully considered accessibility, participation barriers, and inclusiveness for vulnerable groups.	**Moderate**	**High**	▪ Provide safe, easily accessible consultation venues that are friendly for persons with disabilities and the elderly. ▪ Provide easily understood communication media, including the use of simple language, visual media, and accessible information materials. ▪ Adjust consultation timing and methods to ensure accessibility for all community groups. ▪ Provide supporting facilities such as seating, access ramps,	Project Implementation Unit/ Social Consultant.	15

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					translation services, or companion assistance as needed. ▪ Conduct identification and mapping of vulnerable groups in the project stakeholder mapping. ▪ Ensure the representation of vulnerable groups in socialization and public consultation activities. ▪ Adopt participatory approaches and actively engage vulnerable groups. ▪ Involve community leaders, local organizations, and community facilitators in the consultation process. ▪ Provide complaint and aspiration submission mechanisms that are easily accessible to vulnerable groups. ▪ Conduct periodic evaluations of the effectiveness of inclusive consultation approaches.		
B	**CONSTRUCTION**						
B.1.	**ENVIRONMENTAL**						
1.	Air Quality	**Mobilization of materials and equipments**.Air quality will be triggered from Mobilization and transportation of piling rigs, cranes, excavators, trucks, generators and other construction plant; delivery of cement, sand, aggregate, reinforcement, formwork, precast components, pipes, cables and finishing materials; vehicle	**High**.	**High.**	▪ Conduct regular water spraying on exposed surfaces, existing access roads, and laydown areas during dry conditions. ▪ Cover trucks transporting soil, sand, and construction materials. ▪ Limit vehicle speeds within The Project site. ▪ Maintain heavy equipment and vehicles regularly to minimize exhaust emissions.	EPC Contractor - HSE Team	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		movement, queuing, idling, loading and unloading; initial operation of temporary generators; establishment of laydown areas; and soil or mud tracking onto hospital and public roads. These activities may generate road-dust resuspension, fugitive material dust, diesel exhaust, particulate matter, NO_2, SO_2 and CO			▪ Minimize idling time of construction equipment. ▪ Implement staged land clearing to reduce exposed soil areas. ▪ Provide dust masks or respiratory PPE for workers. ▪ Conduct regular housekeeping within construction areas.		
		Land clearing and preparation. Sources of air emissions include vegetation clearing, topsoil stripping, excavation, earthworks, movement of heavy equipment, and transportation of materials, which may generate dust and exhaust emissions.		**Moderate.**			
		Building construction. Substructure works (pile cap, tie beam, ground beam, foundation concrete works), superstructure works (reinforced concrete structure, masonry, roofing), architectural and fit-out works (partition installation, plastering, cutting, grinding, finishing, material handling and internal transportation)**.**		**High**			
2.	Noise	**Mobilization of materials and equipments**.	**High.**	**Moderate**		EPC Contractor - HSE Team	20

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		Mobilization and transportation of foundation rigs, cranes, excavators, loaders, dump trucks, concrete mixers, generators and other construction equipment; delivery of reinforcing steel, formwork, precast components, pipes, cables and finishing materials; movement of vehicles along public and internal hospital roads; vehicle queuing, manoeuvring and reversing; loading and unloading; material placement within laydown areas; and initial operation of temporary plant. Noise sources include vehicle engines, exhausts, horns, reversing alarms, braking, loading impacts and equipment operation..			▪ Restrict noisy construction activities to daytime working hours. ▪ Select and utilize low-noise construction equipment and technologies, to minimize noise generation at the source. ▪ Maintain construction equipment regularly to reduce noise levels. ▪ Install temporary noise barriers or acoustic enclosures near sensitive receptors where necessary. ▪ Avoid simultaneous operation of multiple high-noise equipment whenever feasible. ▪ Inform nearby communities and hospital users regarding noisy activities and construction schedules. ▪ Provide hearing protection PPE for workers exposed to high noise levels. ▪ Conduct periodic noise monitoring during construction activities.		
		Land clearing and preparation. Noise impacts mainly originate from the operation of heavy machinery, chainsaws, earthmoving equipment, and construction vehicles during land clearing and preparation activities.		**High**			
		Building construction and infrastructure development. High noise levels are particularly associated with piling operations, concrete		**High**			

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		works, heavy vehicle movement, and operation of generators and mechanical equipment. These activities may temporarily affect nearby sensitive receptors, including residential areas, healthcare facilities, and public facilities.					
3.	Vibration	**Building construction.** The most significant vibration sources are typically pile. These activities may temporarily affect nearby sensitive receptors, including residential areas, healthcare facilities, and existing structures.	**High.**	**Moderate**	▪ Select low-vibration construction equipment and technologies, particularly for foundation and piling activities ▪ Utilize bored pile and other vibration-controlled construction methods, where technically feasible, to minimize vibration generation at the source ▪ Limit pile driving and high-vibration activities to daytime hours. ▪ Conduct pre-construction condition surveys of nearby structures and facilities. ▪ Monitor vibration levels periodically during piling and heavy construction activities. ▪ Inform nearby sensitive receptors regarding vibration-generating activities. ▪ Minimize the duration of vibration-intensive works.	EPC Contractor - HSE Team	5
4.	Asbestos Contamination of Soil	Demolition of suspected ACM in the Protese Building, ULP Building and parking lot, combined with the absence of a	**High.**	**High**	▪ Inventorying suspected ACM materials. ▪ Area labelling. ▪ Access restriction to high-risk locations. ▪ Securing damaged materials	Construction / Contractor & EHS Team	100

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		demolition SOP, may release asbestos fibers/fragments to soil during dismantling, handling and waste storage. Asbestos is a persistent mineral material and will not naturally biodegrade; contaminated soil/debris can remain hazardous after construction unless identified, segregated, removed and disposed of as B3 waste.			▪ Development of safe work procedures. ▪ Training or awareness-raising for personnel ▪ Waste management in the event of demolition, .		
		Mobilzation of materials and equipments. During equipment mobilization activities, heavy vehicles and machinery moving across exposed ground surfaces may disturb potentially contaminated soil and generate fugitive dust emissions. If residual asbestos-containing debris is present within the upper soil layer, vehicle movement, vibration, and repeated surface disturbance may contribute to the re-suspension of asbestos fibers into the ambient air. In addition, transportation activities may spread contaminated	**High.**	**Moderate**	▪ Inventorying suspected ACM materials. ▪ Area labelling. ▪ Access restriction to high-risk locations. ▪ Securing damaged materials. ▪ Development of safe work procedures. ▪ Training or awareness-raising for personnel ▪ Waste management in the event of demolition. ▪ Periodic inspection program	Construction / Contractor & EHS Team	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		dust or small debris fragments to adjacent work areas through tire tracking and surface runoff, particularly during dry weather conditions.					
		Land Clearing. Land clearing activities present a higher potential for disturbance of surface soils because such works generally involve vegetation removal, grading, excavation, and leveling of the site. These activities may directly expose or disturb asbestos-containing fragments that remain buried or partially embedded within the soil. Mechanical disturbance caused by bulldozers, excavators, and grading equipment can break residual asbestos materials into smaller particles, thereby increasing the likelihood of airborne fiber release. Dust generation during land clearing therefore represents one of the primary pathways for potential asbestos exposure to workers and					

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		nearby sensitive receptors. Building Construction. During the building construction, several activities such as excavation, foundation works, and utility installation activities may continue to disturb soil layers that potentially contain residual asbestos debris. Repeated soil handling and stockpiling activities can contribute to further dust generation if asbestos-containing materials are present. The risk may become more significant in dry and windy conditions where fine particulate matter can disperse beyond the active construction area.					
5.	Solid waste pollution	During the construction phase, domestic solid waste is expected to be generated from workforce activities across all stages of The Project, including worker recruitment, mobilization of materials and equipment, land clearing and preparation, building construction, infrastructure	**Low.**	**Moderate**	▪ Implement waste segregation between recyclable, organic, and non-recyclable waste. ▪ Provide adequate covered waste bins in worker and construction areas. ▪ Collect and transport waste regularly to authorized disposal facilities. ▪ Prohibit open burning of waste within The Project site. ▪ Maintain cleanliness and good housekeeping practices.	EPC Contractor - Waste Management Team	30

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		development, and commissioning activities. The waste will primarily consist of municipal-type waste such as food waste, plastic packaging, paper, cans, bottles, and other non-hazardous refuse generated from worker accommodations, offices, and daily operational activities. The volume of domestic solid waste is anticipated to increase significantly during the building construction and infrastructure development stages due to the higher number of workers involved. Improper handling and disposal of such waste may result in environmental pollution, unpleasant odors, visual impacts, and potential health and sanitation issues within and around The Project site. Therefore, proper waste segregation, collection, temporary storage, and disposal through authorized waste management services will be required to minimize environmental impacts			▪ Conduct awareness programs for workers regarding proper waste management. ▪ Coordinate with a third-party contractor licensed by the Ministry of Environment for the transportation of solid waste. ▪ Develop SOP for cleared biomas and debris.		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		during the construction phase.					
6.	Wastewater pollution	Construction activities may generate domestic wastewater from workers, runoff from working areas, and wastewater from equipment washing activities.	**Moderate.**	**Low**	▪ Adequate sanitation facilities and portable toilets will be provided for construction workers ▪ Domestic wastewater will be conveyed to the existing wastewater treatment plant (WWTP) prior to discharge. ▪ Existing drainage systems will be maintained to control runoff within the working area ▪ Used oil and construction-related waste will be collected and managed separately ▪ Routine inspections will be conducted to prevent fuel and oil leakage from heavy equipment ▪ Direct discharge of construction wastewater into water bodies or surrounding areas will be prohibited ▪ Regular housekeeping activities will be implemented to prevent the accumulation of liquid and solid waste within the project area.	Contractor – HSE Team	30
7.	Natural disasters - Flood	Construction of three new buildings (IBS, Oncology, Neurology & Urology) flood exposure	**High.**	**Moderate.**	▪ Construction Flood Risk Assessment (CFRA) & seasonal scheduling ▪ Site dewatering & temporary drainage system ▪ Excavation protection - sheet piling & cofferdams - For basement excavations ▪ Erosion & Sediment Control Plan (ESCP) ▪ Stockpile & hazardous material protection - Stockpiles of soil, cement, rebar, and finishing materials shall be placed on platforms	EPC Contractor	30

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					at ≥ DFL+0.5 m, covered with waterproof tarpaulins ▪ Site office, batching plant & worker camp above DFL		
8.	Reduction of green/open-space function	**Mobilization of Materials and Equipment.** Temporary use of open spaces for equipment staging, parking, and material storage may reduce existing infiltration and landscape functions. **Infrastructure Development.** Risks may arise from expansion of paved surfaces, utility installation, and temporary construction facilities occupying vegetated or landscaped areas within The Project complex.	**Moderate.**	**Low**	▪ Minimize vegetation clearing outside approved construction footprint. ▪ Protect retained trees and landscape elements. ▪ Rehabilitate temporary distributed areas after construction completion.	EPC Contractor – Landscape Team	5
9.	Internal road damage	**Mobilization of materials and equipments.** The total number of material transport trips is approximately 11,846 trips over a construction period of 360 working days (approximately 12 months). This corresponds to an average of 33 trips per day, or approximately 4 - 5 trips per hour (assuming 8 working hours per day). The planned mobilization	**Moderate**	**Low**	▪ Conduct a pre-construction condition survey of internal roads and access routes to establish baseline conditions. ▪ Designate and enforce alternative route for construction vehicles and heavy equipment within The Project complex. ▪ Restrict vehicle loads to comply with road design capacity and applicable transportation regulations. ▪ Implement vehicle speed limits (e.g., ≤20 km/h within The Project area) to minimize	EPC Contractor (HSE Team)	5

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		route for equipment and materials is expected to originate from the Ring Road and pass through local roads within the Karang Sari Village.			pavement deterioration and ensure safety. ▪ Carry out routine inspection and maintenance of roads used by construction traffic, including repair of potholes, rutting, and surface damage. ▪ Install wheel-washing facilities and conduct regular road cleaning to prevent mud, debris, and construction materials from accumulating on road surfaces. ▪ Schedule material deliveries to avoid peak hospital operating hours and emergency access periods. ▪ Restore any road sections damaged by construction activities to their original or better condition upon completion of construction works.		
10.	Disruption to existing utilities/ service continuity	Land clearing and site preparation works for the three new buildings - including vegetation removal, demolition of obstructions, grubbing, cut-and-fill, and shallow excavation - may disturb or sever existing buried and overhead utility networks (potable water/PDAM and groundwater supply lines, electrical feeders, telecommunication and data cabling, medical gas piping, sewerage, and site	**High**	**Moderate.**	▪ Conduct a pre-construction utility survey to locate, map, and mark all existing buried and overhead services (potable/PDAM and groundwater lines, electrical feeders, telecommunication and data cabling, medical gas piping, sewerage, and site drainage) using as-built drawings and detection tools (e.g., GPR/cable locators) prior to any ground-disturbing works. ▪ Pre-install temporary bypass or rerouting for critical services (water, power, medical gas, and data) before disconnecting any permanent line; schedule all cut-overs	Construction Phase / EPC Contractor (MEP & HSE Team) & Hospital Facility Management (IPSRS)	25

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		drainage) that serve the operating hospital, causing temporary interruption of essential services and clinical service continuity.			outside clinical peak hours and coordinate timing with hospital management. ▪ Provide standby/backup supply for critical loads - generator sets and UPS for operating theatres, ICU, and life-support areas, water storage/tanker backup, and redundant telecommunication links - and install surge protection/voltage stabilizers on power feeds. ▪ Prepare an emergency contingency plan for accidental utility strikes, including rapid isolation, on-call repair crews, fallback to backup supply, and a 24/7 emergency contact list.		
B.2.	**SOCIAL**						
1.	Hospital service continuity	Hospital construction activities (structural works, heavy equipment usage, material mobilization, and civil works in the vicinity of healthcare service areas)	**High.**	**High**	▪ Restrict high-noise construction activities during specific hours. ▪ Install noise barriers and dust enclosures around the construction zone. ▪ Provide safe, segregated access routes between the construction zone and active healthcare areas. ▪ Conduct regular watering to control dust emissions. ▪ Formulate an internal hospital traffic management plan. ▪ Maintain regular coordination with hospital management regarding construction schedules	Construction Phase / EPC Contractor – HSE Team & Hospital Management	25

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
2.	Community expectations regarding local hiring priority	Construction workforce recruitment activities, initial project mobilization, and communication of job opportunities to the surrounding community	**Moderate.**	**Moderate**	▪ Conduct the workforce recruitment process transparently and openly. ▪ Prioritize local labor in accordance with qualifications and project requirements. ▪ Disseminate clear information regarding job openings to the community and local authorities. ▪ Provide a grievance mechanism specifically for labor and employment issues	Construction Phase / EPC Contractor – HRD & Community Relations	10
3.	Uncontrolled growth of new food stalls/kiosks	Daily presence of up to 265 construction workers, worker movements at project gates, and unmet or poorly managed demand for affordable meals and beverages.	High - operating-hospital users and vulnerable informal livelihoods.	**High.**	▪Before worker mobilization, complete a dated, geotagged photographic survey and mapped register confirming the absence of existing stalls within the Project area and immediate access zone. Communicate the site vendor policy and cut-off date through public notices and engagement with nearby communities and local authorities. ▪Provide sufficient, affordable and hygienic on-site canteen or approved catering services, safe drinking water and suitable meal/rest areas before peak workforce mobilization. Size the service for the workforce and review capacity, price and opening hours so unmet demand does not drive informal vending. ▪Establish and mark vendor-exclusion zones covering hospital and construction gates, ambulance and fire routes, patient drop-off	Pre-construction and construction. Implementation: EPC/Main Contractor - Site Manager, HSE, Community Relations, Site Logistics/Canteen Manager and Security. Oversight: PIU E&S Officer and RS Sitanala Management.	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					points, pedestrian paths, parking access, hydrants, drains and utility corridors. Keep these routes unobstructed at all times through signs, barriers and routine patrols. ▪ If vending is considered necessary, permit it only through transparent written approval and registration in a designated area outside clinical and emergency interfaces. Require potable water, handwashing and toilet access, controlled drainage/grease and wastewater, covered segregated bins with daily removal, pest control, food-hygiene inspection, safe LPG/electrical installations and fire extinguishers. ▪ Integrate the controls into the Contractor's C-ESMP, Site Logistics and Traffic Management Plan, Waste Management Plan, Community Health and Safety Plan, worker induction/Code of Conduct, security procedures and catering/vendor contracts. Contractor personnel shall not facilitate unauthorized land occupation or utility connections. ▪ Use progressive and non-coercive management if a new stall appears: verify and document its status, engage the operator, issue clear notice and a reasonable		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					corrective period, and coordinate with relevant local authorities. Screen any Project-related livelihood restriction under applicable AIIB economic-displacement requirements before relocation or removal, and document any required transition or livelihood support. Maintain an accessible grievance mechanism for vendors, workers, hospital users and the surrounding community. Record complaints, obstruction/sanitation/fire incidents and corrective actions, and review performance jointly each month to adjust catering capacity or site controls.		
4.	Disease transmission	Presence of construction workforce (labor influx) inside an operating hospital compound; worker accommodation/camps; worker-community interaction in Karang Sari Village; standing water from excavations, basement works and material laydown; shared sanitation and food handling at the site.	**Moderate**.	**Moderate**	▪ Designate dedicated construction access routes and staging zones physically separated from clinical areas to prevent worker–patient cross-traffic. ▪ Locate worker camps and temporary housing outside The Project compound perimeter (minimum 200 m from the nearest clinical building) to avoid direct worker–patient interaction. ▪ Conduct mandatory pre-employment and periodic medical screening for all construction workers, maintain confidential health records per Permenkes No. 52/2018.	Contractor (EPC/Main Contractor)	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ Implement a vector-control programme: inspection and elimination of standing water in excavation pits, basement works, material laydown areas and formwork; application of larvicide (temephos/Abate 1%) per Permenkes No. 374/2010; ▪ Provide and maintain adequate WASH facilities at the worker camp: clean drinking water (tested quarterly per PP 22/2021), and food-safety-compliant catering facilities subject to monthly inspection by the Project OHS Officer. ▪ Conduct awareness and prevention programme, and information sessions in collaboration with Puskesmas Neglasari and/or the local Dinas Kesehatan. ▪ Implement disease-outbreak response protocol ▪ Provide free medical treatment for any construction worker contracting a communicable disease attributable to site conditions, including hospitalisation costs, until full recovery, at no cost to the worker (consistent with BPJS Ketenagakerjaan/Jaminan Kecelakaan Kerja obligations)		
5.	Spatial disturbance to surrounding land-use activities	Construction activities near settlements, hospital facilities, public access roads, parking areas,	**High**	**High**	▪ Develop and implement a Traffic Management Plan (TMP) according to the traffic impact analysis (ANDALALIN) during the construction phase.	**Construction Phase.** Responsible Party: Project Proponent, Contractor, E&S Team, Site Manager, Traffic Management Officer, Stakeholder Engagement	15

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		utility corridors, and community activity areas.			▪ Provide safe temporary access routes for vehicles, pedestrians, patients, and hospital facility users. ▪ Install traffic signs, information boards, safety barriers, warning lights, and directional signage in construction areas. ▪ Schedule heavy equipment mobilization and material transportation outside peak hours where possible. ▪ Maintain cleanliness of work areas and public access through routine housekeeping. ▪ Control dust and construction materials that may obstruct access or reduce environmental comfort. ▪ Conduct routine coordination with hospital management regarding access arrangements for patients, ambulances, healthcare workers, and visitors during construction. ▪ Conduct socialization to the community and surrounding facility users regarding work schedules, potential disturbances, and temporary access arrangements. ▪ Provide an accessible and responsive community grievance mechanism (GRM) for complaints related to access and mobility disturbances. ▪ Follow up on community complaints promptly and with proper documentation.	Officer, and Hospital Management.	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ Coordinate with local government, public facility managers, and relevant stakeholders in traffic and access management during construction.		
6.	Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH SEA/SH)	Mobilization and presence of project workforce, worker interactions with surrounding communities, patients and hospital visitors, use of worker facilities, contractor and subcontractor activities, and non-compliance with the code of ethics and work behavior during the construction phase.	**High**	**Very High**	▪ Develop and implement a SEA/SH and GBV Prevention and Response Plan as part of the project ESMP. ▪ Require all workers, contractors, subcontractors, and support staff to sign a Code of Conduct (CoC) that explicitly prohibits SEA, SH, GBV, child exploitation, discrimination, and other inappropriate behavior. ▪ Integrate SEA/SH and GBV clauses into all employment contracts and service procurement contracts. ▪ Implement a clear disciplinary sanction system for Code of Conduct violations. ▪ Regulate worker access and movement in sensitive areas such as patient care facilities, hospital public spaces, and surrounding community areas. ▪ Social and Institutional Approach: ▪ Conduct mandatory training on SEA/SH, GBV, professional behavior, child protection, and work ethics for all workers before commencing work and periodically during the project. ▪ Conduct socialization to surrounding communities regarding rights to protection	Preconstruction and Construction Phase. Responsible Party: Project Proponent, E&S Team, Contractor, Human Resources Manager, HSE Manager, GBV/SEA-SH Focal Point, Stakeholder Engagement Officer, and Social Consultant and Gender Specialist.	75

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					from SEA/SH, reporting mechanisms, and available support services. ▪ Develop a safe, confidential, accessible, survivor-centered, and gender-sensitive complaint mechanism (GRM). ▪ Appoint a SEA/SH focal point who has received specialized training to receive and handle reports. ▪ Provide referral procedures to healthcare, psychological, legal, and social protection services in the event of SEA/SH or GBV cases. ▪ Conduct mapping and collaboration with women and children's service institutions, hospitals, psychologists, and relevant agencies as part of the referral pathway. ▪ Ensure there is no retaliation against reporters or victims. ▪ Conduct periodic awareness campaigns and communication on SEA/SH and GBV prevention to workers and the community.		
7.	Occupational Health and Safety Risk (OHS)	Every activities in construction phase. **Working at Heights.** Scaffolding erection and dismantling. Formwork installation. Reinforcement works on upper floors. Concrete casting at elevated levels. Tower crane operation.	**High.** Sensitivity currently to workers within the project area**.**	**Moderate**.	**Working at Heights:** ▪ Prepare and implement a work-at-height permit and JSA; ▪ install guardrails, toe boards, safety nets or lifelines; ▪ require certified full-body harnesses and secure anchor points; ▪ establish drop/exclusion zones and tool lanyards; ▪ stop work during unsafe weather;	EPC Contractor – HSE Team	20

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		Roof works. Façade installation. MEP installation above ceiling level.External finishing works). **Lifting Operations.** Tower crane operation. Mobile crane operation. Lifting reinforcement cages. Lifting formwork materials. Lifting HVAC units. Lifting generators and transformers. Medical equipment installation (MRI, LINAC, CT Scan). **Electrical Work.** Temporary power installation. Cable pulling. Switchgear installation. Transformer installation. Panel energization. Generator connection. Testing and commissioning. **Hot Works.** Welding. Cutting. Grinding. Brazing medical gas pipes. Steel fabrication. **Heavy Equipment.** Operation. Excavator			▪ provide rescue arrangements and daily toolbox talks. **Erection, inspection, and dismantling of scaffolding :** ▪ Scaffolds to be designed/erected/dismantled by competent scaffolders; ▪ use sound base plates, bracing, safe access, guardrails and toe boards; ▪ apply scaffold tag system; ▪ prohibit overloading or unauthorized modification; ▪ inspect before first use, weekly, after alteration and after severe weather. **Demolition works :** ▪ Prepare approved demolition method statement, permit and JSA; ▪ isolate utilities; ▪ confirm structural stability and ACM/asbestos clearance where applicable; ▪ set barricades and exclusion zones; ▪ control falling debris, dust and noise; ▪ provide PPE, safe access, waste segregation and competent supervision; ▪ coordinate work timing with hospital operations.		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		operation. Bored pile rig operation. Loader operation. Dump truck movement. Compaction works. Earthmoving activities..			**Excavation works:** ▪ Implement excavation permit and utility clearance; ▪ provide shoring, benching or safe sloping as required; ▪ barricade and sign excavations with night lighting; ▪ keep spoil/materials away from edges; ▪ provide safe access/egress; ▪ inspect daily and after rain; ▪ manage dewatering and traffic/pedestrian diversion. **Crane operation and lifting activities:** ▪ Prepare approved lifting plan for all critical lifts; ▪ use certified crane, operator, rigger and signalman/banksman; ▪ verify load chart, ground bearing and outriggers/mats; ▪ inspect slings and rigging; ▪ set exclusion zones and tag lines; ▪ do not lift over people or occupied areas; ▪ apply wind/weather limits and clear communication. **Electrical works:** ▪ Use lock-out/tag-out and isolation permits; ▪ only competent electricians to work on electrical systems; ▪ install ELCB/RCD/GFCI protection; ▪ inspect temporary panels, cables and grounding; ▪ use insulated tools and appropriate PPE; ▪ keep cables protected and dry;		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ prohibit unauthorized energized work; ▪ provide fire extinguishers near panels. **Confined space entry:** ▪ Apply confined space entry permit; ▪ conduct atmospheric testing for oxygen, flammable gases and toxic gases before and during entry; ▪ provide ventilation, communication, lighting and standby attendant; ▪ prepare rescue plan and equipment; ▪ use trained entrants; ▪ isolate energy sources and prevent unauthorized entry. **Hot works:** ▪ Implement hot work permit; ▪ remove or protect combustible materials; ▪ provide fire blankets, extinguishers and spark containment; ▪ assign fire watch during work and after completion; ▪ inspect gas cylinders, hoses and flashback arrestors; ▪ monitor flammable atmosphere where relevant; ▪ ensure PPE and emergency communication.		
8.	Road and Traffic safety	**Mobilization of Materials and Equipment**. The average of vehicle approximately 33 trips per day, or approximately 4 -	**High.**	**High**	▪ Provide separate access for construction acvities apart from the existing entrance gate. ▪ Prepare and implement a traffic management plan.	EPC Contractor - HSE Team	15

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		5 trips per hour (assuming 8 working hours per day).			▪ Schedule material deliveries outside peak traffic hours where feasible. ▪ Install warning signs, traffic cones, and speed limit signage around project access roads. ▪ Assign traffic marshals or flagmen during material mobilization activities. ▪ Ensure all vehicles and drivers comply with applicable safety standards. ▪ Maintain clear and safe access for surrounding road users. ▪ Coordinate with local authorities regarding traffic arrangements if necessary.		
9.	Child labor	Workforce recruitment by contractors and subcontractors, use of informal labor, construction support activities, and procurement of goods and services through suppliers that lack adequate labor verification systems.	**High**	**Low**	▪ Establish and implement a Child Labor Prohibition Policy applicable to all project contractors, subcontractors, and suppliers. ▪ Include child labor prohibition requirements in all tender documents, employment contracts, and supplier agreements. ▪ Implement worker age verification procedures prior to recruitment through official identity document checks. ▪ Develop and implement handling procedures in the event child labor is discovered, including safe work cessation and remediation plans oriented toward the best interest of the child.	Project Proponent, E&S Team, Human Resources Manager, Contractor, Subcontractor, Procurement Officer, and Field Supervisor.	5

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ Social and Institutional Approach: ▪ Conduct socialization of the child labor prohibition policy to all workers, contractors, subcontractors, and suppliers. ▪ Provide training to HR staff, field supervisors, and contractor management on the identification and prevention of child labor. ▪ Encourage reporting of suspected child labor through project complaint mechanisms that are easily accessible and free from intimidation. ▪ Communicate with surrounding communities regarding the project's commitment to child protection and responsible labor practices.		
10.	Underpaid pay and unequal treatment	Workforce recruitment and management, wage systems, provision of benefits and work facilities, work hour arrangements, job promotions, contractor and subcontractor management, and implementation of labor policies during the construction and operational phases.	**High**	**Very High**	• Develop and implement a **Labor and Equal Employment Opportunity Policy** applicable to all workers, contractors, and subcontractors. ▪ Ensure the wage system complies with applicable labor regulations, including minimum wage, overtime, allowances, and other benefits. • Establish a transparent wage structure and scale based on competence, qualifications, experience, and job type. • Integrate non-discrimination and equal treatment principles into recruitment, promotion, performance evaluation, and career development procedures. ▪ Include labor compliance requirements in contracts with contractors and subcontractors.	Project Proponent, E&S Team, Human Resources Manager, Contractor, Subcontractor, Procurement Manager, and Hospital Management.	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ Conduct socialization of workers' rights, non-discrimination policies, and labor standards to the entire workforce. ▪ Provide a Worker Grievance Mechanism that is easily accessible, confidential, free from intimidation, and responsive. ▪ Guarantee workers' freedom to submit complaints without the risk of retaliation. ▪ Provide training to project management, supervisors, and contractors on equal employment opportunity, discrimination prevention, and protection of vulnerable workers. ▪ Encourage worker participation in labor communication forums and periodic consultations.		
C	**OPERATION**						
C.1.	**ENVIRONMENTAL**						
1.	contamination from increased volumes of medical waste and hazardous waste due to expanded hospital capacity	**Operational of three buildings.** Hospital operations generate medical waste from healthcare activities such as patient treatment, surgery, laboratory services, emergency care, pharmacies, and other clinical services. This waste may include infectious waste, sharps, pathological waste, contaminated personal protective equipment (PPE), and other healthcare-related	**High.** Patients in ICU who may be exposed to medical waste if not properly managed. **High.** Hospital patients, staff and workers are sensitive receptors.	**Moderate**	**Medical Waste:** ▪ Segregate medical waste according to waste categories using color-coded containers. ▪ Store medical waste in designated temporary storage areas with proper labeling. ▪ Transport and dispose medical waste through licensed third-party waste management companies. ▪ Implement standard operating procedures (SOPs) for handling infectious waste and sharps. ▪ Provide PPE for workers handling medical waste. ▪ Conduct regular training on medical waste management and infection prevention.	Hospital Management	350

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		materials. Improper management of medical waste may pose risks of disease transmission and environmental contamination. Hazardous waste is generated from hospital operational and maintenance activities involving hazardous materials and chemicals. This waste may include laboratory chemicals, pharmaceutical waste, used oil, batteries, fluorescent lamps, chemical containers, and other hazardous residues. Improper handling of B3 waste may cause soil and water contamination, air pollution, and health risks to workers and surrounding communities.			▪ Monitor medical waste management practices regularly. **Hazardous Waste:** ▪ Store hazardous waste in designated temporary hazardous waste storage facilities with secondary containment. ▪ Label all hazardous waste containers clearly according to applicable regulations. ▪ Maintain hazardous waste inventory and manifest documentation. ▪ Collaborate with a third-party contractor licensed by the Ministry of Environment for the transportation of hazardous waste. ▪ Provide spill kits and emergency response equipment in hazardous material storage areas. ▪ Conduct regular inspections of storage facilities and containers. ▪ Train workers on hazardous waste handling and spill response procedures. ▪ Provide Radiation Safety Management Plan for the radiation technologies facilities.		
2.	Wastewater pollution due to expanded hospital capacity	Hospital operations will generate domestic and medical wastewater from inpatient wards, laundry, kitchens, emergency units, and supporting facilities. The wastewater will be treated through	**High**. The sensitivity of affected receptors is considered high, particularly for receiving water bodies and surrounding areas	**High**	▪ Wastewater generation will be minimized through efficient water use practices ▪ Closed drainage and piping systems will be used to prevent leakage and environmental contamination. ▪ Domestic and medical wastewater streams will be separated		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		the existing treatment system	potentially affected by wastewater discharge		▪ The wastewater treatment plant (WWTP) will be operated and maintained in accordance with established standard operating procedures (SOPs) ▪ Physical, chemical, and biological treatment processes will be applied prior to discharge into receiving water bodies ▪ Periodic effluent quality monitoring will be conducted to ensure compliance with environmental standards ▪ Routine inspection and maintenance of pumps, piping networks, storage tanks, and treatment units will be implemented ▪ Emergency response procedures will be established to address overflow, leakage, or operational disturbances of the WWTP ▪ WWTP operators will be required to have adequate competency and training in wastewater management.		
3.	Contamination from radioactive waste	**Operational of three buildings.** Occupational and patient exposure to ionising radiation, radioactive wastewater, isotope handling, shielding failure, and radioactive contamination risks associated with nuclear medicine services.	**High**. Hospital patients, staff and workers are sensitive receptors	**Low**	▪ Establish and implement a hospital-specific Radioactive Waste and Radiation Safety Management Plan covering radionuclide inventory, radioactive waste segregation, contaminated materials, radioactive wastewater/patient excreta, decay storage/tanks, radiation monitoring and dosimetry, controlled areas and shielding, emergency response, and final clearance/disposal in accordance with applicable BAPETEN requirements.	Hospital Management with Bapeten	100
4.	Solid waste pollution	**Operational of three buildings.** Domestic solid	**High.** The primary receptors include	**Moderate**	▪ Implement waste segregation at source between recyclable,	Hospital Management	100

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		waste is generated from daily activities of patients, visitors, medical personnel, and administrative staff. The waste mainly consists of food waste, plastic packaging, paper, cardboard, bottles, cans, and other non-hazardous municipal waste. If not properly managed, domestic waste may create odor, visual disturbance, and sanitation issues within The Project environment	patients, healthcare workers, visitors, and nearby communities.		organic, infectious, and non-hazardous waste. ▪ Provide sufficient waste bins in hospital operational areas. ▪ Conduct regular waste collection and cleaning activities. ▪ Coordinate waste transportation and disposal with authorized waste management contractors. ▪ Prohibit waste accumulation in operational areas. ▪ Conduct awareness programs for staff, patients, and visitors regarding proper waste disposal.		
5.	Nosocomial Infections	**Operational of three buildings.** Nosocomial infections (healthcare-associated infections) may occur during hospital operations due to exposure to pathogenic microorganisms from patients, contaminated equipment, medical waste, wastewater, or inadequate infection control practices. These infections can negatively affect patients, healthcare workers, visitors, and the surrounding community by increasing health risks, prolonging hospitalization, raising	**High.** The primary receptors include patients, healthcare workers, visitors, and nearby communities. Patients, particularly those with weakened immune systems, chronic illnesses, elderly individuals, infants, and other vulnerable groups, are considered sensitive social receptors and are more susceptible to healthcare-associated infections (HAIs). Therefore, receptor	**Moderate**	▪ Implement strict Infection Prevention and Control (IPC) procedures throughout hospital operations. ▪ Conduct regular sterilization and disinfection of medical equipment, patient rooms, and healthcare facilities. ▪ Ensure proper hand hygiene practices for healthcare workers, patients, and visitors. ▪ Provide adequate PPE for healthcare workers and cleaning personnel. ▪ Isolate infectious patients when necessary according to medical protocols. ▪ Manage infectious waste and wastewater properly to prevent disease transmission. ▪ Conduct regular staff training on infection prevention and	Hospital Management	5

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		treatment costs, and potentially causing disease transmission and outbreaks. Poor management of infectious waste and hospital wastewater may also contribute to environmental contamination and the spread of antimicrobial-resistant microorganisms.	sensitivity is assessed as High.		healthcare-associated infection control. ▪ Monitor and evaluate nosocomial infection cases periodically.		
6.	Groundwater quality	**Operational of three buildings.** Hospital operational activities may affect groundwater quality through the generation of domestic wastewater, medical wastewater, and hazardous substances from healthcare services, laboratories, pharmacies, laundries, and maintenance activities. Potential impacts may occur if wastewater treatment systems are not properly operated or maintained, resulting in seepage or leakage into the surrounding soil and groundwater. In addition, improper handling of hazardous and toxic waste (B3 waste), fuel, chemicals, and medical	**Moderate.** The underlying aquifer is a protected water resource used for water supply and has limited recharge and slow recovery capacity.	**Moderate**	▪ Operate and maintain wastewater treatment facilities properly. ▪ Conduct periodic groundwater quality monitoring. ▪ Inspect pipelines, tanks, and wastewater systems regularly to prevent leakage. ▪ Implement proper handling and storage of chemicals, fuels, and hazardous waste. ▪ Maintain emergency response procedures for spills and contamination incidents. ▪ Ensure treated wastewater complies with applicable discharge standards before disposal.	Hospital Management	10

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		waste may also contribute to groundwater contamination. Potential pollutants may include organic matter, pathogens, detergents, nutrients, heavy metals, pharmaceutical residues, and chemical substances that could degrade groundwater quality and pose risks to human health and the environment.					
7.	Groundwater quantity	**Operational of three buildings.** Hospital operations may increase groundwater consumption due to the continuous demand for clean water for medical services, sanitation, laundry, cooling systems, kitchens, and other supporting facilities. Excessive groundwater abstraction without proper management may reduce groundwater availability, lower groundwater tables, and potentially affect surrounding water users. In urban areas, intensive groundwater extraction may also contribute to land subsidence and	**Very Low**. Community wells are likely to be shallower (less than 40 meter depth) than the Sitanala Hospital well (100 meter depth). Therefore, the community wells are not disturbed by the Sitanala Hospital well.	**Negligible**.	▪ Implement water conservation measures and efficient water use practices. ▪ Monitor groundwater abstraction and water consumption regularly. ▪ Conduct regular maintenance of plumbing systems to prevent leakage. ▪ Encourage water reuse and recycling where feasible. ▪ Utilize alternative water sources where technically and economically feasible. ▪ Monitor groundwater levels periodically to assess potential impacts.	Hospital Management	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		reduced aquifer recharge capacity, particularly where groundwater serves as a major source of water supply.					
8.	Natural disaster – Flooding	Operation three new buildings (IBS, Oncology, Neurology & Urology) flood exposure	**High**	**Moderate**	▪ Flood barriers at entrances, ambulance bays, ED, loading docks ▪ During feasibility study for The Project and detailed engineering de Utility resilience: IP-rated rooms, N+1 emergency power, 72-hr fuel reserve ▪ Green Open Space ≥ 30% RDTR threshold ▪ Stakeholder coordination with BBWS / Dinas PUPR / BPBD to avoid transferring risk to Karang Sari Village ▪ Adaptive management: 5-year review + post-event review > 10-yr return period	Hospital Management	50
9.	Disease transmission	Operation of three new buildings (IBS, Oncology Center, Neurology & Urology Center) within an active tertiary referral hospital. Disease transmission at operational includes: (a) community-to-hospital pathogen importation through ER triage, outpatient clinics and admission of patients with communicable diseases (TB, dengue, respiratory pathogens, emerging	**High**. Sensitive receptors include immunocompromised oncology patients, post-surgical patients, elderly and pediatric inpatients, neonates, pregnant women among visitors and staff.	**High**	▪ Maintain and update The Project Infection Prevention and Control (IPC) Committee and Komite PPI per Permenkes No. 27/2017 ▪ Implement transmission-based precautions (standard, contact, droplet, airborne) per WHO/CDC and Pedoman PPI Kemenkes; ▪ Develop hand hygiene procedure and support with additional facilities needed. ▪ Maintain HVAC and shared mechanical ventilation per Permenkes No. 7/2019 on Hospital Environmental Health:	▪ RSUP Dr. Sitanala (PIU) - overall accountability ▪ Komite PPI (IPC Committee) - IPC implementation,outbreak response, ▪ Direktur Medik & Keperawatan - clinical staff training and compliance ▪ Unit K3RS (Hospital OHS Unit) - staff vaccination, occupational health ▪ Unit Kesling (Environmental Health Unit) - WWTP, B3 waste, vector control, HVAC ▪ Facilities O&M Contractor - HVAC, HEPA filter, AHU maintenance	5

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		infectious diseases); (b) hospital-to-community spread via discharged patients, visitors, healthcare staff commuting, and improperly managed medical waste;(c) intra-facility cross-transmission in large-aggregation areas (outpatient waiting halls, oncology day-care, ER); (d) airborne transmission risk in shared mechanical ventilation pathways; (e) vector-borne disease risk on the wider hospital grounds where standing water may persist.			▪ Operate a syndromic surveillance system for early outbreak detection - per Permenkes No. 1501/2010. ▪ Implement medical waste segregation, on-site temporary storage and licensed third-party transport/incineration of B3 medical waste ▪ Operate the dedicated Wastewater Treatment Plant (WWTP) ▪ Provide annual vaccination programme for hospital staff ▪ Conduct vector-control programme on hospital grounds ▪ Conduct infection prevention training for all clinical and support staff (medical, nursing, cleaning, food service, security) at induction and annually thereafter; ▪ Implement visitor management controls in sensitive wards (oncology, post-surgical, pediatric, neonatal): ▪ Conduct community health awareness programmes biannually in Karang Sari Village and Neglasari Subdistrict in coordination with Puskesmas: ▪ Operate the Grievance Redress Mechanism (GRM) accessible to patients, staff, and surrounding community to report disease-transmission concerns	▪ Licensed B3 Waste Transporter - medical waste off-take	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
10.	Seawater intrusion to the groundwater quality	Operational of three new buildings (IBS, Oncology, Neurology & Urology). The 100 m groundwater well is only a backup source, so continuous abstraction is expected to be limited. However, if backup use becomes frequent or prolonged during PDAM disruption, salinity indicators such as TDS, conductivity and chloride may increase and aquifer recovery can take months to several years because groundwater flushing is slow.	**Moderate.**	**Low**	▪ Use PDAM as primary supply and groundwater as backup only; ▪ Install flow meter and log pumping hours/volume; ▪ set abstraction threshold; ▪ Reduce/stop pumping if TDS, EC or chloride increases; ▪ Groundwater usage in line with groundwater Permit (SIPA); ▪ Implement water-saving fixtures/leak control and alternative emergency water supply.	Hospital Management	5
C.2.	**SOCIAL**				▪		
1.	Hospital service continuity	Phased commissioning and activation of the Central Surgical Building (IBS), Oncology Building, and Neurology/Urology Building, including: (i) transfer of inpatients, outpatients, critical/non-ambulatory patients, medical records, medications, specimens, and life-support arrangements; (ii) decontamination, dismantling, packaging, transportation, reinstallation, connection,	**High** Staff, patients and visitors	**High**	▪ Plan and governance: Approve a Hospital Transition and Service Continuity Plan before the first move; activate a multidisciplinary Transition Command Team with named leads and 24-hour coordination for each wave. ▪ Readiness and go/no-go control: Complete documented checks before each wave covering clinical readiness, utilities/medical gases, ICT/HIS, infection prevention and control, fire/life safety, access/wayfinding, medicines/supplies, staffing, licenses, emergency	Hospital Management	65 (for all social risk in operation phase)

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		calibration, and IQ/OQ/PQ qualification of medical equipment; and (iii) reassignment, rostering, orientation, simulation, access authorization, and deployment of medical, nursing, technical, and support staff. Poor coordination may cause treatment delays or cancellations, unsafe patient movement, medication or identification errors, equipment damage or unavailability, staffing gaps, unfamiliarity with the new layout and emergency routes, overcrowding, and temporary suspension of clinical services.			response, abort criteria, and rollback. ▪ Phased service cutover: Move services in low-demand, clinically prioritized waves. Avoid simultaneous closure of linked services and maintain parallel operation, backup equipment, referral capacity, and emergency access until stable. ▪ Patient transfer: Risk-classify patients; assign clinical escorts and required monitoring/oxygen; use safe, accessible, infection-controlled routes; and verify identity, clinical handover, medication/record/specimen reconciliation, patient/caregiver communication, and arrival. ▪ Medical-equipment transfer: Maintain an equipment inventory and chain of custody; decontaminate, pack, and move under biomedical/OEM supervision; provide backup units; then reinstall, calibrate, electrically test, complete IQ/OQ/PQ and acceptance, and release before clinical use. ▪ Staff transition: Maintain minimum roster coverage at origin and destination; provide orientation, system access, simulations/drills, emergency-route briefing, and competency sign-off; add staff during stabilization. ▪ Communication and review: Notify staff, service users, and		

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					referral/ambulance partners of schedules and alternatives; operate a hotline/GRM; track disruptions, incidents, complaints, and corrective actions; conduct daily post-move and final lessons-learned reviews.		
2.	Improvement of healthcare services	Hospital operations, service capacity expansion, and improvements in both medical and non-medical service quality.	**High.**	**Very High.**	▪ Ensure hospital operations comply with healthcare service standards and hospital accreditation requirements. ▪ Provide adequate health facilities, inclusive services, and regular capacity building for medical staff. ▪ Conduct routine monitoring of service quality and patient satisfaction ▪	Operational Phase / Hospital Management	
3.	Improvement of employment opportunities	Hospital operations, and requirements for medical personnel, non-medical staff, and supporting services	**Moderate.**	**Moderate**	▪ Prioritize local labor based on matching competencies ▪ Provide training and capacity-building programs for workers ▪ Execute recruitment processes transparently and non-discriminatorily ▪	Operational Phase / Hospital Management – HRD	
4.	Public perception towards waste management	Operational management of medical waste, B3 waste, and hospital liquid effluents.	**Moderate.**	**Moderate**	▪ Operate medical waste, B3 waste, and WWTP systems in strict compliance with applicable environmental regulations ▪ Perform regular environmental quality monitoring. ▪ Disseminate environmental management information to the public transparently ▪ Provide a community grievance mechanism for environmental concerns.	Operational Phase / Hospital Management – HRD	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
5.	Potential business opportunities in laundry services	Operation of hospital support services (internal or outsourced laundry)	**Moderate.**	**Moderate**	▪ Prioritize partnerships with local laundry service providers that satisfy health and environmental standards ▪ Encourage the involvement of local MSMEs within The Project supply chain ▪ Conduct periodic quality oversight of laundry services ▪	Operational Phase / Hospital Management – Procurement & General Services	
6.	Improvement of patient safety	Implementation of patient safety SOPs, clinical service systems, and hospital risk management	**High.**	**Very High**	▪ Implement a patient safety management system adhering to national and international benchmarks. ▪ Conduct regular patient safety training programs for healthcare workers. ▪ Enforce a routine system for medical incident reporting and clinical service audits.	Operational Phase / Hospital Management – Quality Assurance & Patient Safety Team	
7.	Increased demand for local food supply vendors	Operation of dietary services and hospital food logistic	**Moderate.**	**High**	▪ Prioritize local suppliers who comply with food safety and product quality benchmarks. ▪ Establish a transparent and sustainable procurement framework. ▪ Perform regular quality oversight on food raw materials. ▪	Operational Phase / Hospital Management – Nutrition Unit & Procurement	
8.	Building Fire	Operational of Central Surgical Building, Oncology Building and Neurology/Urology Building. The fire risk associated with the operation of the Central Surgical Building, Oncology Building, and Neurology/Urology Building is considered	**High**.	**Low**	▪ Install and maintain fire protection systems including fire alarms, smoke detectors, hydrants, sprinklers, and portable fire extinguishers (APAR) in accordance with applicable standards and regulations. ▪ Develop and implement Emergency Response Procedures (ERP) and fire evacuation plans for all hospital buildings.	Hospital Management	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		significant due to the intensive use of medical equipment, complex electrical systems, medical gases, and chemical substances.			▪ Perform regular inspections, testing and maintenance of electrical systems and medical equipment to prevent short circuits and overheating. ▪ Provide regular fire safety training and emergency evacuation drills for hospital staff, contractors and related personnel. ▪ Ensure emergency exits, evacuation routes and assembly points are clearly marked and unobstructed at all times. ▪ Coordinate with local fire departments and emergency services for emergency preparedness and response. ▪ Store flammable and hazardous materials in designated storage areas equipped with appropriate safety systems.		
9.	Unequal hospital access by vulnerable group	Hospital operations, healthcare service provision, patient registration and administration systems, medical service mechanisms, provision of service information, healthcare facility design, patient complaint management, and service policies that do not yet fully accommodate the needs of vulnerable groups.	**High**	**Very High.**	▪ Apply Universal Accessibility principles in hospital facilities, including the provision of ramps, wheelchair paths, accessible toilets, elevators, priority waiting areas, guiding blocks, handrails, and other supporting facilities for persons with disabilities and the elderly. ▪ Provide easily accessible service information systems, including clear information boards, visual media, digital information, and communication facilities that are friendly to groups with special needs.	**Operational Phase.** Responsible Party: Hospital Management, Patient Service Unit, E&S Team, Quality and Patient Safety Unit, Facilities and Infrastructure Division, Human Resources Department, and Complaint Management Unit.	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					▪ Provide priority service lanes for the elderly, persons with disabilities, pregnant women, children, and other vulnerable groups. ▪ Ensure service facilities and supporting equipment can be used safely and comfortably by all service user groups. ▪ Social and Service Approach: ▪ Develop and implement service policies that are inclusive, non-discriminatory, and oriented toward equal access to healthcare services. ▪ Identify and map the needs of vulnerable groups as part of hospital service planning and evaluation. ▪ Provide training to medical personnel, healthcare workers, administrative staff, and service officers on inclusive services, communication with vulnerable groups, and non-discrimination principles. ▪ Provide assistance for patients who require special support during the registration, consultation, and medical service processes. ▪ Develop healthcare service socialization and education programs that are accessible to all community groups.		
10.	Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH SEA/SH)	Interactions among healthcare workers, administrative staff, support staff, outsourced workers, contractors, patients, patients'	**High**	**Very High.**	▪ Develop and implement a Zero Tolerance policy on SEA/SH and GBV applicable to all employees, healthcare workers, outsourced workers, contractors, student interns,	**Operational Phase.** Responsible Party: Hospital Management, E&S Team, Human Resources Department, Quality and Patient Safety Unit,	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		families, visitors, student interns, volunteers, and other third parties in healthcare service and hospital operational activities.			volunteers, and other third parties. ▪ Develop and implement a Code of Conduct (CoC) that prohibits sexual harassment, sexual exploitation, discrimination, bullying, and gender-based violence. ▪ Integrate SEA/SH policy compliance requirements into employment contracts, service contracts, and cooperation agreements with third parties. ▪ Technical and Operational Approach: ▪ Provide service areas, consultation rooms, examination rooms, and public facilities that support the privacy, security, and comfort of both patients and workers. ▪ Display information media on anti-harassment policies, patient rights, worker rights, and reporting mechanisms in easily accessible locations. ▪ Ensure The Project security system functions properly, including supervision of public areas and high-risk areas in accordance with privacy protection provisions. ▪ Establish clear, documented case-handling procedures for SEA/SH that maintain victim confidentiality. ▪ Conduct mandatory training on SEA/SH, GBV, professional ethics, patient protection, child protection, and professional behavior for all	Complaint Management Unit, Ethics Committee, Women and Children Protection Team (if available), and all heads of service units.	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
					hospital personnel periodically. ▪ Provide special orientation to new employees, contractors, student interns, and volunteers regarding SEA/SH protection policies. ▪ Conduct internal awareness campaigns on the prevention of sexual violence and a safe, mutually respectful work culture. ▪ Increase patients' and visitors' understanding of their right to safe services free from harassment ▪ .		
11.	Road and Traffic safety	**Operational of three buildings.** Hospital operations may increase traffic volume due to the movement of patients, visitors, staff, ambulances, service vehicles, and delivery vehicles entering and leaving The Project area. Increased traffic activity may contribute to congestion, reduced road performance, and elevated risks of traffic accidents, particularly during peak hours. Additional safety concerns may arise from pedestrian movements, emergency vehicle access, on-street parking, and vehicle crossing activities at	**High.** There are existing traffic conditions is poor, characterized by obstructed traffic flow, low travel speeds, and frequent prolonged traffic congestion.	**High**	▪ Implement internal traffic management systems within The Project area. ▪ Provide separate entry and exit gates where feasible. ▪ Provide adequate parking areas for visitors, staff, and emergency vehicles. ▪ Install clear traffic signage, pedestrian crossings, and directional signs. ▪ Assign security personnel to manage vehicle movement during peak hours. ▪ Ensure unobstructed ambulance and emergency vehicle access. ▪ Conduct periodic traffic evaluation and coordinate with local authorities when necessary.	Hospital Management	

No	E&S Risk/Impact	Project Activities That Cause Risks/ Impacts	Receptor Sensitivity	Risk/Impact Significance	Proposed Mitigation Measures	Project Stage/Responsibility	Estimated Cost (in IDR Million /year)
		hospital access points. However, proper traffic management measures, including separate entry and exit gates, internal parking arrangements, clear traffic signage, pedestrian pathways, and adequate security personnel, can help minimize traffic disruption and improve road safety around The Project area.					

7.3 Heritage-Specific Mitigation

Heritage-specific mitigation is calibrated to the institutional and intangible heritage character of the compound, pending the formal verification of any registered Cagar Budaya designation. The principal heritage-specific mitigation measures are:

- Pre-demolition documentation - photographic and architectural recording of the 26 rumah dinas and the former cooperative building, capturing institutional memory; salvage of materials of historical or institutional value where feasible.
- Chance Find Procedure (CFP) - formal protocol for stoppage, reporting, and consultation with Disbudpar Tangerang City and BPCB Banten in the event of unanticipated archaeological or heritage findings.
- Vibration-controlled demolition - hourly vibration monitoring during demolition; limit values consistent with German DIN 4150-3 cosmetic-damage thresholds for heritage-sensitive structures.
- Engagement with the eks-pasien kusta community - sustained dialogue, capturing intangible heritage (oral histories, institutional memory, landscape associations), and co-design of any commemorative interpretation within the redeveloped campus.
- Heritage Adviser - appointment of a qualified heritage adviser embedded in the PIU for the duration of demolition and construction, with monthly reporting and quarterly BPCB liaison.

8 CLIMATE CHANGE ASSESSMENT

8.1 Summary of Climate Risk Analysis

The climate risk assessment for the RS Sitanala redevelopment project was conducted to identify climate-related hazards potentially relevant to the Project during both construction and long-term operational phases. The assessment considered baseline environmental conditions, Project characteristics, future climate projections under multiple SSP climate scenarios, and Project sensitivity to identified climate hazards.

Based on the assessment, the main climate-related hazards considered relevant to the Project include heat wave and heat stress, drought conditions, extreme precipitation and localized urban flooding, fluvial flood influence, sea level rise-related regional inundation impacts, and earthquake hazards. Increasing heat wave conditions and prolonged dry periods are projected to become the most relevant long-term climate-related exposures for the Project, particularly in relation to cooling demand, operational energy consumption, water availability, utility reliability, and operational continuity of healthcare services. Although the Project Area is generally located outside major flood and coastal hazard zones, temporary localized runoff accumulation, urban drainage congestion, and indirect regional flooding influence associated with future sea level rise conditions may still affect surrounding infrastructure and emergency accessibility during severe weather events.

The assessment also identified earthquake hazard as one of the main natural hazards relevant to the Project due to the regional seismic setting of Java Island and local soil conditions that may amplify ground shaking intensity. Considering the Project involves critical healthcare infrastructure requiring continuous operation during emergency situations, seismic resilience and operational continuity remain important considerations throughout the Project lifetime.

A summary of the current and projected future climate exposure relevant to the Project is presented in Table 41. Detailed climate risk assessment, hazard screening methodology, future climate projections, and adaptation analysis are provided in Annex E.

Table 46 Summary of Future Exposure Key Insights

Hazard	Current Exposure	Projected Future Exposure
Fluvial Flood	Outside	Moderate to Significant (SSP5-8.5, late century)
Pluvial Flood	Outside	Remains Not Relevant (All SSPs)
Storm Surge	Outside	Extreme (SSP3-7.0 and SSP5-8.5, 2085)
Heat Wave	Low to Moderate (Baseline Tropical Conditions)	Extreme (All SSPs)

Hazard	Current Exposure	Projected Future Exposure
Heat Stress	Low (Baseline Humid Tropical Conditions)	Moderate (SSP5-8.5, 2085)
Drought	Low to Moderate (Seasonal Dry Period Conditions)	Extreme (SSP3-7.0 and SSP5-8.5)
Windstorm	Very Low	Remains Very Low (All SSPs)
Landslide	Negligible	Remains Negligible (All SSPs)
Wildfire	Negligible	Remains Negligible (All SSPs)

Source: Swiss Re - CatNet® Risk Assessment Report

8.2 Summary of Adaptation Analysis

The adaptation analysis for the RS Sitanala redevelopment project was conducted to identify potential adaptation measures that may support long-term climate resilience, operational continuity, and infrastructure reliability throughout the Project lifetime. The assessment focused on the main climate-related hazards identified through the climate risk assessment, including heat wave and heat stress, drought conditions, extreme precipitation and localized urban flooding, fluvial flood influence, sea level rise-related regional drainage impacts, and earthquake hazards.

The analysis considered potential implications of these hazards on demolition and construction activities, hospital buildings and healthcare facilities, supporting utility systems, emergency access, and long-term hospital operations. Adaptation measures were identified to support climate-resilient infrastructure design, utility reliability, water resilience, emergency preparedness, and continuity of healthcare services under future climate conditions. A summary of the adaptation analysis relevant to the Project is presented in Table 42.

Table 47 Summary Of Climate Hazards, Impacts And Adaptation Measures

Components / Work Package	Climate Hazards, Impacts, and Adaptation Measures											
	Fluvial Flood		Heat Wave / Heat Stress		Drought		Extreme Precipitation		Sea Level Rise / Storm Surge		Earthquake	
	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate IMpacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Impacts	Adaptation Measures
Demolition and Site Preparation Activities	Temporary flooding and surrounding urban drainage congestion may affect temporary site access and material mobilization during severe rainfall conditions.	Consider temporary access planning and flood response arrangements during severe rainfall conditions.	Prolonged hot weather conditions may increase worker heat exposure and operational stress during demolition and site preparation activities.	Consider shaded temporary facilities, hydration measures, and heat exposure management during outdoor demolition and site preparation activities.	Temporary water demand for demolition, dust suppression, and sanitation activities may increase during prolonged dry conditions.	Consider temporary water supply arrangements to support demolition and site preparation activities during prolonged dry conditions.	Heavy rainfall conditions may contribute to temporary runoff accumulation, drainage congestion, and temporary site access disturbance during demolition and excavation works.	Incorporate temporary drainage systems and runoff control measures during demolition and excavation works.	Regional lowland flooding and downstream drainage constraints associated with future sea level rise conditions may indirectly influence temporary access and surrounding urban drainage performance.	Consider temporary access planning and operational preparedness during severe regional flooding conditions.	Earthquake events may affect demolition safety, temporary structures, and worker safety during demolition activities.	Consider temporary structural protection measures and emergency evacuation planning during demolition activities.

Components / Work Package	Climate Hazards, Impacts, and Adaptation Measures											
	Fluvial Flood		Heat Wave / Heat Stress		Drought		Extreme Precipitation		Sea Level Rise / Storm Surge		Earthquake	
	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate IMpacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Impacts	Adaptation Measures
Construction Activities	Temporary flooding and urban drainage congestion may affect construction logistics, material mobilization, and temporary site access during prolonged rainfall conditions.	Consider emergency access planning during periods of prolonged rainfall and temporary flooding conditions.	Increasing temperature conditions and prolonged hot days may increase worker fatigue, heat exposure, and operational stress during outdoor construction activities.	Consider work-rest arrangements, shaded rest areas, and heat exposure management measures during prolonged hot weather conditions.	Prolonged dry periods may increase temporary water demand for construction activities, dust suppression, and sanitation needs.	Consider temporary water storage and contingency water supply arrangements during construction activities.	Heavy rainfall may contribute to temporary runoff accumulation, drainage congestion, exposed soil erosion, and temporary disruption to construction access and excavation works.	Incorporate temporary drainage systems, runoff control measures, and sediment management during construction activities.	Regional lowland flooding and downstream drainage constraints associated with future sea level rise may indirectly affect surrounding urban infrastructure and temporary construction access.	Consider temporary operational contingency arrangements during severe regional flooding conditions.	Earthquake events may affect worker safety, temporary structures, excavation works, and construction equipment during seismic events.	Consider construction safety procedures, equipment securing measures, and emergency response planning during construction activities.
Hospital Buildings and Healthcare Facilities	Temporary flooding and urban drainage congestion may affect surrounding hospital accessibility and supporting infrastructure during prolonged	Ensure adequate drainage discharge capacity and protected emergency access within hospital facilities to support operational continuity during regional	Increasing temperature conditions and prolonged hot days may increase cooling demand, indoor thermal stress, and operational pressure on	Incorporate energy-efficient HVAC systems, passive cooling strategies, thermal insulation, shading systems, and backup power supply for cooling systems.	Increasing drought conditions may affect long-term water availability required to support sanitation systems, cooling demand, and healthcare services.	Incorporate rainwater harvesting systems, water storage facilities, water-efficient fixtures, and treated wastewater reuse systems for non-clinical purposes.	Heavy rainfall may contribute to temporary drainage congestion, localized runoff accumulation, and disruption to internal circulation and	Incorporate climate-resilient drainage systems, stormwater detention facilities, and runoff retention systems within hospital design.	Regional lowland flooding and downstream drainage constraints associated with future sea level rise may indirectly affect surrounding urban infrastructure and external	Consider operational contingency arrangements and emergency access planning associated with regional flooding disruption.	Earthquake events may affect structural integrity, critical equipment, utility systems, and operational continuity of hospital facilities.	Ensure hospital buildings and critical facilities are designed in accordance with applicable seismic standards and emergency operational requirements.

Components / Work Package	Climate Hazards, Impacts, and Adaptation Measures											
	Fluvial Flood		Heat Wave / Heat Stress		Drought		Extreme Precipitation		Sea Level Rise / Storm Surge		Earthquake	
	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate IMpacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Impacts	Adaptation Measures
	rainfall conditions.	flooding conditions.	critical healthcare facilities.				emergency access.		hospital accessibility.			
Utility Systems and Supporting Infrastructure	Temporary flooding and drainage congestion may affect utility access, supporting infrastructure, and surrounding circulation areas.	Consider utility resilience planning and emergency access arrangements during prolonged rainfall conditions.	Increasing temperature conditions may increase operational stress on cooling systems and electricity demand.	Consider energy-efficient utility systems, smart building management systems, renewable energy integration, and cooling system redundancy within supporting infrastructure.	Reduced long-term water availability may affect utility systems and supporting operational infrastructure requiring continuous water supply.	Ensure backup water storage capacity and contingency water supply systems are incorporated within supporting infrastructure design.	Extreme rainfall events may affect utility systems, drainage performance, and temporary site accessibility.	Incorporate stormwater systems considering future climate projections and climate change safety allowances within drainage design.	Regional flooding and downstream drainage constraints may indirectly affect surrounding urban utility networks and supporting infrastructure systems.	Consider operational contingency arrangements and utility resilience planning associated with regional flooding conditions.	Earthquake events may disrupt power supply, water systems, communication systems, and other critical utilities.	Ensure backup utility systems and operational continuity provisions are incorporated within critical supporting infrastructure.
Hospital Operations	Temporary flooding and surrounding urban drainage congestion may affect emergency transportation routes and hospital accessibility during severe	Consider operational continuity planning and emergency transportation coordination during temporary flooding conditions.	Heat wave conditions may increase heat-related discomfort and operational stress for patients, healthcare workers, and visitors.	Consider thermal comfort management measures and operational preparedness during prolonged hot weather conditions.	Drought conditions may affect long-term operational water demand and continuity of healthcare services requiring stable water supply.	Consider water conservation measures and operational water resilience planning for critical healthcare services.	Temporary heavy rainfall events may affect operational access, circulation, and emergency response activities.	Consider operational preparedness and emergency response planning during periods of heavy rainfall conditions.	Regional lowland flooding and broader urban drainage disruption associated with future sea level rise conditions may indirectly affect surrounding transportation routes and	Consider operational continuity planning and emergency transportation coordination associated with regional flooding disruption conditions.	Earthquake events may disrupt hospital operations, emergency services, and healthcare response activities.	Consider emergency preparedness procedures, evacuation planning, and post-earthquake operational recovery arrangements for hospital operations.

Components / Work Package	Climate Hazards, Impacts, and Adaptation Measures											
	Fluvial Flood		Heat Wave / Heat Stress		Drought		Extreme Precipitation		Sea Level Rise / Storm Surge		Earthquake	
	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Climate IMpacts	Adaptation Measures	Key Climate Impacts	Adaptation Measures	Key Impacts	Adaptation Measures
	rainfall conditions.								supporting urban infrastructure.			

Note: Heat wave and heat stress hazards are presented together within the adaptation summary matrix due to the substantial overlap between the proposed adaptation and operational management measures, particularly related to cooling systems, indoor thermal management, worker protection, and hospital operational continuity during prolonged hot weather conditions.

8.3 Project Existing Plan on Climate Change and Energy Efficiency

Project planning has incorporated several climate change adaptation, operational resilience, and energy efficiency considerations through the implementation of the Smart and Green Hospital strategy integrated into the overall hospital redevelopment concept. The strategy generally aims to support long-term operational efficiency, environmental sustainability, climate resilience, and healthcare service continuity within the Project lifecycle. Key climate-related and energy-efficiency considerations currently incorporated into the Project planning include the following:

- Integration of Smart Hospital systems, including Hospital Information Systems, electronic medical records, telemedicine, SATUSEHAT integration, remote diagnostics, clinical workflow automation, and smart Building Management Systems (BMS) for HVAC, lighting, and energy management.
- Incorporation of Green Hospital design principles, including high-efficiency building envelopes, passive cooling approaches, glazing performance optimization, daylight utilization, and energy-efficient HVAC and lighting systems.
- Consideration of rooftop photovoltaic (PV) systems with planned potential capacity of approximately 1.0–1.5 MWp (subject to Detailed Engineering Design/DED feasibility assessment) to support renewable energy utilization and long-term operational energy efficiency.
- Utilization of building glass and daylight optimization strategies to reduce daytime electricity demand for lighting within hospital operational areas.
- Integration of water stewardship and stormwater management measures, including rainwater harvesting systems, stormwater detention facilities, and retention pond infrastructure to support runoff control and temporary water storage within the Project Area.
- Retention of existing green open space (RTH), mature trees, and native landscape elements within the redevelopment concept to support environmental quality, urban microclimate conditions, and site vegetation coverage.
- Incorporation of climate-resilient drainage and flood management systems considering relatively lowland Jabodetabek conditions and future climate-related rainfall conditions.
- Provision of emergency power continuity systems, including genset and potential PV-battery integration, to support operational resilience during emergency or severe weather conditions.
- Facility planning and building design intended to support patient comfort and hospital operational continuity during increasing temperature and extreme heat conditions.
- Integration of universal design principles, including barrier-free access, accessible signage, and inclusive sanitary facilities, in accordance with accessibility and inclusive infrastructure considerations.

As a conclusion, the current Project planning indicates that climate resilience, operational continuity, energy efficiency, and environmental sustainability considerations have been incorporated into The Project redevelopment concept. These approaches may support long-term operational resilience, improve resource efficiency, reduce future operational greenhouse gas emissions, and strengthen the Project's adaptive capacity toward future climate-related conditions.

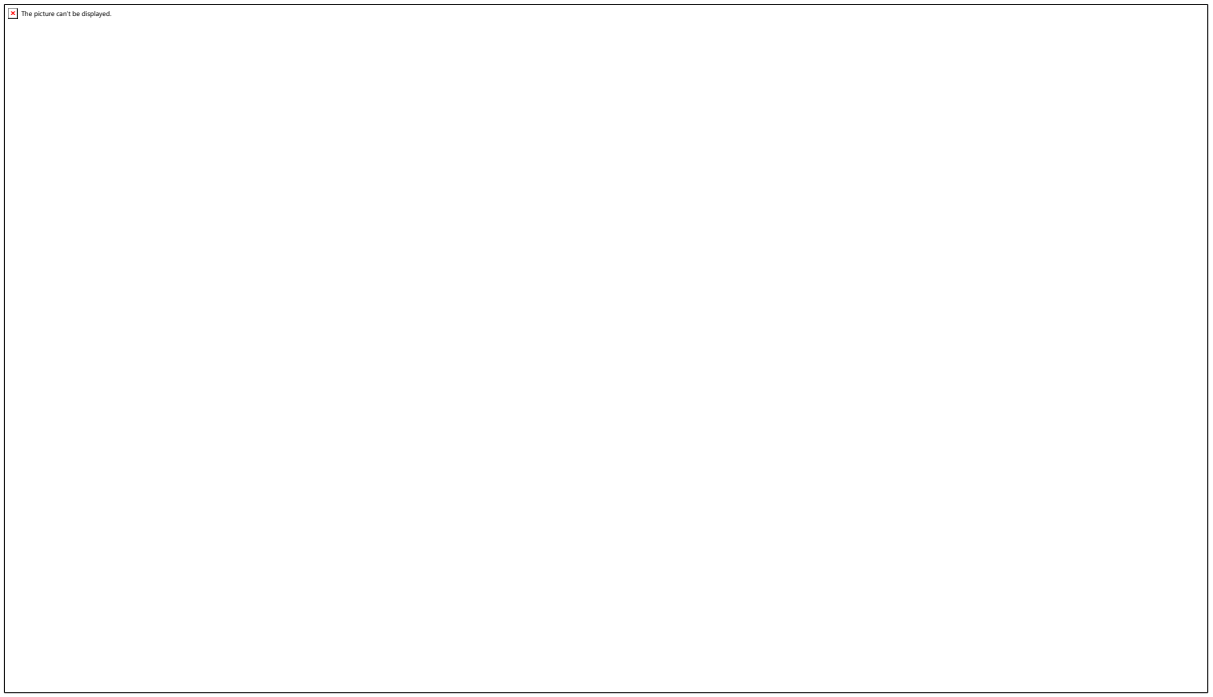
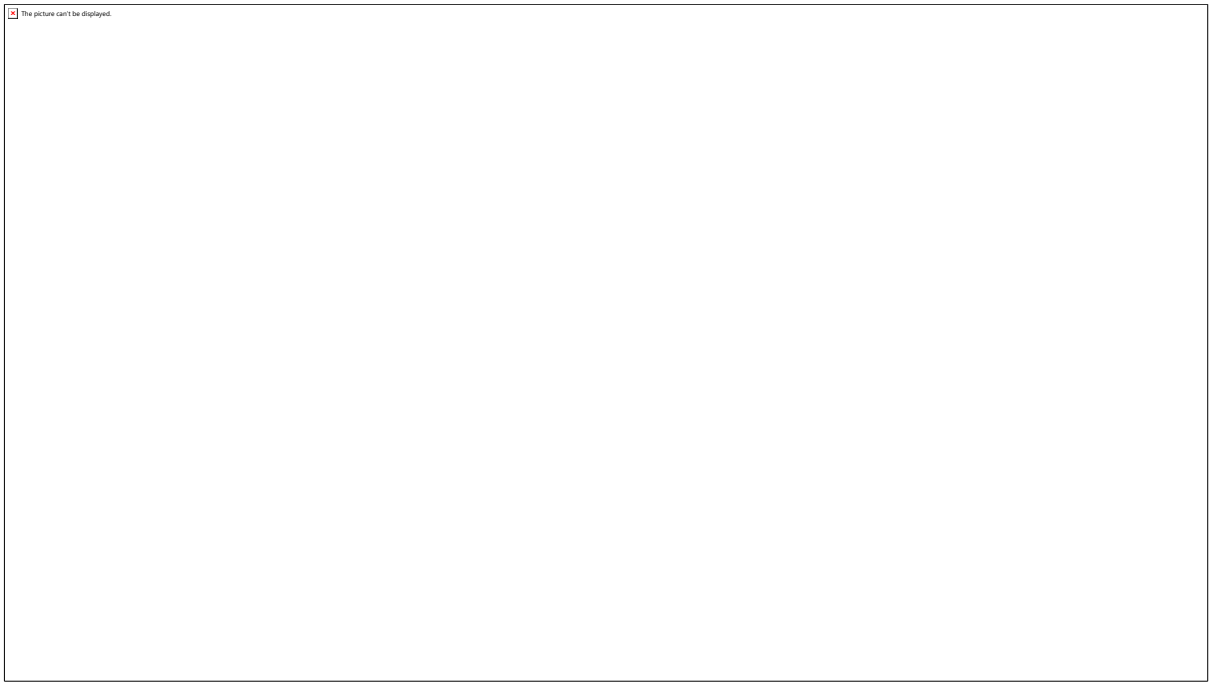


Figure 43 Master plan project



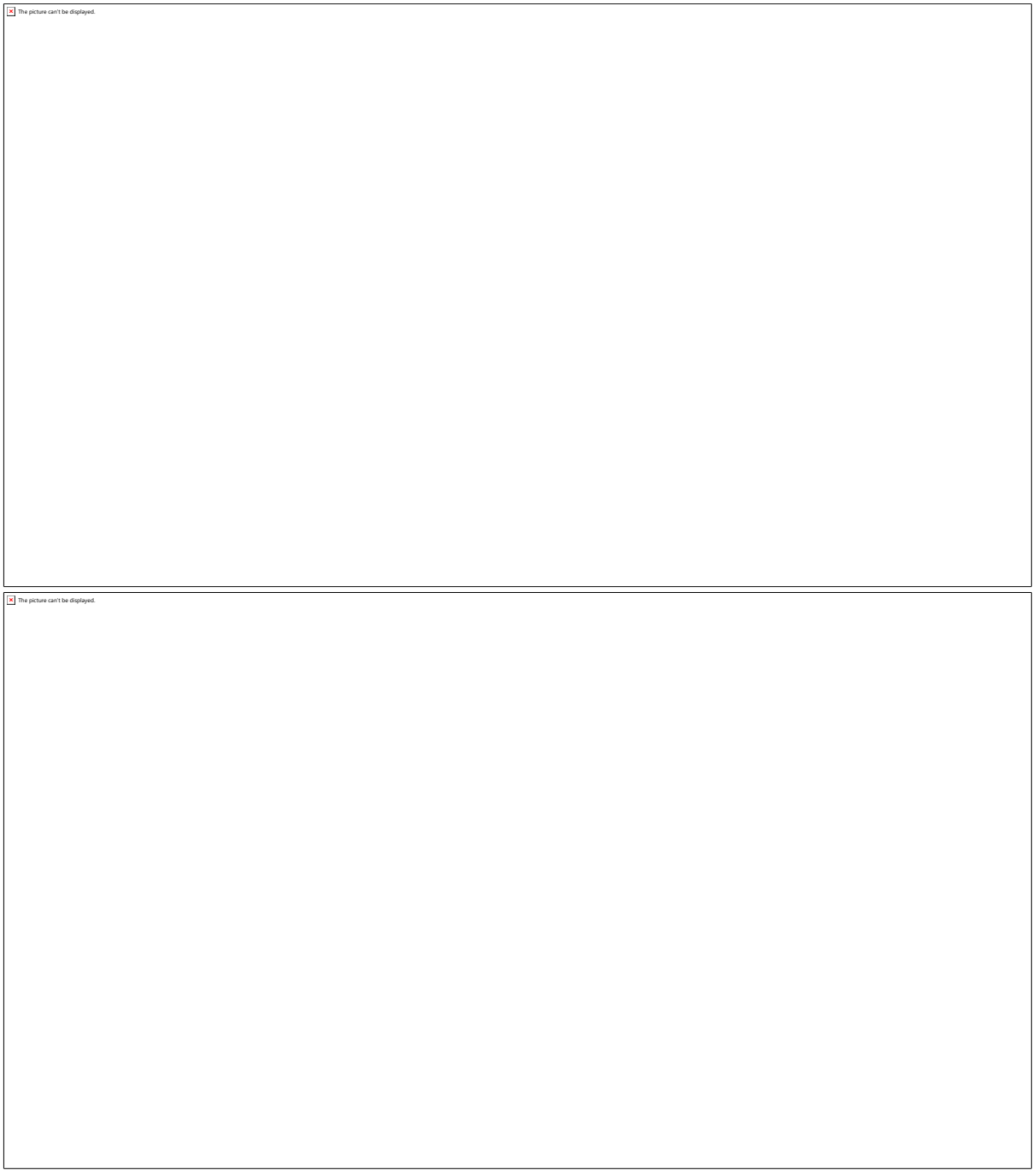


Figure 44 Building concept.

9 STAKEHOLDER ENGAGEMENT PLAN (SEP)

The Stakeholder Engagement Plan (SEP) is an operational document that describes how the Project will communicate, consult, engage stakeholders, receive feedback, and address grievances throughout the project lifecycle, from the pre-construction and construction stages through hospital operations.

In the context of the RSUP Dr. Sitanala Development Project, the SEP has been prepared to support the ESIA process and the management of environmental and social risks in a participatory, transparent, inclusive, and adaptive manner in response to evolving stakeholder dynamics. The SEP also serves as an important instrument to ensure that stakeholders, particularly affected communities and vulnerable groups, have access to project information and adequate opportunities to provide input, raise concerns, and submit grievances related to the project.

This SEP has been prepared with reference to the results of stakeholder mapping, environmental and social impact and risk identification, as well as the outcomes of initial consultations and stakeholder surveys that have been conducted.

9.1 Stakeholder Identification and Analysis

The stakeholder identification for this project draws on the raphic

raphic and institutional context of Neglasari District and the wider catchment of The Project, the regulatory authorities of Tangerang City and Province of Banten, the patient and caregiver community, the workforce and resident communities surrounding the compound, the academic and clinical partner network, and the safeguards team of AIIB. Stakeholders are categorised below within an interest-influence framework, with engagement modalities tailored accordingly:

9.1.1 Stakeholders During the Pre-Construction Stage

The pre-construction stage represents the initial phase of project development, focusing on preparatory, planning, and administrative activities prior to the commencement of physical construction works. At this stage, project activities are generally dominated by coordination processes, technical planning, and fulfillment of permitting and safeguard requirements.

Table 48 High Interest – High Influence

Stakeholder	Rationale
Ministry of Health	Determines health policy, hospital service standards, and institutional support
Health Agency	Influences permitting and acceptance within the regional healthcare system
Environmental Agency	AMDAL/environmental authority
Local Government	Determines political and administrative support
Hospital Management	Project decision-maker
Project Management	Controls project financing and direction

Table 49 Lower Interest – High Influence

Stakeholder	Rationale
Media	Shapes public opinion
Civil Society Organizations / NGOs	May influence the social legitimacy of the project
Community Leaders	Influence community social acceptance

Table 50 High Interest – Lower Influence

Stakeholder	Rationale
Land-affected communities	Risk of asset or access loss
Informal tenants	Vulnerable to exclusion from compensation records
Small nearby businesses	Risk of losing customers
Vulnerable groups (elderly persons, women, persons with disabilities)	Sensitive to changes in access and information
Communities surrounding the site	Affected by project-related uncertainty

Table 51 Lower Interest – Lower Influence

Stakeholder	Rationale
Communities outside the area of influence	Limited direct impact
Unrelated business actors	No direct relationship with the project

9.1.2 Stakeholders During the Construction Stage

The construction stage represents the physical implementation phase of the project, characterized by increased field activities, mobilization of resources, and direct interaction between project activities and the surrounding environment and communities. At this stage, environmental, social, health, and safety impacts generally become more apparent compared to the pre-construction phase.

Table 52 High Interest – High Influence

Stakeholder	Rationale
Main Contractor	Controls field activities
Supervision Consultant	Oversees technical compliance
Project Management	Operational decision-maker
Transportation Agency	Regulates traffic and accessibility
Environmental Agency	Supervises environmental impacts

Table 53 Lower Interest – High Influence

Stakeholder	Rationale
Media	Dust, traffic congestion, and noise issues may attract public attention
Security Authorities	Influence project social stability
Activists / NGOs	May raise environmental and safety issues
Local Political Figures	May mobilize public opinion

Table 54 High Interest – Lower Influence

Stakeholder	Rationale
Existing hospital patients	Sensitive to noise and dust
Elderly persons and ICU patients	Highly sensitive to vibration and noise
Surrounding communities	Risk of disturbance to comfort and safety
Nearby vendors	Changes in access and customer flow
Pedestrians / road users	Risk of construction-related accidents
Persons with disabilities	Risk of accessibility barriers
Daily construction workers	High interest but limited bargaining power

Table 55 Lower Interest – Lower Influence

Stakeholder	Rationale
General public	No significant impacts
Areas outside the area of influence	Minimal impacts

9.1.3 Stakeholders Identified Following the Public Consultation

Following the initial project socialization in May 2026 and the first round of public consultation in June 2026 covering Mekar Sari and Karang Sari Subdistricts, the stakeholder identification was updated to reflect actual field conditions. The questionnaire results indicate that the majority of surrounding community members have a high level of interest but relatively low influence over Project decisions, and are therefore categorised as Project Affected Parties (PAPs) requiring a high level of engagement. Stakeholders are categorised below within the interest–influence framework applied throughout this SEP.

Table 56 High Interest – High Influence

Stakeholder	Rationale
Hospital Management	Operational decision-maker
Ministry of Health	Healthcare service regulator
Health Agency	Supervises healthcare services
Medical Waste Operators	Control hazardous medical waste risks

Stakeholder	Rationale
Core Healthcare Personnel	Determine service quality
Mekar Sari Subdistrict Government	Local government representation
Karang Sari Subdistrict Government	Local government representation
Neglasari District Government	Regional government coordination institution
RT/RW Community Representatives	Primary communication channel between communities and the Project

Table 57 Lower Interest – High Influence

Stakeholder	Rationale
Media	Service or waste issues may rapidly become public concerns
Professional Healthcare Organizations	May influence hospital reputation
Local Parliament / Local Government	Influence policy and public support
Influencers / Digital Communities	Influence public perception
Community Organisations / Social Foundations	May represent specific vulnerable groups or community interests

Table 58 High Interest – Lower Influence

Stakeholder	Rationale
Mekar Sari Subdistrict Community	Project Affected Parties (PAP); 88.9% consider RSUP important or very important, and some community members perceive impacts from RSUP activities
Karang Sari Subdistrict Community	Project Affected Parties (PAP); approximately 76% consider RSUP important, and 36.8% perceive direct impacts
Road Users Around RSUP	Group most frequently perceived as potentially affected by construction activities
RSUP Patients	Direct beneficiaries of healthcare services
Patients' Families and Visitors	Dependent on accessibility and comfort of healthcare services
RSUP Employees (Doctors, Nurses, and Other Healthcare Workers)	Hospital operations may be affected by Project activities
Traders/MSMEs Around RSUP	Potentially affected by accessibility and traffic conditions
Persons with Disabilities	Require accessible facilities and inclusive consultation approaches
Elderly Persons	Sensitive to access disruptions, dust, and noise disturbance
Children	Sensitive to safety risks and traffic-related hazards
Low-Income Households	More sensitive to economic disruption and access constraints

Female-Headed Households	Require inclusive consultation approaches

Table 59 Lower Interest – Lower Influence

Stakeholder	Rationale
General public not using hospital services	Limited direct relationship
Non-health-related businesses located far from the site	Low relevance to the project

The key findings of the stakeholder survey conducted as part of the public consultation, together with their implications for stakeholder engagement under ESS10, are summarised below.

Table 60 Lower Interest – Lower Influence

Summaries	ESS10 Implication
The hospital is considered important by the surrounding communities (Mekar Sari: 88.9%; Karang Sari: approximately 76%).	High stakeholder interest.
Local economic dependence on the hospital is relatively low.	Limited direct economic impacts.
Most respondents have never participated in project consultations (77.8–86.8%).	Enhanced stakeholder engagement is required.
Most respondents believe they have little or no influence over project decisions (63–78%).	Indicates a participation gap.
Awareness of the Grievance Redress Mechanism (GRM) remains low (66.7–76.3% of respondents are unaware of the GRM).	Strengthening GRM outreach and awareness is necessary.
Vulnerable groups constitute a significant proportion of the affected population, particularly in Karang Sari.	Targeted engagement measures are required in accordance with ESS10.

9.2 Stakeholder Engagement Program

The stakeholder engagement program has been developed based on project stages and the characteristics of identified stakeholders.

Pre-Construction Stage

Engagement activities during this stage focus on:

- initial project information disclosure;
- public consultation;

- validation of issues and impacts;
- identification of social sensitivities; and
- institutional coordination and permitting.

Engagement methods include:

- public announcements;
- public consultations;
- interviews;
- stakeholder surveys;
- small group discussions; and
- technical coordination with relevant agencies.

Construction Stage

During the construction stage, engagement focuses on:

- management of construction-related impacts;
- disclosure of field activities;
- handling of community grievances; and
- coordination regarding Community Health and Safety (CHS) issues.

Engagement methods include:

- periodic consultations;
- construction activity disclosure;
- community communication;
- grievance monitoring; and
- coordination with regulators and hospital management.

Operational Stage

During the operational stage, engagement focuses on:

- service quality;
- medical waste management;
- accessibility;
- patient and community safety;
- surrounding environmental comfort; and
- responses to healthcare service and public health issues.

Engagement methods include:

- patient surveys;
- community consultations;
- grievance mechanisms;
- coordination with health institutions;
- disclosure of selected information; and
- routine communication with relevant stakeholders.

Engagement activities will be implemented progressively in accordance with project development and stakeholder needs. Monitoring and engagement outcomes will be documented and used to improve SEP implementation in subsequent project stages.

Table 61 Stakeholder Engagement Matrix

Stakeholder	Key Issues	Engagement Method	Frequency	Responsible Party
Communities surrounding the hospital	Dust, noise, traffic, accessibility	Public consultation, surveys, environmental announcements	Periodic	Project Team / Hospital Management
Patients and patient companions	Service disruption, comfort, accessibility	Interviews, surveys, limited consultations	Periodic	Hospital Management
Vulnerable groups	Accessibility, safety, social sensitivity	Limited FGDs, interviews, special approaches	As needed	Project Social Team
Former leprosy patient community	Social stigma sensitivity	Limited consultation and direct communication	Periodic	Social Team / Hospital Management
Health Agency	Healthcare service compliance	Technical coordination	Periodic	Hospital Management
Environmental Agency	Environmental compliance	Technical coordination and reporting	Periodic	Environmental Team
Transportation Agency	Traffic and accessibility	Technical coordination	As needed	Project Team
Media	Project information and public issues	Information disclosure and media briefing	As needed	Project Public Relations Team
Asian Infrastructure Investment Bank Safeguard Team	Safeguard compliance	Reporting and coordination	Periodic	Project Proponent

10 GRIEVANCE REDRESS MECHANISM (GRM)

10.1 Purpose of the Grievance Redress Mechanism

The Grievance Redress Mechanism (GRM) has been established to provide affected communities, project workers, patients, visitors, stakeholders, and other interested parties with a safe, accessible, transparent, and effective mechanism for raising concerns, complaints, suggestions, or grievances related to the Project.

The GRM is designed to ensure that project-related issues are identified and addressed in a timely manner before they escalate into broader social conflicts, disputes, reputational risks, or legal challenges. It also serves as an important governance tool that supports accountability, transparency, stakeholder trust, and continuous improvement of project performance throughout the construction and operational phases.

The GRM is not intended to replace judicial or administrative remedies available under Indonesian law. Rather, it provides an additional and more accessible pathway through which concerns can be addressed and resolved at an early stage.

10.2 Objectives of the GRM

The objectives of the GRM are to:

- provide stakeholders with a safe and accessible avenue for raising concerns;
- ensure complaints are received, recorded, assessed, investigated, and resolved in a timely manner;
- prevent escalation of minor issues into larger disputes or conflicts;
- strengthen trust and communication between the Project and stakeholders;
- identify recurring issues and emerging social risks;
- improve environmental and social management performance; and
- support compliance with national regulations and international good practice.

The GRM also functions as an early conflict prevention system by enabling concerns to be addressed before they develop into community dissatisfaction, social unrest, political escalation, or reputational impacts.

10.3 Guiding Principles

The Project GRM shall be implemented in accordance with the following principles:

Accessibility

The mechanism shall be easily accessible to all stakeholders without unnecessary barriers.

Accessibility includes:

- **Physical Accessibility** – grievance channels are easy to reach;
- **Communication Accessibility** – information is easy to understand and available in appropriate formats;
- **Social Accessibility** – individuals can raise concerns without fear of retaliation;
- **Cultural Accessibility** – procedures are appropriate to local social and cultural contexts;
- **Economic Accessibility** – submission of complaints is free of charge; and
- **Technological Accessibility** – multiple communication channels are available.

Inclusiveness

All stakeholders, including vulnerable groups, women, children, elderly persons, persons with disabilities, former leprosy communities, project workers, and affected households, shall have equal access to the mechanism.

Transparency

Stakeholders shall be informed regarding complaint procedures, timelines, and resolution outcomes.

Confidentiality

Personal information shall be protected, particularly in cases involving sensitive social issues.

Non-Retaliation

No person shall experience intimidation, discrimination, retaliation, or adverse consequences for submitting a grievance.

Survivor-Centred Approach

Complaints involving GBV, SEA, SH, child protection concerns, or other sensitive matters shall be managed using survivor-centred principles that prioritize safety, confidentiality, dignity, informed consent, and appropriate referral services.

10.4 Scope of the GRM

The GRM will be available to all stakeholders who may be affected by or interact with the Project, including:

- surrounding communities;
- community organizations;
- religious institutions;
- educational institutions;
- local businesses;

- patients and patient caregivers;
- visitors;
- hospital staff;
- construction workers;
- contractors and subcontractors;
- households affected by relocation activities; and
- vulnerable groups within the Project Area of Influence.

The mechanism may receive concerns arising during both construction and operational phases.

10.5 Types of Grievances

The GRM may receive and manage grievances related to a broad range of environmental, social, health, safety, labor, and operational issues. Indicative grievance categories include:

Table 62 Indicative Grievance Categories

No.	Category	Examples
1	Construction Activities	Dust, noise, vibration, construction schedules, access restrictions, temporary utility interruptions
2	Traffic and Transportation	Traffic congestion, parking management, road safety, vehicle movements
3	Community Health and Safety	Unsafe conditions, project vehicle incidents, pedestrian safety concerns
4	Gender and Social Inclusion	Safety concerns, discrimination, unequal access, exclusion from consultation
5	GBV/SEA/SH	Sexual harassment, sexual exploitation, abuse, inappropriate behaviour
6	Community Disturbance	Disruption of daily activities, nuisance, community conflicts
7	Hospital Operations	Access to services, operational disruptions, patient circulation issues
8	Information Disclosure	Insufficient information, communication concerns, consultation-related issues
9	Workforce Conduct	Contractor behaviour, worker-community interactions, code of conduct violations
10	Religious and Community Facilities	Disturbance of religious activities, community events, cultural sensitivities
11	Resettlement and Housing	Relocation-related concerns, compensation issues, housing transition concerns

10.6 Grievance Submission Channels

To ensure accessibility, the Project will establish multiple channels through which grievances may be submitted, including:

- dedicated telephone hotline;
- WhatsApp messaging service;
- email communication;
- written grievance forms;
- complaint boxes located at appropriate facilities;
- direct submission to Community Liaison Officers (CLOs);
- stakeholder consultation meetings;
- hospital information and complaint desks; and
- referrals from local government representatives, RT/RW leaders, community organizations, and other stakeholders.

Information regarding grievance procedures and contact details shall be publicly disclosed and regularly communicated.

10.7 Anonymous Grievances

Anonymous grievances shall be accepted. The Project recognizes that individuals may be reluctant to identify themselves due to fear of retaliation, social pressure, concerns regarding confidentiality, employment-related consequences, or sensitivity of the issue being reported.

Anonymous reporting is particularly important for cases involving:

- GBV
- SEA
- SH
- discrimination
- workplace misconduct; and
- other socially sensitive concerns.

Anonymous complaints will be assessed and investigated to the extent possible based on the information provided.

10.8 General Grievance Management Process

The grievance process shall generally include the following steps:

Step 1 – Receipt and Registration. All grievances are received and recorded in the grievance register.

Step 2 – Screening and Classification. The grievance is reviewed and categorized according to issue type, severity, urgency, and responsible unit.

Step 3 – Verification and Investigation. Relevant information is collected and the issue is investigated by designated personnel.

Step 4 – Response and Resolution. Corrective actions, explanations, or remedial measures are proposed and communicated to the complainant.

Step 5 – Closure. The grievance is closed once resolution has been accepted or all reasonable actions have been completed.

Step 6 – Monitoring and Learning. Grievance trends are periodically analyzed to identify recurring issues and opportunities for improvement.

10.9 Indicative Timeframes and Escalation Procedure

To maintain stakeholder confidence, the Project will establish target timelines for grievance management. Indicative timeframes include:

Table 63 Indicative Timeline

No.	Stage	Indicative Timeline
1	Acknowledgement of Receipt	Within 3 working days
2	Initial Assessment	Within 7 working days
3	Investigation and Response	Within 30 working days
4	Closure and Documentation	Following agreement on resolution

Where grievances cannot be resolved at the initial level, an escalation procedure will be applied involving senior project management and, where appropriate, relevant authorities or independent mediation mechanisms.

10.10 Grievance Redress Procedures for Internal Staff

In addition to the general grievance channels, a dedicated pathway shall be provided for internal staff and all project workers, including RS Sitanala civil-servant and non-civil-servant staff, contracted and outsourced workers (such as cleaning services, security, drivers, and gardeners), and construction workers engaged by contractors and subcontractors. Labor and working-conditions grievances may be submitted verbally or in writing, in person or by phone, SMS, WhatsApp, mail, or email. Anonymous complaints shall be accepted.

Step 1 – Employer Level (Contractors, Subcontractors, and RS Sitanala Units). Affected workers may submit their grievance directly to their Employer, who serves as the first focal point for receiving and resolving labor-related complaints. For RS Sitanala staff, the Employer is the respective hospital unit or Human Resources; for outsourced and construction workers, the Employer is the relevant Contractor or Subcontractor. The Employer shall review and resolve the case as soon as possible and no later than 15 calendar days, taking into account the nature and urgency of the issue, and shall report the process and result to the RS Sitanala GRM focal point / PMU for record. If the complainant is not satisfied, the Employer shall inform the complainant of the possibility to escalate the complaint to Step 2.

Note: Complaints relating to serious health and safety risks to one or more workers (for example, unsafe equipment or hazardous exposure) must be addressed immediately, and temporary safety measures shall be put in place as soon as practicable, regardless of the 15-day timeframe.

Step 2 – RS Sitanala GRM / PMU Level. The RS Sitanala GRM focal point or PMU shall handle complaints that could not be resolved satisfactorily at the Employer level. Receipt shall be acknowledged within 7 calendar days, and the case shall be investigated in consultation with Human Resources, K3RS/OHS, and the relevant Contractor or hospital unit. The complainant shall be informed in writing of the decision and proposed actions within 30 calendar days from receipt of the complaint at this level. If the complainant remains dissatisfied, the GRM focal point shall inform the complainant of the possibility to submit the case to the Regional Manpower Office.

Step 3 – Regional Manpower Office (Disnaker). If an internal resolution cannot be achieved or is not satisfactory, the affected worker may file a complaint with the Regional Manpower Office (Disnaker) for mediation and further action in accordance with Indonesian labor regulations. RS Sitanala and/or the Employer shall cooperate with Disnaker by providing relevant information and attending mediation sessions as required.

Step 4 – Industrial Relations Court. If the grievance still cannot be resolved satisfactorily through mediation, the affected worker may bring the case to the Industrial Relations Court, following applicable laws and procedures. The decision of the Court shall be final and binding on the parties.

These procedures shall be reflected in contracts and tender documents for project workers and communicated during induction and orientation sessions, so that all workers – whether RS Sitanala staff or contracted workers – understand the available channels, steps, and timelines for raising concerns related to labor and working conditions.

10.11 Grievance Redress Procedures for GBV and SEAH

RSUP Dr. Sitanala shall establish a dedicated, confidential, and survivor centred grievance pathway for complaints involving Gender Based Violence, Sexual Exploitation and Abuse, and Sexual Harassment. This pathway shall operate separately from the general grievance mechanism and may be used by patients, caregivers, visitors, hospital staff, students, trainees, contractors, subcontractors, suppliers, and community members affected by the expansion of the Central Surgery Installation, Integrated Oncology Center, and Neurology Urology Center. Complaints may be submitted through a dedicated telephone or WhatsApp number, a dedicated email address, direct reporting to a trained GBV and SEAH focal point, or a secure written reporting option. The hospital should designate at least one trained female focal point wherever possible. Complainants may report anonymously and may bypass the regular reporting hierarchy, including where the alleged perpetrator is a supervisor, manager, contractor representative, clinician, or other person in a position of authority.

All GBV and SEAH complaints shall be managed using a survivor centred and trauma informed approach that prioritizes the safety, confidentiality, dignity, wishes, and informed consent of the survivor. The designated focal point shall conduct an initial safeguarding assessment within 24 hours after receiving a complaint to identify immediate safety concerns and determine whether urgent protection measures are needed. With the survivor's informed consent, the focal point shall facilitate referrals to appropriate medical, psychosocial, legal, protection, and child protection services. Where the survivor is a child, the hospital shall apply relevant child protection requirements and referral

procedures. Mediation, reconciliation, or direct confrontation between the survivor and the alleged perpetrator shall not be used to resolve GBV or SEAH complaints.

GBV and SEAH case records shall be kept securely, with access limited to authorized focal points and personnel who require the information for survivor support, safeguarding, or formal action. Monitoring reports shall use anonymized and aggregated information only, such as the number of complaints, broad case category, referral status, and resolution status. The report shall not disclose names, contact details, medical information, locations, or any other information that may identify a survivor. All staff who receive or manage these complaints shall receive training on confidentiality, survivor centred communication, informed consent, referral procedures, child protection, and prevention of retaliation. Any retaliation against a survivor, complainant, witness, or focal point shall be treated as a serious grievance and subject to prompt corrective action.

Substantiated cases involving hospital workers, students, contractors, subcontractors, consultants, suppliers, or service providers shall result in disciplinary action in accordance with applicable codes of conduct, employment rules, and contractual provisions. Sanctions may range from written warnings and mandatory corrective training to suspension, dismissal, removal from the project, or termination of contract. These administrative actions do not prevent survivors from seeking criminal, civil, labour, professional, or other remedies under Indonesian law. All project workers, including contractor and subcontractor personnel, shall sign a code of conduct prohibiting GBV, SEA, and SH before beginning work and shall receive induction training and periodic refresher training. Contractors shall be required through their contracts to enforce these provisions and cooperate with the hospital's safeguarding.

Grievance Steps

Step 1: RSUP Dr. Sitanala GRM Focal Point

Complaints shall first be submitted to the RSUP Dr. Sitanala Grievance Redress Mechanism focal point through channels that will be publicly disclosed by the hospital. These channels should include a telephone number, WhatsApp or SMS number, dedicated email address, hospital website or digital complaint platform, written complaint boxes located in accessible public areas, and direct verbal reporting to designated personnel at the information desk, Quality Unit, Public Relations Unit, or patient service desk. The hospital should ensure that complaint boxes and reporting areas are accessible to women, persons with disabilities, older persons, and patients who may require assistance. Receipt of a general complaint should be acknowledged within seven calendar days, and the hospital should aim to provide a resolution within 14 calendar days after acknowledgement. GBV and SEAH complaints shall not follow this standard timeline where immediate safeguarding action is required. Such cases shall be immediately referred to the designated GBV and SEAH focal point for action within 24 hours.

169. Telephone: 021 - 5523059

170. WhatsApp / SMS: 08119997473

171. Email: rsupdr.sitanala@gmail.com

172. Website: https://rsup-drsitanala.go.id/complain/

Step 2: Hospital Management and Project Implementation Unit

If the complainant is not satisfied with the Step 1 resolution, they may escalate the complaint to RSUP Dr. Sitanala Hospital Management or the Project Implementation Unit responsible for project related activities. Escalation may use the same complaint channels and should clearly state that the complaint is an appeal of the Step 1 decision. The Hospital Management or Project Implementation Unit shall acknowledge receipt within seven calendar days and aim to provide a reviewed resolution within 14 calendar days after acknowledgement. GBV and SEAH complaints shall not be referred to the alleged perpetrator's line manager, contractor supervisor, or any person with a potential conflict of interest.

Step 3: Ministry of Health or Higher Authority

If complainants remain dissatisfied with the Step 2 resolution, they may submit the grievance to the Ministry of Health unit responsible for supervising RSUP Dr. Sitanala or to another competent higher authority. Contact details for this step should be disclosed in public grievance information materials, on the hospital website, at public information desks, and in construction area notices. The Ministry of Health or relevant authority should acknowledge the complaint within seven calendar days and aim to provide a response within 14 calendar days after acknowledgement. Complainants retain the right to seek external remedies at any stage through relevant institutions, including the Ombudsman, inspectorates, professional bodies, law enforcement agencies, labour dispute mechanisms, or courts.

10.12 Proposed Project's Redress Procedures for Submitting Grievance through AIIB

AIIB's Project-affected People's Mechanism (PPM) is an independent accountability mechanism for people who believe they have been, or are likely to be, directly and materially adversely affected because AIIB failed to implement its Environmental and Social Policy. Under the current PPM framework, project-affected people are generally expected to make good-faith efforts to raise the issue first through the Project-level GRM and AIIB Management's grievance process, subject to the exceptions provided in the PPM Policy (for example, where a mechanism is not functioning or use could create a risk of retaliation). The PPM is not a routine appeal stage of the Project GRM. https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/submission/index.html. The PPM is administered independently by AIIB's Complaints-resolution, Evaluation and Integrity Unit (CEIU) and reports to AIIB's Board. The revised PPM Policy became effective on 1 January 2026. Current information, eligibility requirements, submission channels, and forms should be verified at the time of each public disclosure at https://www.aiib.org/ppm.

10.13 Roles and Responsibilities

Table 64 Role in GBV and SEAH Cases

Stakeholder	Primary role	Key responsibilities	Role in GBV and SEAH cases
Hospital Director	Overall accountability and oversight	Approves the GRM policy, appoints focal points, ensures staff and budget availability, reviews GRM performance, and ensures corrective actions are implemented	Ensures survivor centred procedures, confidentiality, and non retaliation are enforced

Stakeholder	Primary role	Key responsibilities	Role in GBV and SEAH cases
Project Implementation Unit	Project coordination	Coordinates GRM implementation for the Central Surgery Installation, Integrated Oncology Center, and Neurology Urology Center. Monitors contractor compliance and reports project grievances	Immediately refers project related GBV and SEAH complaints to the designated focal point
Environmental and Social Safeguards Team	Safeguards compliance	Integrates the GRM into safeguards procedures, monitors grievance trends, supports consultation, assesses risks, and verifies corrective actions	Monitors GBV and SEAH prevention measures without accessing survivor identifying information
GRM Focal Point	General grievance receipt and coordination	Receives, registers, acknowledges, classifies, tracks, and coordinates resolution of general grievances	Immediately refers GBV and SEAH complaints to the GBV and SEAH Focal Point
GBV and SEAH Focal Point	Confidential safeguarding and referral	Receives confidential complaints, conducts safeguarding assessment within 24 hours, obtains informed consent, provides referrals, and maintains secure records	Leads survivor centred case handling and protects confidentiality
Community Liaison Officer	Community communication	Shares information on the GRM with patients, caregivers, staff housing occupants, visitors, and local communities. Supports accessible consultation and reporting	Provides information on confidential reporting options and refers survivors without requesting unnecessary details
Contractor Representatives	Contractor compliance	Ensures worker compliance with codes of conduct, maintains worker grievance channels, provides training, and reports compliance to the Project Implementation Unit	Must immediately report suspected cases and must not investigate, mediate, pressure, or retaliate against survivors
Human Resources Unit	Employment related grievance handling	Manages grievances related to recruitment, promotion, training, remuneration, workplace conditions, discrimination, and staff conduct	Supports disciplinary action for substantiated cases involving hospital staff

Stakeholder	Primary role	Key responsibilities	Role in GBV and SEAH cases
Quality Unit and Patient Relations Unit	Patient complaints and service quality	Manages complaints concerning patient care, privacy, waiting times, communication, service access, and facility conditions	Immediately refers sensitive complaints and does not record confidential case details in routine systems
Legal Unit and Ethics Committee	Legal compliance and ethical oversight	Provides guidance on hospital procedures, patient rights, ethics, confidentiality, disciplinary action, and external remedies	Provides legal and ethical guidance while respecting survivor wishes and informed consent
Occupational Health and Safety Unit	Workplace safety	Addresses grievances concerning unsafe conditions, accidents, hazardous exposure, worker facilities, fatigue, and workplace violence	Supports immediate safety measures while protecting confidentiality
Hospital Management	Appeal review and institutional action	Reviews complaints escalated from Step 1, approves management level corrective actions, and oversees complex grievances	Reviews anonymized information only, unless authorized involvement is necessary
Ministry of Health	Higher level oversight	Receives unresolved appeals, provides oversight, supports institutional corrective action, and monitors compliance	Receives anonymized and aggregated monitoring information only
Local government agencies and service providers	External referral and support	Provide health, psychosocial, protection, disability, social assistance, child protection, legal aid, and safety services	Receive referrals with informed consent, except where child protection or legal reporting duties apply

10.14 Monitoring and Reporting

The Project shall maintain a grievance database and periodically monitor:

- number of grievances received;
- grievance categories;
- grievance sources;
- response times;
- resolution rates;
- unresolved grievances;
- recurring issues and trends; and
- stakeholder satisfaction with grievance outcomes.

Monitoring results shall be used to improve project performance and strengthen environmental and social management measures.

10.15 Relationship with Legal and Administrative Remedies

The GRM does not replace or restrict access to judicial, administrative, or other legal remedies available under Indonesian law.

Stakeholders retain the right to pursue grievances through courts, government agencies, law enforcement institutions, ombudsman services, or other legally recognized dispute resolution mechanisms at any time.

The Project GRM is intended to complement, rather than substitute for, these formal mechanisms by providing a more accessible and timely avenue for addressing concerns at the project level.

10.16 Existing Baseline at The Project

The Project already operates an institutional patient-feedback and complaint management system in accordance with the requirements of Permenkes No. 4 of 2018 concerning Hospital Obligations and Patient Rights. Existing channels include Customer Service units, telephone hotlines, physical complaint boxes, and electronic complaint submission through the hospital website.

These mechanisms primarily address complaints related to healthcare services, patient experiences, hospital administration, and operational issues. However, the proposed hospital redevelopment project may generate additional environmental and social concerns that extend beyond the scope of routine hospital operations, including construction impacts, community health and safety issues, stakeholder engagement concerns, traffic management, resettlement-related matters, and contractor conduct.

Accordingly, the Project GRM will build upon, integrate with, and where necessary expand the existing institutional complaint management system to ensure that project-related grievances can be effectively received, managed, and resolved throughout the construction and operational phases.

10.17 RS-Specific Adaptations

Adaptations specific to The Project that distinguish this GRM from a generic hospital-redevelopment GRM are:

- Dedicated channel for the eks-pasien kusta community - culturally and stigma-sensitive engagement; community liaison maintained continuously throughout the construction and operational phases.
- Channel for displaced households (26 rumah dinas + cooperative members) - co-designed with the parallel RAP team; integrated with the RAP grievance framework.
- Patient-and-caregiver-specific channel - accommodating mobility impairment, intensive-care context, and post-operative / isolation context.
- Heritage chance-find channel - integrated with the Heritage Adviser framework (Chapter 7.3).
- Aircraft-noise-related grievance routing - coordination with the Soekarno-Hatta operating airport authority for grievances arising from cumulative metropolitan noise loadings.

11 IMPLEMENTATION ARRANGEMENTS

11.1 Institutional Roles and Responsibilities

Implementation of this ESIA-ESMP is structured around a layered institutional architecture spanning the Ministry of Health Project Implementation Unit, The Project institutional units, the Construction Contractor(s), the Implementation Consultant, and AIIB safeguards. Roles and responsibilities are summarised below:

Table 65 Institutional Roles and Responsibilities

Entity	Role and Responsibilities
Ministry of Health (Kemenkes)	Project owner; ultimate accountability for compliance with the AIIB ESP, applicable ESSs, ESEL, Legal Agreements, and agreed ESMP/ESAP commitments; Directorate General of Tertiary Health Services provides direct oversight.
Project Implementation Unit (PIU) within Kemenkes / The Project	Day-to-day project management and ESIA-ESMP implementation oversight; PIU Director as accountable officer; integrated PMU function.
The Project Direksi (Hospital Director)	Chairs Project Steering Committee; monthly review of progress, ESF compliance, GRM, risk; ultimate beneficiary accountability.
The Project Environmental Management Unit (institutional)	Operational-phase E&S management; integration with the existing Bagian K3 dan Sanitasi Lingkungan; supported by an institutional Environmental and Social Officer.
Project Steering Committee (PSC)	Multi-stakeholder oversight; monthly to quarterly review; attended by Kemenkes, Hospital, Banten DLH, AIIB observer.
Implementation Consultant (Construction Management Consultant - CMC)	External supervision; monthly site inspections; quarterly compliance reports; AIIB direct reporting; independent audit of the C-ESMP.
Detailed Engineering Design Consultant (DEDC)	Design fidelity to the FS; integration of Smart and Green Hospital provisions; design-stage E&S risk control.
Equipment Consultant (EQC)	Procurement and commissioning quality assurance; biomedical equipment safety; LINAC and Nuclear Medicine specific protocols.
Construction Contractor(s)	Site-level implementation of ESMP measures; C-ESMP prepared and approved before mobilisation; SMK3 framework; daily safety briefings; first-line GRM.

Entity	Role and Responsibilities
DLH Provinsi Banten / Tangerang City	Regulatory authority for AMDAL persetujuan and RKL-RPL semester reporting (SI-PELITA).
Disbudpar Tangerang City and BPCB Banten	Heritage liaison; any Cagar Budaya verification outcomes; Chance Find Procedure escalation.
AIIB Safeguards Team	Periodic E&S supervision; quarterly progress reporting receiver; annual ESF Compliance Report receiver; No-Objection authority.

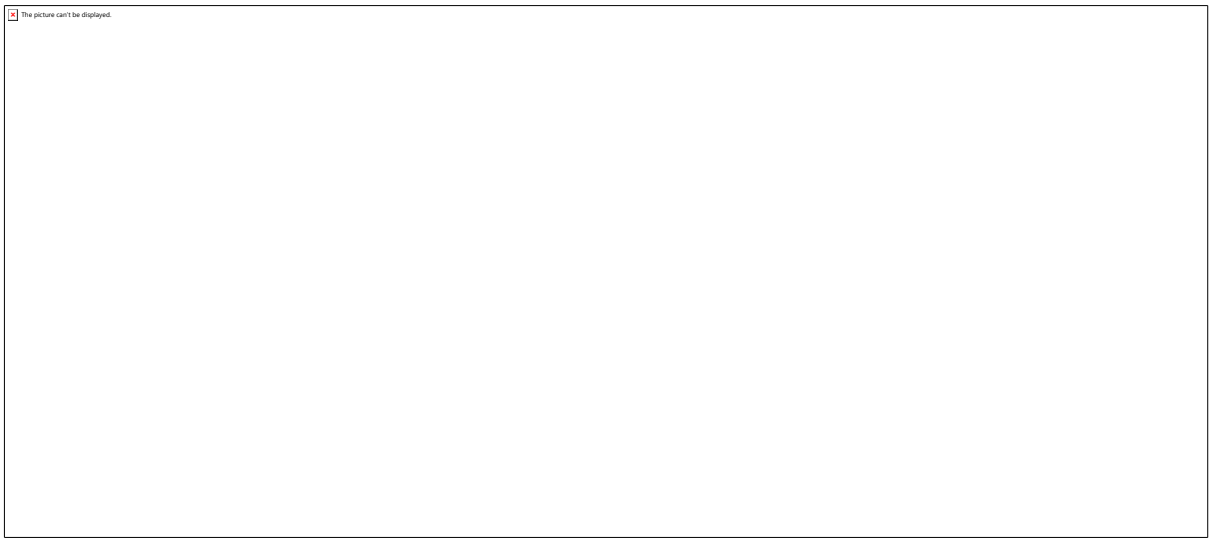


Figure 45 Organization Chart of Project Management Unit (PMU) of Sitanala Hospital



Figure 46 Organization Chart of Project Implementation Unit (PIU) of Sitanala Hospital

11.2 Capacity Building

Capacity building is targeted across four audiences - PIU staff, Contractor workforce, institutional Hospital staff, and wider stakeholders - to ensure that ESF expectations are operationally embedded throughout The Project lifecycle:

Table 66 Capacity Building Target Audiences and Training Components

Target Audience	Training Components
PIU and PMU Staff	ESF orientation; AIIB-specific safeguards training (PM and ESO); GRM training; heritage management; Climate Risk and GHG inventory; RAP-ESS2, GBV/SEAH awareness training training.
Contractor Workforce (mandated via construction contract)	H&S induction for all workers (SMK3 + IFC GHS + ILO Core Conventions); ESMP induction for site management; trade-specific training (working at heights for 7–8 storey buildings, electricity, confined spaces, asbestos awareness); GBV/SEAH awareness; heritage-awareness for demolition crews; first-aid and emergency response.
The Project Institutional Staff	ESF principles integrated into routine clinical/operational training; infection prevention; indoor air quality; waste segregation (B3, B5, non-B3); energy and water efficiency; institutional GRM operation.
Wider Stakeholders	Briefings for patient and family caregiver community; periodic workforce consultation on ESF; engagement with Pemkot Tangerang and BPBD Banten on disaster-management coordination; community-level sessions on construction-phase expectations.

The Master Plan capacity-building target of 710 personnel for international clinical training (with at least 65% female participation) - funded under the Human Capital Investment component of the loan - provides an institutional platform that is complementary to (but distinct from) The Project-specific ESF capacity building.

12 MONITORING ARRANGEMENTS

Table 67 Environmental Monitoring Plan

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
A	**PRECONSTRUCTION**						
A.1.	**ENVIRONMENTAL**						
1.	Failure to incorporate climate change risk into project	Implementation of climate resilience and adaptation measures in project design	Hospital management	▪ Climate Risk & Vulnerability Assessment (CRVA) report reviewed and signed off ▪ H&H modelling outputs (Q100 + 20% climate uplift) reviewed against site FFL ▪ Verification that FFL ≥ DFL+0.5 m freeboard	Once at concept design, once at detailed design (minimum two review cycles)	Feasibility Study/ Engineering Design stage	25,000,000 – 50,000,000
2.	Failure to incorporate environmental and social considerations in the detailed engineering design (DED)	Integration of environmental and social requirements into project design	Hospital management	Review the design	At least two times during detailed design stage (draft report – final draft_	Feasibility Study/ Engineering Design stage team	25,000,000 – 50,000,000
		Flood-resilient design parameters	Three new buildings (IBS, Oncology, Neurology-Urology) + site-wide stormwater & basement areas	▪ Review of hydrology & hydraulics (H&H) modelling report against Cisadane catchment data ▪ Verification of Design Flood Level (DFL) Q100 + climate uplift on drawings ▪ Drainage capacity calculations reviewed against Q25 design storm + 20% uplift ▪ SUDS / detention pond sizing check ▪ Basement waterproofing & flood-gate specifications verified in MEP drawings	At each design milestone - minimum 4 reviews	Hospital management + Engineering Design Consultant + Independent peer reviewer	50,000,000 – 100,000,00
3.	Non-compliance with the KKPR	Permit compliance and spatial conformity	Project area and administrative offices	Review of permit documents and coordination records with authorities	Quarterly	Project Proponent & Licensing Team	15,000,000
4.	Aviation safety	Compliance with KKOP and OLS requirements	Rooftop helipad, building rooftop, surrounding airspace	Aviation safety audit and coordination reports with aviation authorities	Quarterly	Hospital Management & Aviation Consultant	15,000,000
5.	Environmental quality baseline (groundwater, surface water, ambient air, noise, soil	Baseline physical, chemical and microbiological parameters per applicable standards	Project site and surroundings	Laboratory sampling and analysis (BBLK / KehatiLab)	3–4 sampling events during pre-construction; UKL-UPL/AMDAL assistance monthly	Project Proponent / Environmental Consultant	IDR 63,272,000 total (incl. sampling personnel; based on actual laboratory quotations)

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
	microbiology) and UKL-UPL/AMDAL assistance						
A.2.	**SOCIAL**						
1.	Rising community expectations regarding the project and hospital services	Community comprehension levels regarding project parameters; volume of complaints, aspirations, and inquiries	Effectiveness of public communication and alignment of community understanding with project information	Area surrounding The Project and directly affected communities (RT/Kelurahan around the project site)	▪ Number of socialization, public consultation, and stakeholder engagement activities conducted • Community feedback results (feedback forms/comprehension surveys) Level of alignment between community understanding and official project information	Monthly during the preconstruction phase and at every public consultation activity	60,000,000
			Number and characteristics of complaints related to community expectations	Area surrounding The Project and the project's direct influence zone	• Number of expectation-related complaints (GRM log) • Complaint categories (employment expectations, services, compensation, social benefits) Complaint response and resolution time	Monthly (GRM recap) and ad-hoc for critical cases	
			Effectiveness of stakeholder engagement and project information dissemination	Project area and public consultation points	• Number of stakeholder engagement meetings • Attendance rate of key stakeholders (community leaders, vulnerable groups, etc.) Availability and distribution of public information materials	Every engagement activity + quarterly evaluation	
2.	Exclusion of vulnerable groups from consultation meetings	Identification and mapping of vulnerable groups	Project influence area and communities surrounding The Project	List of identified vulnerable groups and stakeholder database updates	Before every major consultation activity	E&S Team, Social Consultant	60,000,000
		Level of representation of vulnerable groups in	Socialization and public consultation venues	Evaluation of attendance lists by participant category (women, elderly, persons with disabilities, low-income communities, marginalized groups).	Every consultation activity	E&S Team	

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		socialization and public consultation activities					
B	**CONSTRUCTION**						
B.1.	**ENVIRONMENTAL**						
1.	Air Quality	▪ Ambien Air Quality : (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, TSP) ▪ Generator Emission : - 500 kVA (CO, NOx) - 1000 kVA (CO,NOx,SO_2,Particulate)	▪ Ambien Air Quality : Front, Middle and Back Yard ▪ Emission : 500 kVA and 1000 kVA generator	Ambient air quality 24-hour measurement (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, TSP) using calibrated monitoring equipment.	Monthly during construction	EPC Contractor - HSE Team	IDR 6,120,000 for construction period (PM10/TSP, 6 sampling events, incl. sampling personnel; actual laboratory quotation)
2.	Noise	Noise level (dBA)	Front, Middle and Back Yard	Noise quality 48-hour continuous measurement (weekend and weekday) using noise level meter	Monthly during construction	EPC Contractor - HSE Team	IDR 5,520,000 for construction period (6 sampling events, incl. sampling personnel; actual laboratory quotation)
3.	Vibration	Ground vibration level	Nearest settlement and nearest inpatients at The Project	Ground vibration monitoring using vibration meter during piling and heavy construction works	During piling activities	EPC Contractor - HSE Team	20,000,000 – 50,000,000
4.	Asbestos Containing Material	ACM / Suspect ACM inventory	Area that has been demolished and future demolition area	Update asbestos register, location map, photo documentation, material condition, risk category, and lab confirmation status.	Initial before construction; update monthly or whenever new suspect material is found.	Contractor & EHS Team	IDR 15,000,000 – 30,000,000 initial; IDR 3,000,000 – 5,000,000/month update
		Confirmation of suspect ACM		Additional laboratory testing using PLM, XRD phase matching, or TEM where needed, especially before demolition/renovation.	Before any work that may disturb suspect ACM; additional testing if new suspect material is identified.		IDR 3,000,000 – 8,000,000/sample for PLM/XRD; IDR 8,000,000 – 15,000,000/sample for TEM
		Physical condition of suspect ACM		Visual inspection of cracking, breakage, weathering, friability, loose fragments, exposed edges, or deterioration. Include photo log.	Monthly during normal conditions; weekly where construction activity is nearby; immediately after damage, storm, or incident.		IDR 5,000,000 – 10,000,000/month

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		Area labeling and warning signage		Check whether ACM/suspect ACM areas are clearly labeled, warning signs are visible, and labels remain intact.	Monthly; weekly during construction nearby.		IDR 1,000,000 – 2,000,000/inspection; signage allowance IDR 5,000,000 – 10,000,000
		Access restriction to risk areas		Verify barricades, restricted access signs, temporary fencing, locked areas, and no unauthorized entry.	Weekly during construction; monthly during operation.		IDR 2,000,000 – 5,000,000/month
		Contractor work control near suspect ACM		Review Permit to Work, Job Safety Analysis, method statement, Asbestos Management Plan, PPE plan, and dust control method before work starts.	Before each maintenance, renovation, demolition, drilling, cutting, or roof/plafon work.		IDR 5,000,000 – 10,000,000 per work package review
		Airborne fiber monitoring		Personal and/or area air sampling for asbestos fibers using recognized methods such as PCM/NIOSH 7400, with TEM confirmation if required.	Baseline before ACM disturbance; daily or per shift during removal; clearance monitoring before area handover/reoccupation.		IDR 15,000,000 – 35,000,000 per monitoring event; IDR 50,000,000 – 120,000,000 per removal campaign
		Housekeeping and debris control		Check that no broken ACM debris, dust accumulation, dry sweeping, uncontrolled cutting, or exposed waste is present.	Daily during active works; weekly for surrounding areas.		Included in contractor HSE cost; supervision check IDR 2,000,000 – 5,000,000/inspection
		PPE and decontamination compliance		Check use of respirators, disposable coveralls, gloves, eye protection, wet methods, decontamination area, and controlled removal procedure.	Daily during ACM-related works.		Included in contractor cost; independent monitoring IDR 3,000,000 – 7,000,000/day during active works
		Training and awareness		Training attendance records, toolbox meeting records, understanding of ACM locations, prohibition on disturbing suspect ACM, and emergency reporting.	Before mobilization; refresher every 3–6 months; for all new workers/contractors.		IDR 10,000,000 – 25,000,000/session
		Asbestos / B3 waste management		Check waste packaging, double wrapping/bagging, labeling, temporary	Every time ACM waste is generated; weekly check		Monitoring/admin IDR 5,000,000 –

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
				storage, licensed transporter, waste manifest, and final disposal evidence.	if waste is stored temporarily.		10,000,000/event; transport/disposal cost separate
		Corrective action close-out		Track non-compliances, damaged ACM reports, corrective action register, responsible party, and completion evidence.	Monthly; immediately after any incident or non-compliance.		IDR 3,000,000 – 5,000,000/month
5.	Solid waste pollution	Waste segregation, waste storage condition, waste volume	Laydown area	Inspection of waste segregation, storage condition, transportation, and disposal records	Weekly	EPC Contractor - Waste Management Team	15,000,000 – 40,000,000
6.	Wastewater pollution	BOD, COD, TSS, pH, oil & grease, ammonia, total coliform, and wastewater discharge flow	WWTP outlet	Wastewater quality monitoring is conducted by collecting and testing effluent samples from the wastewater treatment plant using calibrated methods and equipment in accordance with applicable standards. The monitoring results are compared with the applicable hospital wastewater quality standards	Monthly during construction	Contractor – HSE Team	IDR 27,324,000 for construction period (chemical effluent testing IDR 20,520,000 and water microbiology IDR 6,804,000, incl. sampling personnel; actual laboratory quotation)
7.	Natural disasters – flooding	Effectiveness of construction-phase flood mitigation; absence of flood-related work stoppages, worker injuries, or pollution incidents	Excavation pits (IBS, Oncology, Neurology-Urology basements); site perimeter; stockpile and hazardous material storage areas; worker camp; haul roads	▪ Inspection of sheet piles / cofferdams (top elevation ≥ DFL+0.5 m) and perimeter berms ▪ Dewatering pump capacity and N+1 redundancy verified; pump-test records reviewed ▪ Silt-fence, sediment trap, and wheel-wash station condition inspected ▪ Stockpile elevation (≥ DFL+0.5 m) and tarpaulin cover verified ▪ Bunded hazardous material storage (110% secondary containment) inspected	Daily during wet season (Nov–Apr); weekly during dry season	EPC Contractor HSE Manager + Hospital Management + Owner's Engineer / Supervision Consultant	30,000,000 – 60,000,000 per year
8.	Reduction of green/open-space function	Number of trees/vegetation retained or lost	Site clearance area and Green Open Space	▪ On-site visual inspections related to vegetation clearance ▪ Periodic photo documentation before, during, and after construction, as well as inspections of the condition of trees and retained landscape elements ▪ Evaluation of the implementation of rehabilitation and vegetation growth	Monthly during construction	EPC Contractor – Landscape Team	170,000,000

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
9.	Internal road damage	▪ Road surface condition (cracks, potholes, rutting, settlement, pavement deterioration) ▪ Traffic volume and frequency of heavy construction vehicles ▪ Road cleanliness (mud, debris, construction material spillage) ▪ Accessibility of emergency and hospital service routes	▪ Internal hospital roads used by construction vehicles ▪ Main access road to the construction area ▪ Material delivery and equipment mobilization routes ▪ Hospital emergency access routes and service roads	▪ Routine visual inspection and photographic documentation of road conditions before, during, and after construction activities. ▪ Recording and assessment of pavement damage, potholes, cracks, and surface deterioration. ▪ Monitoring heavy vehicle traffic frequency and compliance with designated haul routes and speed limits. ▪ Inspection of road cleanliness and effectiveness of wheel-washing facilities. ▪ Verification of corrective maintenance and road repair activities.	▪ Monthly during construction. ▪ Additional inspections following major equipment mobilization or periods of intensive material transportation.	EPC Contractor –HSE Team	IDR 20,000,000 – 50,000,000 for the construction period
10.	Disruption to existing utilities/ service continuity	▪ Status and continuity of critical utilities serving the operating hospital (potable/PDAM and groundwater supply, electrical power, telecommunication/data, medical gas, sewerage/WWTP, and solid/medical waste collection); number and duration of unplanned service interruptions; utility-related complaints received.	▪ Construction work fronts at the three new buildings (Central Surgical Installation/IBS, Integrated Oncology Center, and Neurology & Urology Center) and the adjacent operating hospital facilities and utility corridors.	▪ Verification of the pre-construction utility survey and permit-to-dig clearance records; inspection of temporary bypass/rerouting and standby supply provisions; functionality test of standby genset/UPS and surge protection; log of planned and unplanned utility interruptions (cause, duration, affected area); and review of GRM/complaint records.	▪ Daily during ground-disturbing and utility-related works; reported monthly; and immediately upon any unplanned interruption incident.	EPC Contractor (MEP & HSE Team) and Hospital Facility Management (IPSRS); supervised by the PIU/Project Owner.	100,000,000 – 200,000,000
11.	Project clean water quality and hazardous building material testing	▪ Drinking water package; VOC and heavy metals (paint, thinner)	▪ Project site facilities and material storage areas	▪ Laboratory testing	▪ Clean water 4x; hazardous materials 2x during construction period	Contractor / Environmental Consultant	IDR 8,665,000 for construction period (incl. sampling personnel). Total construction-phase environmental laboratory monitoring: IDR 47,629,000
B.2.	**SOCIAL**						

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
1.	Potential disruption to patients due to construction activities	Construction noise levels; ambient air/dust quality within The Project perimeter; feedback/complaints from patients and medical staff; efficiency of patient and ambulance access; adherence to construction schedules	Hospital construction zone, active healthcare units, patient and ambulance access routes, inpatient wards, and sensitive facilities (e.g., laboratories)	Monitoring of noise and ambient air quality; sensory and instrument-based field observations; aggregation of patient/community grievances; verification of noise barriers and dust controls; evaluation of internal traffic management	Daily during primary construction activities; weekly for evaluating grievances and service access; monthly for environmental monitoring	Execution: EPC Contractor – HSE Team; Oversight: Hospital Management	150,000,000
2.	Community expectations regarding priority for local labor	Volume of local workers recruited; transparency levels of the hiring process; count of labor-related community complaints; job opportunity socialization targeting affected neighborhoods (RW 001, RW 002, RW 003, RW 012, and RW 013)	Project vicinity, project office, and affected community zones at the RW level.	Auditing recruitment data; documenting labor socialization sessions; tracking GRM entries on labor; conducting interviews with residents and stakeholders	Monthly throughout the recruitment and construction phase; upon every new onboarding cycle	EPC Contractor – HRD & Community Relations	75,000,000
3.	Uncontrolled growth of new food stalls/kiosks	▪ Number, location, authorization status and date first observed for all stalls/kiosks. ▪ Zero unauthorized stalls within the hospital compound or designated exclusion zones; 100% of emergency, ambulance, fire and pedestrian routes unobstructed. ▪ Adequacy and use of approved canteen/catering capacity, including meal availability, price and operating hours. ▪ For any approved vendor: registration, food-hygiene/WASH, waste	Construction and hospital gates; ambulance, emergency and fire access; boundary areas; adjacent roads, sidewalks and drains; worker camp/canteen and meal areas; and any formally designated vending area.	▪ Pre-mobilization geotagged photo baseline and mapped vendor register. ▪ Daily gate/security observation log and immediate reporting of new stalls or access obstruction. ▪ Weekly joint HSE/Community Relations walkover using a checklist, photographs and mapped locations. ▪ Review canteen/catering utilization, approved-vendor inspection records, cleaning/waste logs, fire checks, traffic/ambulance incidents, GRM records and corrective-action closure. ▪ Monthly trend analysis in the Contractor E&S report, including verification that any vendor engagement or relocation followed documented due process.	▪ Once before mobilization for the baseline. ▪ Daily visual observation at gates and critical routes. ▪ Weekly formal inspection during construction. ▪ Monthly consolidated review and reporting. ▪ Immediately after a new stall, complaint, access obstruction, food-safety event or fire/sanitation incident is identified.	Implementation and recordkeeping: EPC Contractor - Community Relations, HSE, Site Logistics/Canteen Manager and Security. Monthly verification: PIU E&S Officer and RS Sitanala Management. Local-authority participation where public land, food safety or relocation is involved.	IDR 20,000,000-40,000,000/year

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		and wastewater, pest, LPG/electrical and fire-safety compliance. ▪ Waste/litter, drain blockage, odors, traffic/pedestrian conflicts, fires, foodborne-illness events and other incidents. ▪ Number and status of grievances, notices, corrective actions and any livelihood-screening/transition records.					
4.	Disease transmission	Worker health screening compliance	Worker camp / local clinic	Review of pre-employment medical certificates (Surat Keterangan Sehat) and periodic medical screening records	Pre-employment: each new worker intake batch.	PIU E&S Officer;	
		Vector breeding sites (Aedes aegypti larvae)	Excavation pits, basement works, material laydown areas, formwork, drainage channels within construction zone	Jumantik-style larval survey	Monthly during wet season (Oct–Mar);	Contractor HSE Manager	Included in Contractor HSE overhead (administrative check - no additional laboratory cost beyond Table 42 screening budget)
		WASH facility adequacy and water quality at worker camp	Worker camp / temporary housing; site canteen / catering area; portable toilets and handwashing stations	Physical inspection of WASH facilities	Physical inspection: Quarterly.	Contractor HSE Officer;	
		Communicable disease incidence among construction workers	Worker camp clinic records; Puskesmas Neglasari records (with data-sharing MoU)	Monthly compilation of worker illness records	Quarterly compilation.	Supervised by PIU E&S Officer	IDR 15,000,000 / year
		Worker and community health awareness programme delivery	Construction site (toolbox talk area); Karang Sari Village (community hall / balai RW)	Attendance records and post-session knowledge	Induction: each intake batch.	(survey consumables, ovitrap kits, larvicide test strips)	

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
5.	Spatial disturbance to surrounding land-use activities	Traffic conditions and access flow around the project	Project access roads, hospital access, parking areas, and surrounding local roads	Field observations, documentation of congestion, traffic barriers, and access disruptions occurring during construction	Weekly	Contractor, Traffic Management Officer, E&S Team	275,000,000
		Implementation of Traffic Management Plan (TMP)	All areas affected by material and heavy equipment mobilization activities	Inspection of TMP implementation, compliance of traffic arrangements, and effectiveness of temporary traffic engineering	Weekly	Contractor, Traffic Management Officer	
		Condition of temporary access routes for vehicles and pedestrians	Project area, hospital access, and pedestrian pathways around the site	Inspection checklist for access route conditions, safety, cleanliness, and functionality of temporary access	Weekly	Site Manager, E&S Team	
		Disturbance to hospital operations and ambulance access	Main hospital access, emergency department (ER), parking areas, and ambulance routes	Monitoring the smooth access of ambulances, patients, healthcare workers, and hospital operational vehicles	Weekly	Hospital Management, E&S Team, Contractor	
		Community complaints related to accessibility, mobility, noise, dust, and activity disturbances	Project influence area and GRM system	Review of GRM logbook, number of complaints, complaint types, follow-up status, and resolution time	Monthly	E&S Team,	
		Housekeeping and work area cleanliness	Construction area, public access, and areas surrounding the project	Site cleanliness inspection, material stockpiling, drainage conditions, and physical obstructions on public access	Weekly	Contractor, HSE Officer	
6.	Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH SEA/SH)	Worker compliance with the Code of Conduct (CoC)	Project area, worker facilities, project office	Review of workers who have signed the CoC, inspection of contractor and subcontractor documents	Monthly	HR Manager, Contractor, E&S Team	370,000,000
		Implementation of SEA/SH, GBV, child protection, and professional behavior training	Project area and training facilities	Review of attendance records, training materials, training certificates, and activity documentation	Quarterly	E&S Team, HR Manager, Gender Specialist	
		Level of worker understanding of SEA/SH and GBV policies	Project area and worker facilities	Worker comprehension surveys, random interviews, post-training evaluations	Biannually	E&S Team, Gender Specialist	
		Availability and functionality of gender-sensitive and survivor-	Project office, project area, worker facilities, surrounding communities	Verification of complaint channel availability, accessibility, confidentiality, and publication of reporting mechanisms	Monthly	E&S Team, SEA/SH Focal Point	

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		centered complaint mechanisms (GRM)					
		Number and types of SEA/SH and GBV complaints received	Project GRM system	Review of complaint database, case categories, reporting trends, and case follow-up	Monthly	SEA/SH Focal Point, E&S Team	
		Response time and resolution of SEA/SH and GBV cases	GRM system and case handling unit	Evaluation of report reception time, initial response time, and case handling status	Monthly	SEA/SH Focal Point, E&S Team	
		Effectiveness of referral pathways and victim support services	Project area and referral service institutions	Verification of cooperation with healthcare services, psychologists, legal aid, and social protection	Biannually	E&S Team, Gender Specialist	
		Community socialization on SEA/SH prevention and reporting mechanisms	Project influence area and surrounding communities	Review of socialization documentation, attendance records, communication materials, and activity evaluation results	Biannually	Stakeholder Engagement Officer, E&S Team	
		Contractor and subcontractor compliance with the SEA/SH Prevention and Response Plan	Project area and contractor offices	Compliance audits, implementation document reviews, field inspections, and corrective actions	Quarterly	Project Proponent, E&S Team	
		Overall effectiveness of SEA/SH and GBV program implementation	Project area and project social influence area	Evaluation of case trends, audit results, mitigation effectiveness, lessons learned, and program improvement needs	Annually	Project Proponent, E&S Team, Gender Specialist	
7.	Occupational Health and Safety Risk (OHS) from activities as follows :						
	Working at height	Work-at-height permits, JSA/toolbox talk records, fall protection condition, guardrails/toe boards, exclusion/drop zones, near-miss/incident records.	All roof, edge, shaft, opening, ladder, platform and elevated work areas.	Visual inspection using OHS checklist; review permit, training and rescue records; verify corrective action closure and incident logs.	Daily before work and during shift; weekly HSE audit; after weather change, incident or work-method change.	Contractor HSE Officer and Site Supervisor; Construction Supervision Consultant; PIU/Owner oversight.	IDR 3,000,000/month, included in Contractor HSE budget.

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
	Erection, inspection, and dismantling of scaffolding	Scaffold tag status, inspection checklist, competent scaffolder record, access, guardrails, toe boards, bracing, base plates, load control and unauthorized modification.	All scaffolding and temporary working platforms.	Scaffold inspection checklist and tag verification; review scaffolder competency and inspection records; visual inspection of safe access and loading.	Before first use, daily visual check, weekly formal inspection, and after modification or severe weather.	Contractor HSE Officer, Site Supervisor and certified scaffolder; Construction Supervision Consultant.	IDR 4,000,000/month, included in Contractor HSE budget.
	Demolition works	Approved demolition method statement, utility isolation, exclusion zones, PPE, debris control, dust/noise controls, waste segregation and incident records.	All demolition areas, access routes, debris handling and waste storage points.	Daily field inspection; permit and JSA review; verify barricades, signage, dust suppression and safe waste handling; record non-conformities.	Before demolition starts, daily during demolition, and after any incident or change in method.	Contractor Demolition Supervisor and HSE Officer; Construction Supervision Consultant; PIU/Owner oversight.	IDR 4,000,000/month during demolition, included in Contractor HSE budget.
	Excavation works	Excavation permit, utility clearance, shoring/benching/slope stability, edge protection, safe access/egress, spoil distance, dewatering and trench inspection records.	All trenches, pits, foundations, service corridors and excavation spoil areas.	Excavation checklist; visual inspection of walls, water condition, barricades and spoil placement; verify permit and utility clearance records.	Daily before entry, after rainfall/vibration, and after any change in excavation condition.	Contractor Site Supervisor and HSE Officer; Construction Supervision Consultant.	IDR 3,000,000/month, included in Contractor HSE budget.
	Crane operation and lifting activities	Lifting plan, crane and rigging certification, operator/rigger/signalman competency, ground bearing/outrigger condition, exclusion zone, wind speed and communication.	Crane pad, lifting route, loading/unloading area, laydown area and load landing area.	Pre-lift checklist; review certificates and lifting plan; visual observation during lift; wind-speed check for critical lifts; record deviations.	Before each lift and continuously during critical lifting operations; weekly review during lifting periods.	Contractor Lifting Supervisor, certified operator/rigger and HSE Officer; Construction Supervision Consultant to witness critical lifts.	IDR 5,000,000/month or per major lifting campaign, included in Contractor HSE budget.
	Electrical works	LOTO/permit records, electrician competency, temporary panel condition, cable routing, grounding, ELCB/RCD/GFCI test	Temporary electrical panels, generators, cable routes, powered tools and electrical work areas.	Electrical safety checklist; review LOTO and test records; inspect cable protection, grounding and panel condition; verify corrective action closure.	Daily visual check, weekly formal inspection, and before energizing or modifying temporary electrical systems.	Contractor Electrical Supervisor and HSE Officer; Construction Supervision Consultant.	IDR 3,000,000/month, included in Contractor HSE budget.

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		records, PPE and fire extinguisher availability.					
	Confined space entry	Confined space entry permit, gas test results (O2, LEL, H2S/CO as relevant), ventilation, attendant, communication, rescue equipment and entrant competency.	Manholes, tanks, pits, ducts, utility chambers, basements and other confined spaces.	Permit and gas-test record review; direct observation of entry controls; continuous gas monitoring where required; verify standby and rescue readiness.	Before each entry, continuously during entry, and after any break or change in condition.	Contractor Confined Space Entry Supervisor, HSE Officer and standby attendant; Construction Supervision Consultant verification.	IDR 5,000,000/month or per entry campaign, included in Contractor HSE budget.
	Hot works	Hot work permit, fire watch record, combustibles removal/protection, extinguisher/fire blanket availability, gas cylinder condition, PPE and post-work inspection.	All welding, cutting, grinding, brazing and other hot work areas.	Hot work checklist; direct observation; verify fire watch and post-work inspection; inspect cylinders, hoses and flashback arrestors.	Before each hot work permit, during each shift, and 30-60 minutes after completion as required by site procedure.	Contractor Hot Work Supervisor and HSE Officer; Construction Supervision Consultant; hospital safety representative when near occupied areas.	IDR 3,000,000/month, included in Contractor HSE budget.
8.	Road and Traffic safety	Traffic flow, congestion, traffic incidents	Entrance gate or access road, and nearby settlements, commercial areas, public facilities	▪ Traffic counting at the weekend and weekday. ▪ Traffic incidents. ▪ Road safety implementation	Weekly	EPC Contractor - HSE Team	20,000,000 – 50,000,000
9.	Child labor	Availability and implementation of child labor prohibition policies	Project office, contractor offices, and subcontractor offices	Review of labor policies, recruitment procedures, and contract documents containing child labor prohibitions	Biannually	E&S Team, HR Manager	240,000,000
		Verification of age for all project workforce	Project area, project office, contractor and subcontractor offices	Inspection of worker identity documents (National ID, Family Card, diplomas, or other official documents) and workforce lists	Monthly	HR Manager, Contractor, E&S Team	
		Contractor and subcontractor compliance with child labor prohibition requirements	Project area and contractor offices	Audit of labor documents, worker lists, and field verification	Quarterly	E&S Team, Procurement Officer	
		Supplier compliance with project labor standards	Main supplier locations and related supply chains	Review of supplier documents, supplier self-assessments, and compliance audits as needed	Biannually	Procurement Officer, E&S Team	

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		Implementation of child labor prevention socialization and training	Project office and training areas	Review of attendance records, training materials, activity documentation, and participant evaluation results	Biannually	HR Manager, E&S Team	
		Worker and supervisor understanding of child labor policies	Project area and project office	Random interviews of workers, supervisors, and contractors regarding understanding of Child Labor policies	Biannually	E&S Team	
10.	Underpaid pay and unequal treatment	Compliance of wage payments, overtime, and allowances in accordance with applicable provisions	Project office, contractor offices, and HR unit	Review of pay slips, wage payment lists, overtime, allowances, and payroll documents	Monthly	Human Resources Manager, E&S Team	250,000,000
		Implementation of non-discrimination and equal employment opportunity policies	Project area, project office, and worker facilities	Review of labor policies, recruitment procedures, promotions, performance evaluations, and career development	Biannually	Human Resources Manager, E&S Team	
		Contractor and subcontractor compliance with project labor standards	Project area and contractor/subcontractor offices	Labor audits, employment contract reviews, worker lists, and working conditions	Quarterly	E&S Team, Procurement Manager	
		Number and types of worker complaints related to wages, discrimination, and unfair treatment	Worker Grievance Mechanism (WGM)	Review of complaint database, complaint categories, case trends, and resolution status	Monthly	E&S Team, HR Manager	
		Worker complaint resolution rate	WGM System	Evaluation of response time, resolution time, and worker satisfaction with complaint resolution	Monthly	HR Manager, E&S Team	
		Implementation of workers' rights socialization and non-discrimination policies	Project office and worker facilities	Review of attendance records, socialization materials, activity documentation, and participant evaluation results	Biannually	HR Manager, E&S Team	
		Level of worker understanding of labor rights	Project area and worker facilities	Worker surveys, random interviews, and post-socialization evaluations	Biannually	E&S Team, HR Manager	
C	**OPERATION**						
C.1.	**ENVIRONMENTAL**						

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
1.	contamination from increased volumes of medical waste due to expanded hospital capacity	Medical waste segregation, storage, manifests	Medical waste temporary storage	Inspection of medical waste temporary storage, manifest system, and transportation permits and records from licensed subcontractor.	Weekly inspection and monthly reporting	Hospital Management	IDR 66,000,000 per year (autoclave validation / biological indicator testing, monthly, incl. sampling personnel; actual laboratory quotation)
2.	Wastewater pollution due to expanded hospital capacity	BOD, COD, TSS, pH, oil & grease, coliform, and wastewater discharge flow	WWTP outlet	Effluent wastewater sampling and testing from the wastewater treatment plant (WWTP) are conducted using calibrated testing methods and equipment in accordance with applicable standards. The monitoring activities include assessment of effluent quality, inspection of WWTP operational conditions, recording of wastewater discharge flow rates, and evaluation of compliance with applicable hospital wastewater quality standards.	Quarterly and Monthly reporting	Hospital Management	IDR 182,160,000 per year (WWTP effluent chemical & bacteriological testing, existing and new buildings, monthly, incl. sampling personnel; BBLK tariff & KehatiLab quotation)
3.	contamination from increased volumes of hazardous waste due to expanded hospital capacity	Hazardous waste storage condition and manifest records	Hazardous waste temporary storage	Inspection of hazardous waste temporary storage, manifest records, and transportation permits and records from license subcontractor.	Weekly inspection and monthly reporting	Hospital Management	30,000,000 – 100,000,000 per year
4.	Contamination from radioactive waste	▪ Radiation dose rate (µSv/hr) and surface contamination level (Bq/cm²) on process equipment and waste containers. ▪ Activity concentration of NORM/TENORM radionuclides (e.g. Ra-226, Ra-228, Pb-210) in scale, sludge, and produced-water residues, in Bq/g.	▪ Process equipment with potential NORM scale accumulation; ▪ NORM waste storage/staging areas; ▪ personnel work zones. ▪ Specific monitoring points/coordinates to be determined by the site radiation protection team based on final equipment layout.	▪ Direct radiation survey using a calibrated survey meter/dosimeter. ▪ Representative sampling of scale/sludge with laboratory radionuclide analysis (gamma spectrometry) by a BAPETEN-accredited laboratory.	▪ Indicative: quarterly during normal operations, plus prior to any equipment opening, maintenance, or decommissioning activity.	Project Operator's Radiation Protection Officer/EHS Department, in coordination with a BAPETEN-licensed laboratory/contractor.	30,000,000 – 100,000,000 per year
5.	Solid waste pollution	Waste segregation, waste storage condition, waste volume	Solid waste temporary storage	Monitoring of solid waste segregation, collection, storage, transportation records.	Weekly	Hospital Management	15,000,000 – 40,000,000

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
6.	Nosocomial Infections	Healthcare-associated infection cases and sterilization records	Operating Rooms, ICU, Isolation, Special Treatment Rooms, General Treatment Rooms	Monitoring healthcare-associated infection rates, sterilization procedures, hand hygiene compliance, and IPC implementation	Monthly	Hospital Management	75,000,000 – 250,000,000 per year
7.	Groundwater quality	pH, coliform, heavy metals, detergents, groundwater contaminants; electrical conductivity (EC), chloride (Cl^-), and total dissolved solids (TDS) as early-warning indicators for seawater intrusion	Bore well/deep well	Groundwater sampling and laboratory analysis (pH, coliform, heavy metals, detergents, nitrate)	Semi-annually	Hospital Management	30,000,000 – 80,000,000 per year
8.	Groundwater quantity	Medical waste segregation, storage, manifests	Bore well/deep well	Monitoring groundwater abstraction volume and groundwater table level	Monthly	Hospital Management	15,000,000 – 40,000,000 per year
9.	Natural disasters – flooding	Hospital service continuity during flood events; flood-protection asset condition	IBS, Oncology, Neurology-Urology buildings (basements, ground-floor critical areas, MEP rooms, genset rooms, fuel storage)	▪ Inspection of flood barriers, flood gates, and door seals (IP-65/66) ▪ operability test of sump pump. Back-up genset load and 72-hours reserve check ▪ Drainage and SUDS infiltration capacity inspection ▪ Review of Flood Emergency Response Plan (FERP) and Business Continuity Plan (BCP) ▪ Post-event damage assessment after any flood event	▪ Quarterly: flood barrier, gate, pump, drainage inspection ▪ Bi-annually: full FEWS test and genset load test ▪ Annually: 72-hr fuel reserve audit + flood-resilience compliance audit ▪ Post-event: within 7 days of any flood incident	Hospital Facility & Maintenance Unit	100,000,000 – 200,000,000 per year
10.	Disease transmission	Healthcare-associated infection (HAI) rate and IPC compliance	IBS, Oncology Center, Neurology & Urology Center; all inpatient wards in new buildings	Monthly HAI incidence density. Track IPC Committee quarterly meeting minutes and corrective actions log.	Monthly HAI data compilation.	Komite PPI (IPC Committee	30,000,000/year
		Hand hygiene compliance rate	High-risk wards: oncology, IBS recovery, neurology ICU, post-surgical wards in new buildings	Direct observation audit.	Every 2 weeks (high-risk wards).	Komite PPI (IPC Committee	10,000,000/year

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		HVAC performance and isolation room negative pressure	IBS operating rooms; Oncology Center isolation rooms; negative-pressure rooms in new buildings; AHU plant rooms	Daily pressure differential reading for negative-pressure isolation rooms;	Pressure differential: daily (nursing shift log).	Facilities O&M Contractor	40,000,000/year
		WWTP effluent quality	WWTP outlet (combined final effluent point); each building's pre-treatment unit outlet; receiving water body (drainage channel to Cisadane sub-catchment)	Laboratory analysis of effluent parameters per PermenLHK; BOD_5, COD, TSS, pH, ammonia (NH_3-N), total coliform, free chlorine residual. Compare against Baku Mutu Air Limbah for healthcare facilities.	WWTP effluent: monthly (KAN-accredited laboratory).	Unit Kesling	50,000,000/year
		B3 medical waste segregation, storage, and disposal compliance	Waste segregation points in each ward/unit of new buildings; temporary storage (TPS B3 Limbah); waste transport route	Weekly spot-check of waste segregation compliance at ward level (correct bin use: yellow infectious, red sharps/pathological, black non-hazardous).	Ward spot-check: monthly.	Unit Kesling	15,000,000/year
		Vector surveillance on hospital grounds	Hospital compound grounds (drainage, water reservoirs, rooftop ponding, garden areas); perimeter zone (200 m radius)	Jumantik inspection using ABJ method	Jumantik survey: monthly	Unit Kesling	15,000,000/year
		Staff vaccination coverage and occupational health screening	All clinical and support staff in three new buildings	Annual vaccination coverage rate	Vaccination records: updated continuously, audited annually.	Unit Kesling	15,000,000/year
		Syndromic surveillance and outbreak response readiness	All inpatient wards, ER, outpatient clinics in new buildings	Daily syndromic surveillance log	Syndromic log: daily.	Komite PPI (IPC Committee	10,000,000/year
		Independent IPC performance audit	All three new buildings (IBS, Oncology Center, Neurology & Urology Center)	Annual independent audit by PERSI/PERDALIN-certified external auditor	Annually.		

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		Community health awareness programme delivery and impact	Karang Sari Village; Neglasari Subdistrict (community halls, posyandu, schools)	Attendance records and pre/post knowledge survey for biannual community sessions. Integration with hospital CSR programme documented.	Biannually (sessions).		
		GRM complaints related to disease transmission / environmental health	GRM desk (hospital); online/WhatsApp GRM channel; Kelurahan Karang Sari	Log of health-related grievances from patients, staff, and surrounding community.	Continuous intake.		
11.	Seawater intrusion to the groundwater quality	TDS, electrical conductivity, salinity, chloride, sodium, sulfate, pH, groundwater level, abstraction volume and pumping hours.	Existing groundwater well; water storage outlet fed by groundwater; groundwater well nearest sensitive receptor (community).	Field measurement for EC, TDS, pH and water level; laboratory analysis for chloride, sodium and sulfate; monthly pumping log review; trend evaluation against baseline/applicable standards.	Quarterly water quality monitoring during operation; monthly abstraction log review; additional sampling if TDS/EC/chloride increases or backup well use intensifies.	Hospital Facility Management/Engineering and HSE; accredited environmental laboratory; environmental consultant review if trigger level is exceeded.	Provisional IDR 20,000,000/year for quarterly monitoring and reporting; additional wells/sampling excluded.
12.	Operational environmental and occupational laboratory monitoring	Drinking and sanitary hygiene water; hemodialysis water; surface water; food and utensil/linen swab microbiology; indoor and ambient air quality; noise; workplace environment (incl. lighting, UV, ergonomics, psychology); genset emissions; external quality assurance (PME)	Hospital site (existing and new buildings)	Laboratory sampling and analysis per component	Monthly to semi-annual,	Hospital Management – Environmental Health/Sanitation Unit	IDR 329,140,000 per year (incl. sampling personnel). Total operational environmental laboratory monitoring: IDR 577,300,000 per year (based on actual laboratory quotations)
C.2.	**SOCIAL**						
1.	Hospital service continuity	▪ Approved transition plan, readiness/go-no-go compliance, and completion of each transfer wave. ▪ Number and duration of service interruptions, treatment delays/cancellations,	Origin wards/departments and temporary service areas; designated patient and equipment routes, corridors, lifts, ambulance bays, and staging areas; Central Surgical Building	▪ Review the approved plan, transfer-wave schedule, readiness checklist, go/no-go authorization, contingency, and rollback records. ▪ Observe rehearsals and live transfers; sample patient identification, clinical handover, medication/record reconciliation, monitoring, route, infection-control, and arrival checks.	Plan approved at least 4 weeks before the first transfer. Readiness reviews at T-14 days, T-7 days, and T-24 hours before each wave; continuous observation	Hospital Management	Included in the transition-programme cost (indicative monitoring allocation: IDR 100,000,000-200,000,000).

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		diversions/referrals, and rollback events. ▪ Transfer-related patient safety incidents, including deterioration, falls, and identification, medication, record, specimen, or handover errors. ▪ Equipment damage/downtime and percentage of transferred equipment calibrated, IQ/OQ/PQ-qualified, accepted, and released for use. ▪ Staff coverage and percentage completing orientation, simulation/drills, system access, and competency sign-off. Complaints, corrective-action closure rate, and time to stable operation.	(IBS), Integrated Oncology Center, and Neurology/Urology Center; and backup/referral interfaces.	▪ Audit equipment inventories and chain-of-custody records, vendor/biomedical reports, calibration and electrical-safety results, IQ/OQ/PQ records, and acceptance certificates. ▪ Review duty rosters, orientation and simulation attendance, competency sign-offs, and origin/destination staffing coverage. ▪ Review HIS/appointment, incident, complaint, downtime, cancellation, diversion/referral, and corrective-action logs through a daily transition dashboard and 90-day close-out report.	during transfer; daily review for 7 days and weekly review for 90 days after each wave; immediate reporting/investigation of any serious incident; final review after the 90-day stabilization period.		
2.	Improvement of healthcare services	Capacity and tally of healthcare services; patient satisfaction metrics; patient throughput and service utilization rates; conformity to service standards and institutional accreditation	Active hospital operational zones, medical and non-medical service units, inpatient and outpatient wards	Evaluation of hospital performance indicators; patient satisfaction surveys; quality of care audits; review of hospital operational logs	Monthly for performance indicators; quarterly for patient satisfaction assessments; annually for quality and accreditation audits	Hospital Management / Clinical Quality Team.	120,000,000
3.	Increase in employment opportunities	Proportion of local staff; delivery of workforce training programs; transparency of hiring channels; employee retention rates	Hospital operational footprint, HRD Department, and surrounding neighborhood sectors.	Reviewing employee rosters; evaluating training and human resource development programs; vetting recruitment workflows; conducting personnel interviews	Quarterly; and concurrent with every active recruitment drive	Hospital Management – HRD.	75,000,000

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
4.	Public perception towards waste management	Efficiency of medical and B3 waste handling systems; effluent discharge and environmental quality; volume of eco-centric public grievances; alignment with environmental regulations	B3 Waste Storage Facility, hospital WWTP, operational areas, and surrounding residential communities	Analytical testing of wastewater and environmental samples; inspection of waste storage and processing; logging of public concerns; environmental compliance audits	Semi-annually for environmental site inspections; semi-annually for environmental quality testing	Hospital Management – HSE Team	100,000,000
5.	Potential business opportunities in laundry services	Count of contract agreements with local vendors; adherence to health and sanitation codes in laundry processing; participation metrics of local MSMEs; overall laundry service quality	Hospital laundry facility, operational support wings, and external laundry contractor sites.	Performance evaluation of contracts; physical inspections of laundry sanitation; tracking local vendor shares	Quarterly; with formal vendor appraisals performed annually	Hospital Management – Procurement & General Services	60,000,000
6.	Improvement of patient safety	Rate of patient safety incidents; adherence to patient safety SOPs; execution of patient safety clinical training; medical care quality audits	All clinical service spaces, inpatient/outpatient areas, and surgical/procedural units	Tracking patient safety indicators; performing internal safety audits; evaluating medical incident data; direct observations of SOP implementation	Monthly for incident tracking; quarterly for internal audits; annually for safety system appraisals	Hospital Management – Quality Assurance & Patient Safety Team	150,000,000
7.	Increased demand for local food supply vendors	Count of engaged local vendors; safety and nutritional quality of food supplies; compliance with hygiene and sanitation protocols; stability of supply networks	Nutrition unit, catering/food logistics warehouses, and hospital kitchen zones	Inspections of incoming food supplies; formal vendor performance appraisals; food supply chain monitoring; hygiene and sanitation system audits	Monthly for food raw material checks; quarterly for vendor evaluations	Hospital Management – Nutrition Unit & Procurement	90,000,000
8.	Building Fire	Availability and functionality of fire protection systems	All operational areas of The Project	Inspection and maintenance records of fire alarms, hydrants, sprinklers, smoke detectors, and fire extinguishers	Monthly	Hospital Management / EHS Team	50,000,000
		Implementation of emergency preparedness and response	All operational areas of The Project	Fire drill records, training attendance, and ERP implementation evaluations	Semester	Hospital Management / EHS Team	25,000,000

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
		Electrical system safety	Electrical room, medical equipment room, and operational area	Electrical inspection and preventive maintenance records	Quarterly	Hospital Management / EHS Team	30,000,000
		Accessibility of evacuation routes and emergency exits	All operational areas of The Project	Visual inspection and compliance checklist	Monthly	Hospital Management / EHS Team	10,000,000
9.	Unequal hospital assessed by vulnerable group	Availability and condition of accessibility facilities	Hospital service areas, polyclinics, emergency room, registration areas, waiting rooms, toilets, parking, and building entrances	Inspection of accessibility facilities (ramps, elevators, handrails, accessible toilets, guiding blocks, wheelchairs, priority lanes) using checklists and field documentation	Quarterly	Facilities and Infrastructure Division, E&S Team	350,000,000
		Implementation of inclusive and non-discriminatory service policies	All hospital service units	Review of service SOPs, service observation, and compliance audits against inclusive service standards	Biannually	Hospital Management, Quality Unit, E&S Team	
		Staff competence in serving vulnerable groups	All service units	Review of training implementation, attendance records, training certificates, and post-training evaluations	Biannually	Human Resources Department, Training Unit	
		Number and types of complaints related to access barriers or service discrimination	Hospital complaint system and all service units	Review of complaint database, complaint categories, case trends, follow-up status, and resolution time	Monthly	Complaint Management Unit, E&S Team	
		Resolution rate of vulnerable group complaints	Hospital complaint system	Evaluation of the number of complaints resolved, response time, and follow-up effectiveness	Monthly	Complaint Management Unit, Hospital Management	
		Satisfaction level of vulnerable groups with hospital services	All service units and public service areas	Patient satisfaction surveys covering persons with disabilities, the elderly, women, low-income communities, and other vulnerable groups	Biannually	Quality Unit, E&S Team	
10.	Sexual Exploitation and Abuse (SEA), Sexual	Implementation of the Zero Tolerance policy on SEA/SH and GBV	All hospital units	Review of policies, SOPs, decrees, and evidence of policy implementation	Annually	Hospital Management, Human Resources Department (HRD), E&S Team	350,000,000

No	E&S Risk/Impact	Parameter	Locations	Monitoring Measurement	Frequency	Responsibility	Estimated Cost (IDR)
	Harassment (SH SEA/SH)	Compliance with Code of Conduct (CoC) signing	All work units, contractors, outsourcing, and third parties	Percentage of workers, contractors, student interns, and third parties who have signed the CoC	Biannually	HRD, E&S Team	
		Implementation of SEA/SH, GBV, and professional ethics training	Training rooms, service units, and hospital facilities	Number of training sessions conducted, number of participants, attendance records, and training evaluation results	Biannually	HRD, Training Unit, E&S Team	
		Availability and accessibility of SEA/SH complaint mechanisms	All hospital service areas and the complaint system	Verification of complaint channels, information media, contact numbers, and accessibility of reporting mechanisms	Quarterly	Complaint Management Unit, E&S Team	
		Number and types of SEA/SH reports received	Hospital complaint system	Review of complaint database, case classification, reporting trends, and handling status	Monthly	Complaint Management Unit, E&S Team	
		Effectiveness of SEA/SH case handling	Complaint management unit and all related units	Percentage of cases handled in accordance with SOPs, response time, resolution time, and follow-up documentation	Monthly	Complaint Management Unit, Ethics Committee, Hospital Management	
		Protection of victims and reporters	All related units and the case-handling system	Verification of confidentiality implementation, protection from retaliation, and access to support services	Monthly (as needed)	Case Handling Team, Complaint Management Unit	
		Victims' access to referral services	Hospital and related referral institutions	Number of victims who received medical, psychological, social, or legal services as needed	Monthly (as needed)	Hospital Management, Case Handling Team	
		Socialization of patient rights, worker rights, and SEA/SH prevention	All service areas and public areas of The Project	Documentation of socialization activities, campaign materials, communication media, and number of participants	Biannually	Hospital Public Relations, HRD, E&S Team	
		Compliance audit of SEA/SH policies and the CoC	All hospital units	Document audits, interviews, field inspections, and evaluation of policy implementation	Annually	E&S Team, Internal Audit, Ethics Committee	
11.	Road and Traffic safety	Traffic flow, congestion, traffic incidents	Entrance gate at Sitanala Road	▪ Traffic counting at the weekend and weekday. ▪ Traffic incidents. ▪ Road safety implementation	Monthly	Hospital Management	20,000,000 – 50,000,000

13 BIBLIOGRAPHY AND REFERENCES

This Bibliography compiles the principal regulatory, technical, and methodological sources consulted in the preparation of this ESIA-ESMP. Sub-sections are organised thematically and align with the citation pattern across Chapters 1 to 13 and the Annexes.

13.1 National Regulations of the Republic of Indonesia

The following National regulations are foundational to the assessment:

- Undang-Undang Dasar 1945 - Pasal 28H ayat (1) dan Pasal 34 ayat (3) - hak konstitusional atas lingkungan hidup yang baik dan sehat dan akses fasilitas pelayanan kesehatan yang layak (The 1945 Constitution - Article 28H paragraph (1) and Article 34 paragraph (3) - constitutional rights to a good and healthy environment and access to adequate health care facilities).
- Undang-Undang No. 13 Tahun 2003 tentang Ketenagakerjaan (Law No. 13 of 2003 concerning Manpower).
- Undang-Undang No. 11 Tahun 2010 tentang Cagar Budaya (Law No. 11 of 2010 concerning Cultural Heritage).
- Undang-Undang No. 26 Tahun 2007 tentang Penataan Ruang (Law No. 26 of 2007 concerning Spatial Planning).
- Undang-Undang No. 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan (Law No. 22 of 2009 concerning Road Traffic and Transportation).
- Undang-Undang No. 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (UU PPLH) (Law No. 32 of 2009 concerning Environmental Protection and Management).
- Undang-Undang No. 36 Tahun 2009 tentang Kesehatan (sebelum UU 17/2023) (Law No. 36 of 2009 concerning Health, prior to Law No. 17 of 2023).
- Undang-Undang No. 44 Tahun 2009 tentang Rumah Sakit (Law No. 44 of 2009 concerning Hospitals).
- Undang-Undang No. 6 Tahun 2023 (Cipta Kerja) - penyesuaian UU 32/2009 (Law No. 6 of 2023 on Job Creation - amendments to Law No. 32 of 2009).
- Undang-Undang No. 17 Tahun 2023 tentang Kesehatan (Lembaran Negara RI 2023 No. 105) (Law No. 17 of 2023 concerning Health, State Gazette of the Republic of Indonesia 2023 No. 105).
- Peraturan Pemerintah No. 32 Tahun 2011 tentang Manajemen dan Rekayasa, Analisis Dampak, serta Manajemen Kebutuhan Lalu Lintas (Government Regulation No. 32 of 2011 concerning Traffic Management and Engineering, Traffic Impact Analysis, and Traffic Demand Management).
- Peraturan Pemerintah No. 50 Tahun 2012 tentang Penerapan Sistem Manajemen Keselamatan dan Kesehatan Kerja (SMK3) (Government Regulation No. 50 of 2012 concerning the Implementation of the Occupational Health and Safety Management System).
- PermenLHK No. 5 Tahun 2014 tentang Baku Mutu Air Limbah (Lampiran XLIV - Fasilitas Pelayanan Kesehatan) (Minister of Environment and Forestry Regulation No. 5 of 2014 concerning Wastewater Quality Standards, Annex XLIV - Health Care Facilities).
- Peraturan Pemerintah No. 21 Tahun 2021 tentang Penyelenggaraan Penataan Ruang (Government Regulation No. 21 of 2021 concerning the Implementation of Spatial Planning).

- Peraturan Pemerintah No. 22 Tahun 2021 tentang Penyelenggaraan Perlindungan dan Pengelolaan Lingkungan Hidup (Government Regulation No. 22 of 2021 concerning the Implementation of Environmental Protection and Management).
- Peraturan Pemerintah No. 47 Tahun 2021 tentang Penyelenggaraan Bidang Perumahsakitan (Government Regulation No. 47 of 2021 concerning the Implementation of the Hospital Sector).
- Peraturan Pemerintah No. 28 Tahun 2024 tentang Peraturan Pelaksanaan UU 17/2023 tentang Kesehatan (Government Regulation No. 28 of 2024 concerning the Implementing Regulation of Law No. 17 of 2023 on Health).
- PermenLHK No. 56 Tahun 2015 tentang Tata Cara dan Persyaratan Teknis Pengelolaan Limbah B3 dari Fasilitas Pelayanan Kesehatan (Minister of Environment and Forestry Regulation No. 56 of 2015 concerning Procedures and Technical Requirements for the Management of Hazardous and Toxic Waste from Health Care Facilities).
- Permenkes No. 4 Tahun 2018 tentang Kewajiban Rumah Sakit dan Kewajiban Pasien (Minister of Health Regulation No. 4 of 2018 concerning Hospital Obligations and Patient Obligations).
- Peraturan Menteri Energi dan Sumber Daya Mineral Nomor 31 Tahun 2018 tentang Pedoman Penetapan Zona Konservasi Air Tanah (Minister of Energy and Mineral Resources Regulation No. 31 of 2018 concerning Guidelines for the Determination of Groundwater Conservation Zones).
- Permenkes No. 7 Tahun 2019 tentang Kesehatan Lingkungan Rumah Sakit (Minister of Health Regulation No. 7 of 2019 concerning Hospital Environmental Health).
- PermenLHK No. 4 Tahun 2021 tentang Daftar Usaha dan/atau Kegiatan yang Wajib Memiliki AMDAL, UKL-UPL, atau SPPL (Minister of Environment and Forestry Regulation No. 4 of 2021 concerning the List of Businesses and/or Activities Required to Have AMDAL, UKL-UPL, or SPPL).
- PermenLHK No. 6 Tahun 2021 tentang Tata Cara dan Persyaratan Pengelolaan Limbah B3 (Minister of Environment and Forestry Regulation No. 6 of 2021 concerning Procedures and Requirements for Hazardous and Toxic Waste Management).
- PermenLHK No. 11 Tahun 2021 tentang Baku Mutu Emisi Sumber Tidak Bergerak (Minister of Environment and Forestry Regulation No. 11 of 2021 concerning Emission Standards for Stationary Sources).
- Permenhub No. 17 Tahun 2021 tentang Penyelenggaraan Analisis Dampak Lalu Lintas (Minister of Transportation Regulation No. 17 of 2021 concerning the Implementation of Traffic Impact Analysis).
- Permenkes No. 26 Tahun 2022 tentang Organisasi dan Tata Kerja Rumah Sakit di Lingkungan Kemenkes (sebagaimana diubah) (Minister of Health Regulation No. 26 of 2022 concerning the Organization and Working Procedures of Hospitals under the Ministry of Health, as amended).
- Permenkes No. 40 Tahun 2022 tentang Persyaratan Teknis Bangunan, Prasarana, dan Peralatan Kesehatan Rumah Sakit (Minister of Health Regulation No. 40 of 2022 concerning Technical Requirements for Hospital Buildings, Infrastructure, and Medical Equipment).
- Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No. 8 Tahun 2023 tentang Pedoman Penyusunan Analisis Harga Satuan Pekerjaan Bidang Pekerjaan Umum (AHSP) (Minister of Public Works and Housing Regulation No. 8 of 2023 concerning Guidelines for the Preparation of Unit Price Analysis for Public Works).
- Permenkes No. 9 Tahun 2024 tentang Perubahan Kedua atas Permenkes No. 26/2022 (Minister of Health Regulation No. 9 of 2024 concerning the Second Amendment to Minister of Health Regulation No. 26 of 2022).

- KepMenLH No. 48 Tahun 1996 tentang Baku Tingkat Kebisingan (Minister of Environment Regulation No. 48 of 1996 concerning Noise Level Standards).
- Keputusan Menteri Kesehatan RI No. HK.01.07/MENKES/1277/2024 tentang Rumah Sakit Jejaring Pengampuan Pelayanan KJSU-KIA (Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/1277/2024 concerning Network Hospitals for KJSU-KIA Service Referral and Support).
- Keputusan Menteri Kesehatan RI No. HK.01.07/MENKES/2000/2024 tentang Rencana Induk (Master Plan) Pengembangan Bangunan The Project Tangerang (24 Desember 2024) (Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/2000/2024 concerning the Master Plan for the Development of The Project Tangerang Buildings, 24 December 2024).
- Peraturan Daerah Provinsi Banten Nomor 1 Tahun 2023 tentang Rencana Tata Ruang Wilayah Provinsi Banten Tahun 2023–2043 (Banten Provincial Regional Regulation No. 1 of 2023 concerning the Spatial Plan of Banten Province for 2023–2043).
- Peraturan Walikota Kota Tangerang Nomor 111 Tahun 2023 tentang Rencana Detail Tata Ruang (Tangerang Mayor Regulation No. 111 of 2023 concerning the Detailed Spatial Plan).

13.2 AIIB Environmental and Social Framework

The AIIB safeguards corpus consulted comprises:

- AIIB Environmental and Social Framework (ESF), amended through 26 June 2024.
- AIIB Environmental and Social Policy (ESP).
- AIIB ESS1 - Environmental and Social Assessment and Management.
- AIIB ESS2 - Involuntary Resettlement.
- AIIB ESS3 - Indigenous Peoples.
- AIIB Environmental and Social Exclusion List (ESEL).
- AIIB Directive on the Environmental and Social Framework (effective 14 January 2026).
- AIIB Policy on the Project-affected People's Mechanism (revised 2025; effective 1 January 2026), together with applicable Project-level GRM and AIIB Management grievance-process requirements.

13.3 International Standards and Good Industry Practice

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13.4 Project Documents and Primary Data Sources

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Comparable methodological references and ESIA precedents in the Indonesian healthcare and AIIB-financed-project context:

- ESIA-ESMP RSJ Dr. Radjiman Wediodiningrat Lawang (TRUST Project) - methodological precedent within the same financing framework.
- ESIA-ESMP RSUP Dr. Kariadi Semarang (TRUST Project) - comparable Class A vertical-hospital reference.
- Generic ESIA references - World Bank-financed health-sector projects in Indonesia (I-SPHERE, INEY).
- Modified Leopold Interaction Matrix methodology - adapted from Leopold et al. (1971) and contemporary Indonesian AMDAL practice.
- Cumulative Impact Assessment - IFC Good Practice Handbook (2013) and supplementary case studies.
- Climate Risk Assessment methodology - World Bank Climate Resilience Toolkit and AIIB climate-risk guidance notes.
- GHG Inventory methodology - IPCC 2006 + 2019 Refinement, supplemented by GHG Protocol Corporate Standard for Scope 1-2-3 categorisation.

APPENDICES

Annex A - Climate Risk Assessment and GHG Inventory

A1. Overview

Climate change has become an important consideration in infrastructure development due to the potential influence of changing climate conditions on project sustainability, operational continuity, and long-term asset resilience. Future changes in temperature, rainfall patterns, and extreme weather conditions may affect both construction and operational activities throughout the Project lifetime. Therefore, climate change considerations form an integral part of the ESIA process.

In line with the Asian Infrastructure Investment Bank (AIIB) Environmental and Social Policy, particularly Requirements No. 40 and No. 41, the Project is expected to consider both climate change adaptation and greenhouse gas (GHG) mitigation measures, including the assessment of climate-related risks and the identification of the Project's potential contribution to GHG emissions.

This chapter presents the climate change risk and resilience assessment for the Project based on review of existing climate conditions, Swiss Re CatNet hazard screening, and future climate projection analysis under several IPCC Shared Socioeconomic Pathway (SSP) scenarios up to 2099. The assessment evaluates potential future climate hazards relevant to the Project Area and identifies potential implications for construction activities, hospital operations, infrastructure performance, and service continuity.

The assessment has been undertaken using a site-specific approach considering the Project location, surrounding environmental conditions, topography, planned development activities, and hospital operational characteristics. The identified climate risks and adaptation measures are therefore intended to support long-term Project resilience and operational sustainability under future climate conditions.

A2. Climate Projection Scenario

To complete the climate change consideration assessment, future climate projections utilized from Intergovernmental Panel on Climate Change (IPCC) Shared Socioeconomic Pathway (SSP) scenarios. These scenarios represent different future greenhouse gas emission pathways and global development conditions. Four SSP scenarios were considered in this assessment to represent a range of possible future climate conditions, from lower-emission sustainability pathways to high-emission fossil fuel development pathways. Table 1 provides a short brief of the employed scenarios for this assessment.

Scenario	General Description	Estimated Global Warming by End of Century
SSP1-2.6	Sustainability pathway with lower greenhouse gas emissions and stronger climate mitigation efforts.	~1.8°C
SSP2-4.5	Intermediate development pathway with moderate greenhouse gas emissions and gradual climate mitigation progress.	~2.7°C

Scenario	General Description	Estimated Global Warming by End of Century
SSP3-7.0	Fragmented development pathway with high emissions, limited global cooperation, and increasing climate risks.	~3.6°C
SSP5-8.5	High-emission fossil fuel development pathway representing severe future climate conditions.	~4.4°C

Source: Swiss Re - CatNet® Risk Assessment Report

The future climate screening and hazard assessment presented in this chapter were reviewed using Swiss Re CatNet climate risk outputs and supporting climate projection datasets relevant to the Project Area.

A3. Project Sensitivity

The Project is located within the Neglasari District, Tangerang City, Banten Province. The Project Area is situated within a highly urbanized lowland environment characterized by dense built-up areas, extensive impermeable surfaces, and relatively high dependence on urban drainage and utility infrastructure. Based on the ESIA Baseline (Chapter 3), the Project Area experiences a tropical climate with relatively high temperature, seasonal rainfall variability, and humid conditions throughout the year. The Project Area is also located approximately 300 m from the Cisadane River and approximately 17 km from the northern coastline of Java Sea. Considering these environmental and surrounding urban conditions, several climate-related hazards are considered relevant to the Project Area, including increasing temperature, heat wave conditions, drought, extreme rainfall, temporary localized flooding, earthquake hazard, and potential future influence of sea level rise on regional lowland conditions. These hazards may influence both construction activities and long-term hospital operations under future climate conditions.

Following the Project description, the Project involves redevelopment and long-term operation of a hospital facility which requires continuous healthcare services, reliable utility systems, stable water supply, indoor environmental control, and uninterrupted site accessibility during both normal and emergency situations. Therefore, hospitals are generally considered climate-sensitive infrastructure due to their dependence on operational continuity and supporting infrastructure throughout the Project lifetime. Planned construction activities involving excavation works, temporary drainage systems, utility installation, and phased development activities may increase temporary sensitivity to heavy rainfall, surface runoff, heat exposure, and temporary drainage congestion during adverse weather conditions.

The level of Project Sensitivity presented in Table X was determined qualitatively by considering the Project location, existing environmental conditions, Project characteristics, and the potential influence of each climate hazard on construction activities and long-term hospital operations. The sensitivity categories were generally interpreted as follows:

- **High Project Sensitivity**: climate hazards may directly influence critical hospital functions, operational continuity, emergency access, drainage performance, construction safety, or essential utility systems.

- **Medium Project Sensitivity**: climate hazards may result in temporary operational disruption, increased infrastructure and utility demand, localized disturbance to Project activities, or temporary reduction in operational efficiency.
- **Low Project Sensitivity**: climate hazards are considered less relevant to the Project location or are expected to result in relatively limited influence on construction activities and hospital operations

The level of Project Sensitivity presented in Table X was determined qualitatively by considering the Project location, existing environmental conditions, Project characteristics, and the potential influence of each climate hazard on construction activities and long-term hospital operations. The assessment was informed by professional judgement and relevant international climate risk assessment guidance, including AIIB climate risk assessment recommendations for infrastructure projects.

Climate Hazard	Sensitivity Level	Project Sensitivity
Increased Mean Temperature	Low	Increasing average temperature may gradually increase cooling demand and energy consumption; however, impacts are generally incremental and can be managed through building design, HVAC systems, and routine operational controls.
Extreme Temperature (Heat Wave)	High	Hospitals are highly sensitive to prolonged heat wave conditions due to increased cooling demand, indoor thermal comfort requirements, vulnerable patient groups, and dependence on uninterrupted healthcare services.
Wildfire	Outside	The Project Area is located within a highly urbanized environment in Tangerang City with limited surrounding vegetation and no significant exposure to wildfire-prone landscapes.
Strong Wind / Windstorms	Low	Strong wind events may temporarily affect construction activities, temporary structures, outdoor operations, and the reliability of supporting utility systems. However, most impacts are expected to be localized and manageable through standard engineering design and operational controls.
Water Stress	High	Continuous healthcare services require reliable water supply for sanitation, medical services, cooling systems, cleaning, and daily hospital operations. Any disruption to water availability may directly affect operational continuity.
Sea level rise and storm surge	Outside	The Project Area is located approximately 17 km from the northern coastline of Java Sea within an urban inland area of Tangerang City. Considering the Project location and the absence of direct interaction with

Climate Hazard	Sensitivity Level	Project Sensitivity
		coastal environments or coastal infrastructure, direct sensitivity to sea level rise, storm surge, and coastal inundation is considered not relevant to the Project.
Drought	Medium	Prolonged dry conditions may reduce water availability and increase pressure on water resources. However, operational impacts are expected to be moderate due to the availability of alternative water supply arrangements and routine utility management systems.
River Flood (Fluvial Flooding)	High	Hospitals are highly sensitive to river flooding due to their dependence on continuous healthcare services, reliable utility systems, uninterrupted emergency access, and operational continuity requirements. Flooding events affecting access routes, utilities, and supporting infrastructure may disrupt healthcare delivery and emergency response functions.
Pluvial Flood	Medium	Hospitals require continuous access, functional drainage systems, and uninterrupted utility services. Localized flooding and drainage congestion may temporarily disrupt access, supporting infrastructure, and operational activities.
Storm Surge / Coastal Flooding	Outside	Due to its inland location and lack of direct coastal interaction, the Project is not considered sensitive to storm surge or coastal flooding hazards.
Landslide	Outside	The Project Area is located within a relatively flat urban lowland environment and is not associated with significant slopes or terrain conditions that would increase susceptibility to landslide hazards.
Earthquake	High	Hospitals are considered critical infrastructure requiring continuous operation during emergency situations. Earthquake events may affect structural integrity, utility systems, emergency access, patient safety, and operational continuity..

A4. Current Exposure

Current exposure screening was reviewed using the Swiss Re CatNet hazard assessment and supporting ESIA baseline information for the Project Area.

Hazard	Current Exposure	Score	Current Exposure Level
Fluvial Flood	Considered not relevant, as the Project Area is generally located outside major fluvial flood hazard zones and is not situated within a major river floodplain area. However, the Project Area is located approximately 300 m from the Cisadane River within a highly urbanized environment where temporary localized runoff accumulation and drainage congestion may still occur during periods of intense rainfall.	-	Outside
Pluvial Flood	Considered not relevant, as the Project Area is generally located outside major pluvial flood hazard zones. Nevertheless, temporary urban drainage congestion and localized surface water accumulation may still occur during heavy rainfall conditions due to the surrounding urban characteristics and extensive impermeable surfaces.	-	Outside
Storm Surge	Considered not relevant, as the Project Area is located within an inland urban area approximately 17 km from the northern coastline of Java Sea and has no direct interaction with coastal environments or coastal infrastructure.	-	Outside
Earthquake - Bedrock Conditions	Considered significant due to the regional seismic setting of Java Island and the Project Area's location within an active seismic region.	0.161-0.290	Significant
Earthquake - Local Soil Conditions	Considered high due to local soil conditions that may amplify seismic ground motion and increase earthquake intensity within the Project Area .	0.291-0.400	High
Windstorm	Considered very low, as the Project Area is not located within a region characterized by major cyclone or extreme wind hazard conditions .	<20 m/s	Very Low
Landslide	Considered negligible due to the relatively flat urban lowland characteristics of the Project Area and absence of steep surrounding terrain .	1.00	Negligible
Wildfire	Considered negligible due to the urbanized surrounding environment, humid tropical	1.00	Negligible

Hazard	Current Exposure	Score	Current Exposure Level
	conditions, and absence of significant wildfire-prone vegetation within the Project Area.		

Source: Scoring and Exposure Level form Swiss Re - CatNet® Risk Assessment Report

The current exposure screening indicates that the Project Area is generally characterized by relatively low exposure to major flood, coastal, windstorm, landslide, and wildfire hazards. Although the Project Area is located near the Cisadane River within a highly urbanized environment, major flood exposure is generally considered limited under current conditions. Nevertheless, temporary localized runoff accumulation and urban drainage congestion may still occur during periods of intense rainfall within surrounding urban areas. Earthquake exposure is considered the most significant current natural hazard for the Project Area, particularly due to local soil conditions that may amplify seismic intensity within the surrounding urban environment. These existing exposure conditions were considered further in the future climate risk assessment and development of Project adaptation measures.

A5. Future Exposure

Future climate exposure for the Project Area was reviewed using Swiss Re climate risk screening under four SSP climate scenarios, namely SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5. The assessment evaluates future exposure trends for several climate-related hazards across nine future time steps from 2030 to 2085. The future climate exposure scores for the Project Area are summarized in Table below.

Hazard	SSP Scenario	2030	2035	2040	2045	2050	2055	2060	2070	2085
Drought Score	SSP1-2.6	1.10 (Negligible)	2.10 (Minor)	3.40 (Minor)	5.30 (Moderate)	7.10 (Significant)	7.00 (Significant)	7.20 (Significant)	7.60 (Significant)	5.60 (Moderate)
	SSP2-4.5	3.50 (Minor)	4.50 (Moderate)	4.20 (Moderate)	5.80 (Moderate)	5.60 (Moderate)	6.30 (Significant)	6.40 (Significant)	6.20 (Significant)	6.40 (Significant)
	SSP3-7.0	7.40 (Significant)	8.00 (Extreme)	8.60 (Extreme)	8.50 (Extreme)	8.30 (Extreme)	8.20 (Extreme)	8.20 (Extreme)	8.60 (Extreme)	8.80 (Extreme)
	SSP5-8.5	3.90 (Minor)	5.50 (Moderate)	6.50 (Significant)	7.40 (Significant)	8.10 (Extreme)	8.40 (Extreme)	8.60 (Extreme)	9.10 (Extreme)	9.00 (Extreme)
Fluvial Flood Score	SSP1-2.6	1.50 (Negligible)	1.50 (Negligible)	1.50 (Negligible)	2.00 (Minor)	1.90 (Negligible)	2.30 (Minor)	2.60 (Minor)	3.20 (Minor)	4.30 (Moderate)
	SSP2-4.5	2.30 (Minor)	2.50 (Minor)	2.70 (Minor)	2.60 (Minor)	2.90 (Minor)	2.80 (Minor)	2.90 (Minor)	2.10 (Minor)	3.00 (Minor)

Hazard	SSP Scenario	2030	2035	2040	2045	2050	2055	2060	2070	2085
	SSP3-7.0	1.40 (Negligible)	1.90 (Negligible)	2.90 (Minor)	2.90 (Minor)	2.90 (Minor)	2.20 (Minor)	2.50 (Minor)	3.30 (Minor)	4.90 (Moderate)
	SSP5-8.5	1.90 (Negligible)	2.40 (Minor)	2.90 (Minor)	3.00 (Minor)	2.90 (Minor)	3.20 (Minor)	3.90 (Minor)	4.30 (Moderate)	6.10 (Significant)
Extreme Precipitation Score	SSP1-2.6	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.20 (Negligible)	0.30 (Negligible)	0.30 (Negligible)	1.70 (Negligible)
	SSP2-4.5	0.00 (Negligible)	0.00 (Negligible)	0.10 (Negligible)	0.30 (Negligible)	0.20 (Negligible)	0.30 (Negligible)	0.70 (Negligible)	0.90 (Negligible)	2.20 (Minor)
	SSP3-7.0	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.10 (Negligible)	0.50 (Negligible)	1.30 (Negligible)	2.30 (Minor)
	SSP5-8.5	0.20 (Negligible)	0.30 (Negligible)	0.30 (Negligible)	0.10 (Negligible)	0.30 (Negligible)	0.40 (Negligible)	0.90 (Negligible)	0.90 (Negligible)	3.50 (Minor)
Heat Wave Score	SSP1-2.6	6.90 (Significant)	7.50 (Significant)	8.10 (Extreme)	8.40 (Extreme)	8.70 (Extreme)	8.90 (Extreme)	9.00 (Extreme)	9.10 (Extreme)	9.10 (Extreme)
	SSP2-4.5	6.80 (Significant)	7.60 (Significant)	8.50 (Extreme)	9.00 (Extreme)	9.40 (Extreme)	9.50 (Extreme)	9.70 (Extreme)	9.80 (Extreme)	9.80 (Extreme)
	SSP3-7.0	7.00 (Significant)	7.90 (Significant)	8.70 (Extreme)	9.30 (Extreme)	9.60 (Extreme)	9.80 (Extreme)	9.80 (Extreme)	9.90 (Extreme)	9.90 (Extreme)
	SSP5-8.5	7.50 (Significant)	8.50 (Extreme)	9.20 (Extreme)	9.60 (Extreme)	9.80 (Extreme)	9.80 (Extreme)	9.80 (Extreme)	9.90 (Extreme)	9.90 (Extreme)
Storm Surge (Sea Level Rise)	SSP1-2.6	0.14 (Negligible)	0.17 (Negligible)	0.21 (Negligible)	0.24 (Negligible)	0.28 (Negligible)	0.39 (Negligible)	0.49 (Negligible)	1.19 (Negligible)	3.46 (Minor)
	SSP2-4.5	0.20 (Negligible)	0.25 (Negligible)	0.30 (Negligible)	0.35 (Negligible)	0.40 (Negligible)	0.55 (Negligible)	0.70 (Negligible)	1.70 (Negligible)	4.95 (Moderate)
	SSP3-7.0	0.00 (Negligible)	0.10 (Negligible)	0.10 (Negligible)	0.20 (Negligible)	0.30 (Negligible)	0.40 (Negligible)	0.70 (Negligible)	1.90 (Negligible)	8.60 (Extreme)
	SSP5-8.5	0.20 (Negligible)	0.25 (Negligible)	0.30 (Negligible)	0.45 (Negligible)	0.60 (Negligible)	1.00 (Negligible)	1.40 (Negligible)	3.30 (Minor)	9.35 (Extreme)
Heat Stress	SSP1-2.6	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)

Hazard	SSP Scenario	2030	2035	2040	2045	2050	2055	2060	2070	2085
	SSP2-4.5	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)
	SSP3-7.0	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)
	SSP5-8.5	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	0.00 (Negligible)	4.60 (Moderate)

Based on Table above, the key analysis can be summarized as follows:

- Heat wave exposure is projected to become the most significant long-term climate-related hazard for the Project Area under all SSP scenarios. Under SSP1-2.6 and SSP2-4.5, heat wave exposure increases from Significant conditions in 2030–2035 to Extreme conditions from approximately 2040 onwards. Under SSP3-7.0 and SSP5-8.5, Extreme exposure conditions are projected to occur earlier and persist throughout most of the assessment period until 2085. Although the Project Area is located within a tropical environment where daily temperature variation still occurs, the primary concern is associated with increasing frequency and duration of prolonged hot days, which may increase cooling demand, operational energy consumption, and indoor thermal management requirements for long-term hospital operations.
- Heat stress exposure is generally projected to remain Negligible under most SSP scenarios throughout the assessment period. Only under SSP5-8.5 does the heat stress exposure increase to Moderate conditions by 2085. These results indicate that extremely hazardous thermal stress conditions exceeding the Swiss Re heat stress threshold are generally not projected to become a dominant climate-related concern for the Project Area during the main operational lifetime of the Project.
- Drought exposure shows significant variation between climate scenarios. Under SSP1-2.6 and SSP2-4.5, drought exposure gradually increases from Negligible-Minor conditions in 2030 to Moderate-Significant conditions by mid- to late-century. In contrast, under SSP3-7.0, drought exposure reaches Significant conditions by 2030 and remains within the Extreme category throughout most of the assessment period until 2085. Under SSP5-8.5, drought exposure progressively increases from Minor conditions in 2030 to Extreme conditions from approximately 2050 onwards. Although the Project Area is not located within an arid region, prolonged dry periods and increasing urban water demand may influence long-term water availability and operational water demand for hospital services and supporting infrastructure.
- Fluvial flood exposure is generally projected to remain within Negligible to Minor categories under most SSP scenarios throughout the assessment period. Moderate exposure conditions are only projected toward the end of the century under selected higher emission scenarios, including SSP1-2.6 in 2085, SSP3-7.0 in 2085, and SSP5-8.5 from approximately 2070 onwards. Although future projections indicate slight increases in fluvial flood scores under certain scenarios, the Project Area is generally considered outside major flood hazard zones. Nevertheless, temporary localized

runoff accumulation and urban drainage congestion may still occur during periods of intense rainfall within surrounding urban areas.

- Extreme precipitation exposure is generally projected to remain Negligible under most SSP scenarios throughout the assessment period. Minor exposure conditions are only projected toward 2085 under SSP2-4.5, SSP3-7.0, and SSP5-8.5. These results indicate that substantial increases in extreme rainfall hazard are generally not projected to become a dominant climate-related exposure for the Project Area, although temporary localized runoff and drainage congestion may still occur during intense rainfall events.
- Storm surge and sea level rise exposure are generally projected to remain Negligible under most SSP scenarios during the main operational lifetime of the Project. However, future projections under SSP3-7.0 and SSP5-8.5 indicate increasing exposure toward the end of the century, reaching Extreme conditions by 2085. Considering the Project Area is located approximately 17 km inland from the northern coastline of Java Sea, direct coastal inundation and storm surge exposure are generally considered not relevant to the Project under current conditions, although long-term regional lowland and drainage influence associated with sea level rise may gradually increase under higher emission scenarios.

As a final result, the current and future climate exposure assessments were combined to identify the main climate-related exposures potentially relevant to the Project. Table X summarizes the comparison between current exposure conditions and projected future exposure under future SSP climate scenarios. The assessment indicates that increasing heat wave conditions and prolonged dry periods may become the main long-term climate-related exposures for the Project, particularly under higher emission scenarios. In contrast, major flood, extreme precipitation, coastal hazard, landslide, and wildfire exposure are generally expected to remain limited or not relevant within the Project Area under current conditions, although temporary localized runoff accumulation and urban drainage congestion may still occur during periods of intense rainfall.

Table 5. Future Exposure Key Insights

Hazard	Current Exposure	Projected Future Exposure	Notes
Fluvial Flood	Outside	Moderate to Significant (SSP5-8.5, late century)	The Project Area is generally located outside major fluvial flood hazard zones and is not situated within a major river floodplain area. However, the Project Area is located approximately 300 m from the Cisadane River within a highly urbanized environment where temporary localized runoff accumulation and drainage congestion may still occur during periods of intense rainfall.
Pluvial Flood	Outside	Remains Outside (All SSPs)	Although the Project Area is generally located outside major pluvial flood hazard zones, temporary localized runoff accumulation and urban drainage congestion may still occur during heavy rainfall conditions due to surrounding urban characteristics and extensive impermeable surfaces.

Hazard	Current Exposure	Projected Future Exposure	Notes
Storm Surge	Outside	Extreme (SSP3-7.0 and SSP5-8.5, 2085)	The Project Area is located within an inland urban area approximately 17 km from the northern coastline of Java Sea and has no direct interaction with coastal environments or coastal infrastructure. Therefore, direct coastal inundation and storm surge exposure are generally considered not relevant to the Project under current conditions. However, future climate projections under higher emission scenarios indicate increasing sea level rise influence toward the end of the century, which may indirectly contribute to regional lowland drainage stress and broader urban flood management challenges within coastal and low-lying areas surrounding Tangerang.
Heat Wave	Low to Moderate (Baseline Tropical Conditions)	Extreme (All SSPs)	Future climate projections indicate a substantial increase in heat wave conditions and prolonged hot days under all SSP scenarios, particularly from approximately 2040 onwards. Increasing temperature conditions may increase cooling demand, operational energy consumption, and indoor thermal management requirements for long-term hospital operations.
Heat Stress	Low (Baseline Humid Tropical Conditions)	Moderate (SSP5-8.5, 2085)	Heat stress exposure is generally projected to remain negligible under most SSP scenarios throughout the assessment period. Moderate exposure conditions are only projected under SSP5-8.5 toward the end of the century.
Drought	Low to Moderate (Seasonal Dry Period Conditions)	Extreme (SSP3-7.0 and SSP5-8.5)	Future climate projections indicate increasing drought conditions and prolonged dry periods, particularly under higher emission scenarios, which may influence long-term water availability and operational water demand for hospital services and supporting infrastructure.
Windstorm	Very Low	Remains Very Low (All SSPs)	No significant increase in future windstorm exposure is projected for the Project Area.
Landslide	Negligible	Remains Negligible (All SSPs)	The Project Area is generally characterized by relatively flat urban lowland conditions without steep surrounding terrain; therefore, landslide exposure is expected to remain limited.

Hazard	Current Exposure	Projected Future Exposure	Notes
Wildfire	Negligible	Remains Negligible (All SSPs)	Humid tropical conditions and highly urbanized surrounding environments are expected to continue limiting wildfire exposure within the Project Area.

Material Physical Climate Risks and Potential Adaptation Measures

A6. Climate Risk and Natural Hazard Risk

The material physical climate risk assessment focuses on climate-related hazards considered relevant to the Project based on the future climate exposure screening, Project sensitivity assessment, and Project operational characteristics. Hazards identified as not relevant or negligible during the current and future exposure screening were not assessed further in the detailed future climate risk assessment.

Future climate risk was assessed by considering the combination of future hazard exposure and the sensitivity of the Project infrastructure and operational activities to the identified climate-related hazards. The future climate risk levels were categorized qualitatively into six categories, as follows:

- **Very Low**: Climate hazard is considered unlikely to significantly influence Project activities or long-term hospital operations.
- **Low**: Climate hazard may result in limited or localized disturbance to Project activities, with relatively minor influence on operational continuity and supporting infrastructure.
- **Moderate**: Climate hazard may periodically influence construction activities, operational efficiency, utility systems, or site accessibility, requiring routine adaptation and management measures.
- **High**: Climate hazard may significantly affect operational continuity, critical infrastructure, healthcare services, utility systems, or long-term Project resilience without appropriate adaptation measures.
- **Very High**: Climate hazard may result in major operational disruption, substantial infrastructure stress, or prolonged interruption to critical hospital functions under future climate conditions.
- **Extreme**: Climate hazard may pose severe long-term risk to operational continuity, infrastructure performance, and overall Project resilience under future climate conditions if adaptation measures are not effectively implemented.

For natural hazards where future exposure projections are not available or where the hazard is generally not influenced by future climate change conditions (such as earthquake hazard), the future risk assessment was considered consistent with the current exposure condition. Table X summarizes the main future climate-related risks considered most relevant to the Project under future climate conditions

Hazard	Current Exposure	Future Exposure	Project Sensitivity	Risk Level	Potential Impact to Hospital Operations and Infrastructure
Climate Risk					
Fluvial Flood	Outside	Moderate to Significant (SSP5-8.5, late century)	High	Medium	Although the Project Area is generally located outside major fluvial flood hazard zones, future increases in river discharge and prolonged rainfall conditions within the Cisadane catchment may contribute to flooding impacts within surrounding lowland urban areas. These conditions may affect access roads, emergency transportation routes, supporting infrastructure, and utility systems, potentially disrupting hospital accessibility and operational continuity during extreme rainfall and flood events.
Pluvial Flood	Outside	Outside (All SSPs)	Medium	Low	Although pluvial flood exposure is considered limited within the Project Area, intense local rainfall events may temporarily contribute to localized surface water accumulation and drainage congestion. Such conditions may result in minor disruption to site accessibility, traffic circulation, and supporting infrastructure during extreme rainfall events.
Heat Wave	Low to Moderate (Baseline Tropical Conditions)	Extreme (All SSPs)	High	High	Increasing temperature conditions and more frequent hot days may increase cooling demand, operational energy consumption, and operational stress on hospital facilities, particularly for vulnerable patients and temperature-sensitive healthcare services.

Hazard	Current Exposure	Future Exposure	Project Sensitivity	Risk Level	Potential Impact to Hospital Operations and Infrastructure
Heat Stress	Low (Baseline Humid Tropical Conditions)	Moderate (SSP5-8.5, 2085)	Low	Low	Although future heat stress exposure is projected to remain relatively limited, prolonged warm conditions may still contribute to minor increases in indoor cooling demand and temporary thermal discomfort for hospital occupants during hotter periods.
Drought	Low to Moderate (Seasonal Dry Period Conditions)	Significant to Extreme (SSP3-7.0 and SSP5-8.5)	Medium	High	Prolonged dry periods and increasing drought conditions may affect long-term water availability required to support hospital operations, sanitation systems, cooling demand, and continuous healthcare services.
Extreme Precipitation	Low to Moderate (Seasonal Dry Period Conditions)	Negligible to Minor (All SSPs)	Medium	Low	Although future extreme precipitation exposure is generally projected to remain limited, heavy rainfall events may still contribute to temporary urban drainage congestion, localized runoff accumulation, and temporary access disturbance within the Project Area.
Storm Surge / Sea Level Rise	Outside	Extreme (SSP3-7.0 and SSP5-8.5, 2085)	Outside	Low	Although future projections indicate increasing sea level rise influence toward the end of the century under higher emission scenarios, the Project Area is located within an inland urban area without direct interaction with coastal environments or coastal infrastructure. Therefore, direct coastal inundation and storm surge impacts on hospital facilities are generally considered limited. However, long-term regional sea level rise may indirectly contribute to increased

Hazard	Current Exposure	Future Exposure	Project Sensitivity	Risk Level	Potential Impact to Hospital Operations and Infrastructure
					stress on regional drainage systems, reduced downstream drainage capacity, and broader lowland urban flooding conditions within surrounding Tangerang areas. These conditions may potentially influence external access roads, emergency transportation routes, supporting urban infrastructure, and regional utility reliability during extreme weather conditions.
Natural Hazard					
Earthquake	High	High	High	High	Earthquake events may cause significant structural damage, disruption to utility systems, damage to critical medical equipment, and interruption to hospital operations and emergency healthcare services if appropriate seismic design and operational preparedness measures are not implemented.

A7. Proposed of Potential Adaptation Measure

Adaptation measures are intended to reduce potential physical climate risks and support the long-term resilience of the Project under future climate conditions. Potential adaptation strategies may include engineering and design considerations, operational management measures, utility resilience planning, emergency preparedness, and routine maintenance measures to minimize potential disruption to hospital operations and supporting infrastructure.

Based on the climate risk assessment, the main climate-related hazards considered relevant to the Project include increasing heat wave conditions, prolonged dry periods, localized heavy rainfall impacts, fluvial flood influence, and earthquake hazards. As the Project involves long-term hospital operations requiring continuous healthcare services, reliable utility systems, stable water supply, indoor environmental control, and uninterrupted emergency access, climate resilience considerations remain important to support operational continuity and infrastructure performance throughout the Project lifetime. Potential adaptation measures relevant to the Project are summarized below.

Hazard	Proposed adaptation measure
Climate Risk	
Fluvial flood	▪ Incorporating climate-resilient stormwater drainage systems, runoff retention facilities, and controlled surface water management within The Project design to accommodate potential increases in rainfall intensity and temporary urban runoff accumulation under future climate conditions. ▪ Maintaining adequate site elevation, protected access routes, and reliable drainage discharge systems to minimize temporary disruption to hospital accessibility, emergency transportation routes, and supporting infrastructure during periods of intense rainfall. ▪ Conduct routine inspection and maintenance of drainage systems, retention ponds, culverts, and surrounding runoff management infrastructure to maintain drainage performance and reduce temporary water accumulation within the Project Area. ▪ Conduct integrating emergency preparedness and operational response procedures for temporary localized flooding, drainage congestion, and disruption to surrounding urban access during extreme rainfall events.
Heat Wave and Heat Stress	▪ Ensure adequate cooling and air-conditioning systems are provided for critical healthcare facilities, high-risk patient wards, and temperature-sensitive operational areas, including sufficient backup power capacity during prolonged hot weather conditions. ▪ Incorporate passive cooling measures, natural airflow optimization, external shading, roof insulation, and heat-reducing building materials within non-critical hospital areas to reduce indoor heat accumulation and long-term cooling demand. ▪ Design hospital buildings and operational layouts to maintain indoor thermal comfort for patients, healthcare workers, and visitors during prolonged warm periods and increasing future temperature conditions. ▪ Consider integration of renewable energy systems, such as rooftop solar photovoltaic panels, to support part of the operational electricity demand associated with long-term cooling and hospital operations. ▪ Establish operational procedures, inspection programs, and preventive maintenance measures to ensure reliable cooling system performance and operational continuity during periods of increasing temperature and elevated cooling demand.
Drought	▪ Consider rainwater harvesting systems and water storage facilities to support non-potable water demand and provide supplementary water reserves during prolonged dry periods and increasing drought conditions. ▪ Ensure adequate clean water storage capacity and backup water supply systems to support continuous hospital operations, sanitation systems, cooling demand, and healthcare services during periods of reduced water availability.

Hazard	Proposed adaptation measure
	▪ Implement water-efficient fixtures, leak prevention measures, and routine water management programs to reduce long-term operational water consumption within hospital facilities. ▪ Consider landscape management and selection of drought-tolerant vegetation to minimize irrigation demand and improve long-term water use efficiency within the Project Area. ▪ Consider treated wastewater reuse systems for non-clinical applications such as landscape irrigation, toilet flushing, and other general utility purposes to reduce long-term freshwater demand and improve water resilience during prolonged dry periods. ▪ Establish operational procedures and contingency planning for water supply disruption to maintain operational continuity during prolonged dry conditions and future drought events.
Extreme Precipitation	▪ Incorporate high-emission climate change scenarios and future rainfall projections, including appropriate climate change safety allowances, into the design capacity of stormwater drainage systems, rainwater retention facilities, and surface runoff management infrastructure. ▪ Implement rainwater harvesting and temporary retention systems equipped with appropriate filtration to capture excess rainfall and support supplementary non-potable water use within the Project Area. ▪ Ensure critical hospital infrastructure, backup power systems, medical storage areas, emergency access routes, and other operationally critical facilities are elevated or designed with adequate surface drainage protection to minimize temporary disruption during heavy rainfall events. ▪ Incorporate Nature-based Solutions (NbS), such as vegetation management, permeable landscape areas, bioretention features, and green open spaces, alongside engineering drainage controls to support surface water infiltration and reduce localized runoff accumulation within the Project Area. ▪ Establish routine inspection, maintenance, and monitoring programs for stormwater drainage systems, retention facilities, and surrounding runoff management infrastructure to maintain long-term drainage performance during intense rainfall conditions
Storm Surge / Sea Level Rise	▪ Consider long-term regional drainage and urban flood management conditions during future infrastructure planning and operational resilience assessment, particularly under higher emission climate scenarios toward the end of the century. ▪ Maintain adequate site drainage flexibility, runoff discharge capacity, and emergency access planning to accommodate potential indirect influence of regional lowland flooding and downstream drainage constraints associated with future sea level rise conditions.

Hazard	Proposed adaptation measure
	▪ Coordinate with relevant local authorities and urban infrastructure planning initiatives related to regional drainage management, flood control systems, and climate resilience planning within surrounding Greater Jakarta and Tangerang areas. ▪ Periodically review updated regional climate projections, sea level rise information, and urban flood management strategies to support long-term operational resilience of The Project facilities and supporting infrastructure.
Natural Hazard	
Earthquake	▪ Ensure the design hospital buildings and supporting infrastructure in accordance with applicable national seismic standards and appropriate international engineering practices to improve structural resilience against earthquake events. ▪ Ensure critical hospital facilities, utility systems, medical equipment, and non-structural components are secured and protected to minimize damage and maintain operational continuity during seismic events. ▪ Provide redundancy and protection measures for critical utility systems, including backup power supply, water storage, oxygen systems, and communication infrastructure, to support emergency hospital operations following major earthquakes. ▪ Maintain safe evacuation routes, emergency access areas, and designated assembly points to support emergency response and operational safety during earthquake events. ▪ Establish emergency preparedness, post-earthquake inspection procedures, and operational continuity planning to support rapid recovery and continuation of critical healthcare services following seismic events.

Note: Heat wave and heat stress hazards are presented together within the adaptation summary matrix due to the substantial overlap between the proposed adaptation and operational management measures, particularly related to cooling systems, indoor thermal management, worker protection, and hospital operational continuity during prolonged hot weather conditions.

Note: The adaptation measures presented in this table are intended to support the long-term climate resilience of the Project. Adaptation measures associated with Medium and High risk hazards are considered priority measures to support hospital operational continuity, emergency accessibility, utility reliability, and patient safety. Adaptation measures associated with Low or Outside risk hazards are considered supplementary resilience measures and may be implemented as part of routine design, operation, and maintenance practices.

A8. Proposed non-structural Measures

A8.1 Fluvial Flood mitigation and management measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Drainage Inspection and Maintenance	Conduct routine inspection and maintenance of stormwater drainage systems, retention facilities, culverts, and runoff channels within the Project Area.	Maintains drainage performance and reduces temporary water accumulation during heavy rainfall conditions.
2	Rainfall and Runoff Monitoring	Monitor rainfall forecasts, surrounding runoff conditions, and nearby river conditions during periods of prolonged rainfall.	Supports early identification of temporary localized flooding and urban drainage congestion.
3	Emergency Response Procedures for Flood Events	Establish emergency response procedures for temporary flooding, drainage overflow, and localized access disruption during periods of intense rainfall.	Improves operational preparedness and reduces disruption to hospital activities during flood-related events.
4	Protection of Critical Infrastructure	Ensure critical utility systems, backup power systems, emergency access routes, and sensitive operational areas are protected from temporary runoff and water intrusion.	Reduces risk of operational disruption and damage to critical hospital infrastructure.
5	Runoff and Sediment Control Measures	Implement temporary runoff control and sediment management measures within exposed soil areas, landscaped areas, and drainage corridors of the Project Area.	Reduces localized erosion, sediment transport, and temporary drainage blockage during prolonged rainfall events.
6	Emergency Access Management	Maintain accessibility of emergency access routes and surrounding circulation areas during periods of prolonged rainfall and temporary flooding conditions.	Supports continuity of emergency response and hospital operational access during severe weather events.

A8.2 Heatwave and heat stress non-structural measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Cooling System Maintenance	Maintain and periodically inspect air-conditioning, ventilation, and cooling systems within critical hospital areas.	Supports stable indoor temperature conditions and reduces heat-related operational disruption.
2	Backup Power for Cooling Systems	Ensure backup power systems are available to support cooling and ventilation systems during power interruptions and extreme heat conditions.	Maintains cooling system reliability and operational continuity during prolonged hot weather conditions.
3	Indoor Temperature Monitoring	Monitor indoor temperature conditions in patient wards, critical healthcare facilities, and operational areas during periods of elevated temperature.	Supports early identification of overheating conditions and improves thermal comfort management.
4	Heat-Related Operational Procedures	Establish operational procedures and operational arrangements during prolonged hot weather conditions, particularly for vulnerable patients and hospital staff.	Reduces heat-related operational stress and improves occupational safety.
5	Hydration and Thermal Comfort Measures	Provide adequate hydration facilities, shaded rest areas, and thermal comfort management for staff, patients, and visitors.	Reduces heat-related discomfort and supports health protection during hot weather conditions.
6	Preventive Maintenance Program	Conduct routine preventive maintenance for cooling equipment, ventilation systems, and supporting utilities.	Improves long-term cooling system performance and operational reliability.
7	Heat Emergency Preparedness	Establish emergency preparedness procedures for extreme heat conditions and potential heat-related health incidents.	Supports rapid response and operational readiness during prolonged heat events.

A8.3 Drought non-structural Measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Water Consumption Monitoring	Conduct routine monitoring of water consumption, storage capacity, and operational water demand within hospital facilities.	Supports efficient water management and early identification of abnormal water usage.
2	Water Conservation Measures	Implement water-saving practices and water efficiency measures within hospital facilities and supporting infrastructure.	Reduces long-term operational water demand during prolonged dry periods.
3	Water Supply Contingency Planning	Establish contingency procedures and alternative water supply arrangements during prolonged drought conditions or temporary water supply disruption.	Supports continuity of hospital operations and critical healthcare services during water shortage conditions.
4	Routine Inspection of Water Systems	Conduct regular inspection and maintenance of water distribution systems, storage facilities, and pipelines to minimize leakage and water loss.	Improves reliability and efficiency of hospital water supply systems.
5	Water Quality Monitoring	Monitor water quality and storage conditions for backup water supply systems and stored water reserves.	Maintains water quality and operational safety for hospital use.
6	Operational Water Prioritization	Establish operational procedures for prioritization of critical water usage during prolonged dry periods.	Supports continued operation of essential healthcare services during limited water availability.

A8.4 Extreme Precipitation non-structural Measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Drainage Inspection and Maintenance	Conduct routine inspection and maintenance of stormwater drainage systems, retention facilities, and runoff channels within the Project Area.	Maintains drainage performance and reduces temporary water accumulation during heavy rainfall events.
2	Rainfall and Drainage Monitoring	Monitor rainfall forecasts, site runoff conditions, and drainage system performance during periods of intense rainfall.	Supports early identification of localized flooding and drainage overflow conditions.
3	Emergency Response Procedures for Heavy Rainfall	Establish emergency response procedures for temporary flooding, drainage congestion, and localized access disruption during extreme rainfall events.	Improves operational preparedness and reduces disruption to hospital activities during severe weather conditions.
4	Protection of Critical Infrastructure	Ensure critical utility systems, emergency access routes, and sensitive operational areas are protected from temporary runoff and water intrusion during heavy rainfall conditions.	Reduces risk of operational disruption and damage to critical hospital infrastructure.
5	Runoff and Sediment Control Measures	Implement temporary runoff control, sediment management, and erosion prevention measures within exposed soil areas, landscaped areas, and drainage corridors of the Project Area.	Reduces localized erosion, sediment transport, and temporary drainage blockage during prolonged rainfall events.
6	Routine Emergency Access Management	Maintain accessibility of emergency access routes and internal circulation areas during periods of intense rainfall.	Supports continuity of emergency response and hospital operational access during severe weather events.

A8.5 Sea Level Rise and Storm Surge non-structural Measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Regional Flood and Drainage Coordination	Coordinate with relevant local authorities regarding regional drainage management, flood control systems, and climate resilience planning within surrounding Greater Jakarta and Tangerang areas.	Supports long-term regional flood resilience and reduces indirect disruption risks associated with future sea level rise conditions.
2	Drainage Capacity Maintenance	Maintain adequate drainage discharge capacity and runoff management systems within the Project Area to accommodate potential regional downstream drainage constraints.	Reduces temporary drainage congestion and improves site drainage performance during extreme weather conditions.
3	Emergency Access and Utility Preparedness	Maintain contingency procedures for emergency access, utility disruption, and temporary regional flooding conditions affecting surrounding urban infrastructure.	Supports operational continuity and emergency preparedness during regional flood-related disruption events.

A8.6 Earthquake Mitigation and Management Measures

No.	Mitigation / Management Measure	Description	Expected Outcome
1	Emergency Preparedness Plan	Develop and communicate earthquake emergency response and evacuation procedures for hospital staff, patients, and visitors.	Supports organized emergency response and reduces safety risks during earthquake events.
2	Regular Emergency Drills	Conduct periodic earthquake drills and emergency response exercises for hospital personnel and supporting staff.	Improves preparedness and emergency response capability during seismic events.
3	Structural Seismic Design	Ensure hospital buildings and supporting infrastructure are	Improves structural resilience and reduces

No.	Mitigation / Management Measure	Description	Expected Outcome
		designed in accordance with applicable seismic design standards.	risk of severe structural damage.
4	Protection of Critical Equipment	Secure critical medical equipment, utility systems, and hazardous material storage against seismic movement and vibration.	Minimizes damage to critical hospital assets and supports operational continuity.
5	Backup Utility Systems	Provide backup power supply, water storage, and emergency communication systems for critical hospital operations.	Maintains essential healthcare services during utility disruption following earthquakes.
6	Emergency Communication System	Establish emergency communication procedures and reliable coordination systems during seismic emergencies.	Supports timely emergency coordination and operational response.
7	Post-Earthquake Inspection Procedures	Establish inspection and operational recovery procedures following significant earthquake events.	Supports rapid safety assessment and continuation of critical hospital operations.

The Summary of Adaptation Analysis presents an overview of the main climate-related hazards, potential impacts, and adaptation measures relevant to the RS Sitanala development project. The assessment focuses on the key climate-related hazards identified through the climate risk screening, including heat wave and heat stress, drought, extreme precipitation and localized urban flooding, fluvial flood influence, sea level rise, and earthquake hazards.

The analysis considers the potential influence of these hazards on demolition and construction activities, hospital buildings and healthcare facilities, supporting utility systems, emergency access, and long-term hospital operations within a highly urbanized environment. Adaptation measures were identified to support infrastructure resilience, operational continuity, utility reliability, emergency preparedness, water resilience, and long-term climate resilience throughout the Project lifetime.

A9. Energy Efficiency and Renewable Energy

Project planning has also incorporated several climate change mitigation measures, such as improvements to operational efficiency, energy efficiency considerations through the implementation of the Smart and Green Hospital strategy integrated into the overall hospital redevelopment concept. Key climate-related and energy-efficiency considerations currently incorporated into the Project planning include the following table.

A9.1 Key climate-related and energy efficiency program that incoporate in Project planning

Category	Design Strategy / Planned Features	Purpose and Contribution
Smart Hospital	Integration of Hospital Information Systems (HIS), electronic medical records, telemedicine, SATUSEHAT integration, remote diagnostics, clinical workflow automation, and smart Building Management Systems (BMS) for HVAC, lighting, and energy management.	Improve healthcare service efficiency, operational performance, digital connectivity, and building management capabilities.
Green Hospital	High-efficiency building envelope, passive cooling measures, glazing performance optimization, daylight utilization, and energy-efficient HVAC and lighting systems.	Reduce energy consumption, improve indoor environmental quality, and enhance long-term operational efficiency.
	Rooftop photovoltaic (PV) systems with an indicative capacity of approximately 1.0–1.5 MWp (subject to DED feasibility assessment).	Support renewable energy utilization and reduce long-term grid electricity demand and associated GHG emissions.
	Building glass design and daylight optimization strategies.	Reduce daytime electricity consumption associated with artificial lighting.
	Rainwater harvesting systems, stormwater detention facilities, and retention pond infrastructure.	Support water stewardship, runoff management, and temporary water storage during rainfall events.
	Retention of existing green open space (RTH), mature trees, and native landscape elements.	Improve environmental quality, support urban microclimate conditions, and maintain site vegetation coverage.

Category	Design Strategy / Planned Features	Purpose and Contribution
Climate-Resilient Hospital	Climate-resilient drainage systems and flood management infrastructure considering lowland Jabodetabek conditions and future rainfall projections.	Improve resilience to extreme rainfall events, localized flooding, and drainage congestion.
	Emergency power continuity systems, including backup generators and potential PV-battery integration.	Maintain operational continuity during power outages, emergency situations, and severe weather events.
	Building design and facility planning that support patient comfort and operational continuity during increasing temperature and extreme heat conditions.	Enhance resilience to future temperature increases and heat-related operational risks.
Universal Design	Barrier-free access, accessible signage, and inclusive sanitary facilities.	Improve accessibility, inclusiveness, and compliance with universal design principles.

As a conclusion, the current Project planning indicates that climate resilience, operational continuity, energy efficiency, and environmental sustainability considerations have been incorporated into The Project redevelopment concept. These approaches may support long-term operational resilience, improve resource efficiency, reduce future operational greenhouse gas emissions, and strengthen the Project's adaptive capacity toward future climate-related conditions



Figure Master plan project

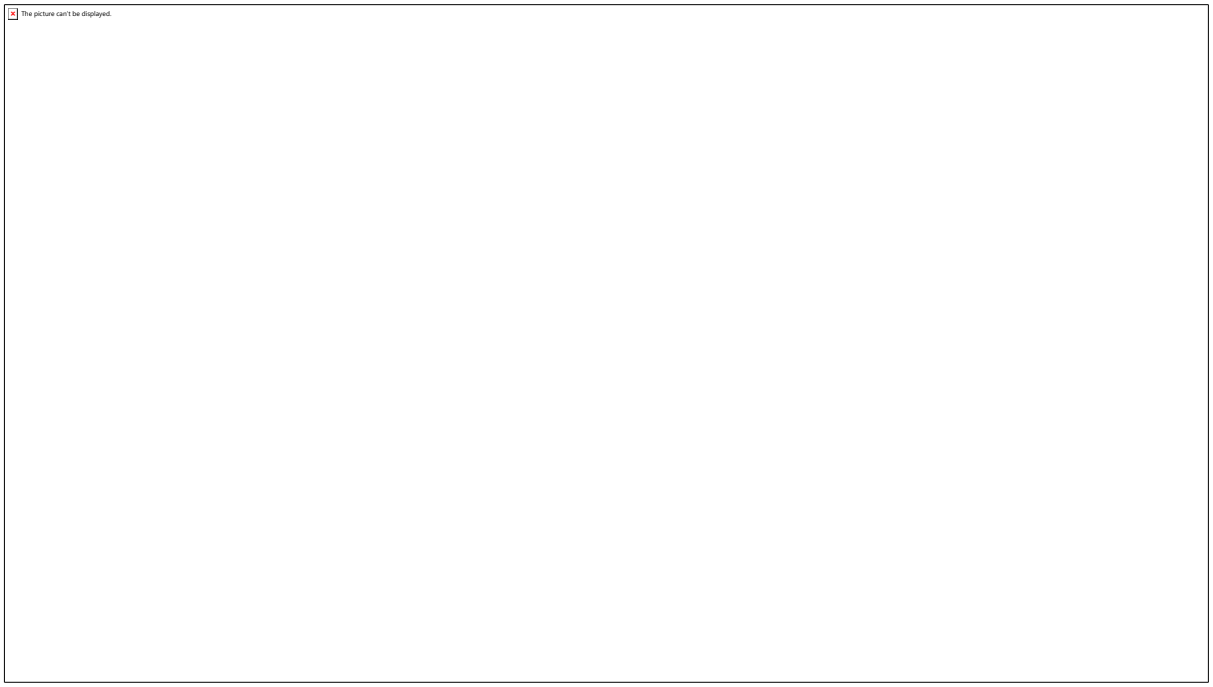
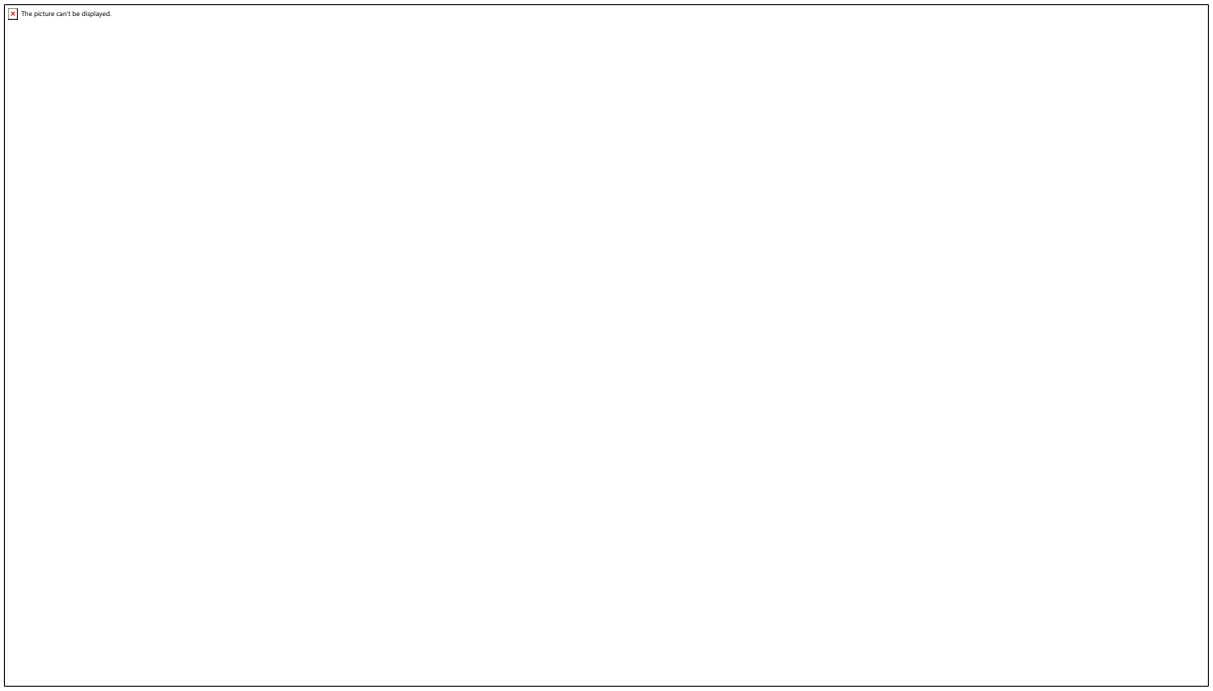
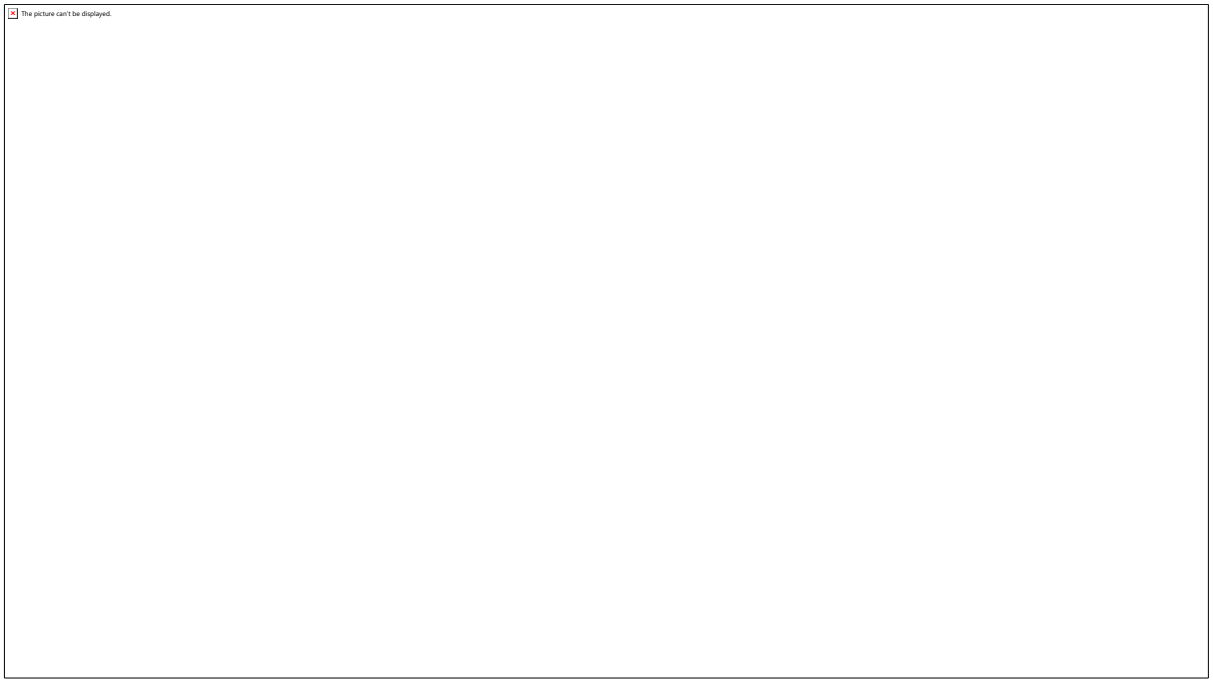


Figure Building concept.





A9.2 Greenhouse Gases Calculation and Reduction Program

This section presents the greenhouse gas (GHG) assessment for the proposed redevelopment of RSUP Dr. Sitanala. The assessment was undertaken to establish the existing GHG emissions profile of the hospital, estimate future emissions associated with the planned redevelopment and expansion of healthcare facilities, and evaluate the potential contribution of selected emission reduction measures. The assessment considers direct and indirect energy-related emissions associated with hospital operations and has been prepared to support climate change considerations, resource efficiency planning, and long-term sustainability objectives of the Project.

A10. GHG Baseline

The GHG baseline assessment was developed using energy consumption data provided by RS Sitanala for the 2025 reporting year. The assessment establishes a reference emissions profile representing existing hospital activities prior to implementation of the proposed redevelopment and expansion program. The inventory considered the principal sources of greenhouse gas emissions currently associated with hospital operations, including diesel fuel consumption for backup power generation and purchased electricity used across healthcare buildings and ancillary facilities. Emissions from these sources were quantified using applicable emission factors and expressed as carbon dioxide equivalent (CO_2-eq) emissions.

Detailed GHG emission calculations for diesel fuel and purchased electricity consumption are presented in the following tables. The resulting emissions profile serves as the baseline condition against which future emissions associated with the redevelopment project are assessed under both the Business-as-Usual (BAU) and GHG reduction scenarios.

Scope 1 – Diesel Fuel GHG Emissions

Parameter	Unit	Value
Diesel Fuel Consumption	L/year	4996
CO_2 Emission Factor	kg CO_2/gallon	10.21
CH_4 Emission Factor	g CH_4/gallon	0.41
N_2O Emission Factor	g N_2O/gallon	0.08
CO_2 Emissions	tons CO_2/year	6.45
CH_4 Emissions	tons CH_4/year	<0.01
N_2O Emissions	tons N_2O/year	<0.01
Total GHG Emissions	**tons CO_2-eq/year**	**13.52**

- **Data Source:** Sitanala Hospital for Generator 550 kVa and 1000 kVa Generator Fuel Consumption, 2025.
- **Emission Factor Sources:** Emission Factors for Greenhouse Gas Inventories US EPA, 2025
- **Global Warming Potential (GWP) value:** CO_2 = 1, CH_4: 29.8, and N_2O = 273 (IPCC AR6)

Scope 2 – Electricity GHG Emissions

Parameter	Unit	Value
Electricity Consumption	MWh/year	5,838.98
Grid Emission Factor (CM Ex-Post, OM=0.5; BM=0.5)	tons CO_2/MWh	0.87
Total GHG Emissions	**tons CO_2-eq/year**	**5,079.91**

Data Source: Sitanala Hospital Purchase Electricity Consumption 2025

Emission Factor Sources: Emission Factors for Greenhouse Gas Inventories from Electricity, Ministry of Energy and Mineral Resources (2019)

Global Warming Potential (GWP) value: CO2 = 1, CH4: 29.8, and N2O=273 (IPCC AR6)

Subject to verification and recalculation of the RSUP Dr. Sitanala-specific Scope 1 source data described above, the current draft estimate combines Scope 1 and Scope 2 emissions at approximately 5,093.43 tons CO_2-eq/year, with purchased electricity as the dominant component. This value must be updated if the verified diesel-consumption dataset differs from the source previously cited.

The World Bank Group 25,000 tons CO_2-eq/year value may be retained, if useful, only as a clearly identified GIIP/reference comparator and should not be presented as an AIIB compliance or disclosure threshold. Under AIIB ESS1, the Project should assess climate-related risks and greenhouse-gas emissions, identify technically and financially feasible resource-efficiency and low-carbon measures, and undertake ex-ante GHG accounting when AIIB determines that Project emissions are significant and such accounting is technically and financially feasible. The final ESIA should therefore emphasize verified Project emissions and feasible reduction measures rather than infer compliance from comparison with a non-AIIB threshold.

A11. GHG Projected under a Business-as-Usual

Future GHG emissions under the Business-as-Usual (BAU) scenario were estimated based on the existing operational GHG baseline and the projected increase in healthcare service capacity and

hospital infrastructure following the proposed redevelopment of RSUP Dr. Sitanala. As described in the Project Description, the redevelopment will significantly expand healthcare facilities, inpatient capacity, specialized treatment areas, outpatient services, supporting medical infrastructure, and overall hospital floor area. Consequently, future operational energy demand is expected to increase compared to existing conditions.

The future BAU GHG emissions forecast was developed based on the following assumptions:

- The existing operational GHG baseline for RSUP Dr. Sitanala is estimated at approximately 5,093.43 tons CO_2-eq/year, based on the 2025 operational data.
- Existing hospital bed capacity is approximately 276 beds, while the proposed redevelopment is planned to increase total bed capacity to approximately 600 beds.
- The existing gross floor area is approximately 31,025 m² (Table 4), while the proposed redevelopment will add approximately 55,950 m² of new gross floor area, resulting in a total gross floor area of approximately 86,975 m² following redevelopment.
- A bed capacity expansion factor of 2.17 was applied, representing the increase from existing to future hospital capacity (600 beds / 276 beds).
- A building area expansion factor of 2.80 was applied, representing the increase in gross floor area following redevelopment (86.975 m² / 31,025 m²).
- A blended scaling factor of approximately 2.49 was adopted to reflect both the increase in healthcare service capacity and the expansion of hospital infrastructure.
- Future operational energy demand is assumed to increase proportionally with the increase in healthcare service demand, supporting facilities, medical equipment, HVAC requirements, lighting systems, and associated utility consumption.

The BAU scenario assumes no dedicated energy efficiency measures, renewable energy systems, or specific GHG reduction initiatives beyond standard operational practices.
Based on the above assumptions, future operational GHG emissions under the BAU scenario are estimated as follows:

$$\text{Future GHG Emissions} = \text{Existing GHG Baseline} \times \text{Blended Scaling Factor} = 5{,}093.43 \times 2.49 = 12{,}682.64 \text{ tons } CO_2\text{-eq/year}$$

Based on the assessment, future operational GHG emissions under the BAU scenario are estimated at approximately 12,682.64 tons CO_2-eq/year, reflecting the planned expansion of hospital capacity, healthcare services, and supporting infrastructure.

A11. GHG Projected With Reduction Program

A GHG reduction scenario was developed to evaluate the potential reduction in operational greenhouse gas emissions associated with the implementation of the proposed Smart and Green Hospital concept. Based on the current Project design, two principal mitigation measures were identified as having the greatest potential to reduce long-term operational GHG emissions. These comprise: (i) implementation of the proposed Green Hospital Program through energy-efficient building design and operational measures; and (ii) installation of rooftop solar photovoltaic (PV) systems to offset purchased grid electricity consumption.

- Implementation of the proposed Green Hospital Program through energy-efficient building design and operational measures

The GHG reduction assessment for the proposed Green Hospital Program was developed with reference to the Green Buildings for the Health Care Sector: Cost-effective Measures for Sustainable Design published by the Inter-American Development Bank (IDB, 2020). The guideline presents several energy performance simulations based on the EDGE methodology to evaluate potential operational energy savings for healthcare facilities.

For this assessment, Simulation B was adopted as it most closely represents the Green Hospital measures incorporated into the current Project design, including a high-efficiency building envelope, glazing optimization, daylight utilization, and energy-efficient HVAC and lighting systems. Based on the IDB (2020) assessment, Simulation B achieves an estimated 29.36% reduction in operational energy consumption, which was adopted as the basis for estimating the corresponding reduction in electricity consumption and operational GHG emissions.

The GHG reduction assessment under the proposed Green Hospital Program was developed based on the following assumptions:

- The existing annual electricity consumption is 5,838.98 MWh/year, based on the 2025 operational electricity consumption of RSUP Dr. Sitanala.
- Under the Business-as-Usual (BAU) scenario, future electricity demand is assumed to increase proportionally with the projected expansion of hospital capacity and healthcare services. Applying the blended scaling factor of 2.49, the projected annual electricity demand under the BAU scenario is estimated at approximately 14,539.06 MWh/year.
- The projected energy saving is assumed to reduce purchased grid electricity consumption only. GHG emissions associated with backup diesel generators are assumed to remain unchanged, as their operation is expected to be limited to emergency conditions and routine testing.
- Implementation of the proposed Green Hospital measures is assumed to achieve an operational energy saving of 29.36%, consistent with the energy performance demonstrated under Simulation B.
- Accordingly, the projected annual electricity demand is reduced approximately from 14,539.06 MWh/year to 10,270.39 MWh/year, representing an annual electricity saving of approximately 4,268.67 MWh/year.
- The reduction in purchased grid electricity consumption is converted into GHG emission reductions using the same grid electricity emission factor adopted in the baseline GHG assessment.

Based on the above assumptions, the projected GHG emissions under the Green Building Program are estimated as follows:

Scope 2 – Reduction Estimated of GHG Emissions

Parameter	Unit	Value
Electricity Reduction	MWh/year	4,268.67
Grid Emission Factor (CM Ex-Post, OM=0.5; BM=0.5)	tons CO_2/MWh	0.87
Total Reduction GHG Emissions	**tons CO_2-eq/year**	**3,713.74**

Emission Factor Sources: Emission Factors for Greenhouse Gas Inventories from Electricity, Ministry of Energy and Mineral Resources (2019)

Global Warming Potential (GWP) value: CO2 = 1, CH4: 29.8, and N2O=273 (IPCC AR6)

Based on the assessment, implementation of the proposed Green Hospital Program is estimated to reduce operational GHG emissions by approximately 3,713.74 tons CO_2-eq/year, reducing projected future operational emissions from 12,682.64 to approximately 8,968.90 tons CO_2-eq/year.

- Installation of rooftop solar photovoltaic (PV) systems

Following implementation of the proposed Green Hospital Program, additional GHG emission reductions were assessed through the potential installation of rooftop solar photovoltaic (PV) systems as part of the Project's Smart and Green Hospital concept. The proposed PV system is intended to offset a portion of the remaining purchased grid electricity demand, thereby further reducing operational GHG emissions.

As outlined in the current Project design, the redevelopment includes the potential installation of rooftop solar PV systems with an indicative installed capacity of approximately 1.0–1.5 MWp, subject to confirmation during the Detailed Engineering Design (DED) stage. Accordingly, the GHG reduction assessment presented in this section represents a preliminary estimate based on the indicative PV capacity and conservative assumptions regarding annual solar electricity generation.

The GHG reduction scenario was developed based on the following assumptions:

- The future operational GHG emissions under the with green hospital program are estimated at approximately 8,968.90 tons CO_2-eq/year.
- The Project incorporates a planned rooftop solar photovoltaic (PV) system with an indicative installed capacity ranging from 1.0 MWp to 1.5 MWp, subject to detailed design and technical feasibility assessment.
- The annual electricity generation from the PV system is assumed to be approximately 1,400 kWh/year per kWp installed capacity, based on typical solar energy performance within the Greater Jakarta region.
- The PV system is assumed to directly offset purchased grid electricity consumption associated with hospital operations.
- The grid electricity emission factor applied in the assessment is 0.87 tons CO_2/MWh, consistent with the emission factor used in the baseline and BAU GHG calculations.
- No additional GHG reduction benefits associated with future energy efficiency measures, smart building systems, demand-side management, or operational optimization programs were included in the assessment. Therefore, the estimated reduction is considered conservative.

Based on the above assumptions, the proposed rooftop solar PV system with an indicative installed capacity of approximately 1.0–1.5 MWp is estimated to generate approximately 1,400–2,100 MWh/year of renewable electricity. By offsetting purchased grid electricity consumption, the PV system could reduce operational GHG emissions by approximately 1,218–1,827 tons CO_2-eq/year.

Accordingly, projected operational GHG emissions are estimated to decrease from approximately 8,968.90 tons CO_2-eq/year following implementation of the Green Hospital Program to approximately 7,750.90 – 7,141.90 tons CO_2-eq/year, depending on the final installed PV capacity and operational performance of the system. This represents an additional GHG emission reduction of approximately 17–25% relative to the Green Hospital scenario.

Based on the assessment, implementation of the green hospital and proposed rooftop solar PV system could provide a meaningful reduction in operational GHG emissions. The projected operational GHG emissions are below the World Bank Group reference value of 25,000 tons CO_2-eq/year, which is presented as a GIIP/reference comparator and not as an AIIB compliance or disclosure threshold.

Annex B - Labour Management Plan

B1. Introduction

Rumah Sakit Umum Pusat dr. Sitanala (RSST) is a government hospital under the Ministry of Health of the Republic of Indonesia, located in Tangerang City, Banten Province. The hospital is undergoing a major reconstruction and development program to upgrade its physical infrastructure, medical facilities, and service capacity in accordance with national health standards and international safeguard requirements.

The reconstruction project involves three phases of work: Pre Construction, Construction, and Operation. Each phase engages different categories of workers whose labor conditions, occupational health and safety, and rights must be carefully managed in accordance with Indonesian national regulations and the Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (ESF) standards.

This Labor Management Plan (LMP) identifies, manages, and monitors labor-related risks throughout the Project lifecycle and applies to Project workers and contracted labor as relevant, including contractors, subcontractors, primary-supply workers and community workers where applicable. Where government civil servants work in connection with the Project and remain subject to existing public-sector employment terms and applicable national civil-service law, the AIIB ESS1 labor-management relationship provisions do not replace those statutory arrangements. Project-specific OHS, safeguarding, incident-reporting and grievance channels may nevertheless be made available as supplementary measures, consistent with the ESP and applicable law.

B2. Purpose and Objectives

This LMP is prepared to achieve the following objectives:

- To establish clear standards, procedures, and responsibilities for labor management across all project phases
- To ensure compliance with applicable Indonesian labor laws and AIIB ESF requirements
- To protect the rights, health, safety, and dignity of all workers engaged in the RSST project
- To prevent and address occupational health and safety (OHS) hazards and incidents
- To prevent and respond to Sexual Exploitation, Abuse, and Harassment (SEAH) in the workplace
- To provide an accessible, fair, and confidential grievance redress mechanism for all workers
- To monitor, evaluate, and report on labor management performance throughout the project

B3. Scope of Application

This LMP applies to all workers involved in the RSST Reconstruction and Development Project across three phases. The categories of workers covered under this LMP are as follows:

B3.1 Pre-Construction Phase Workers

Workers engaged during the pre construction phase include:

- Environmental and social assessment consultants and specialists
- Survey and mapping field teams
- Land and asset assessment officers

- Community consultation and stakeholder engagement facilitators
- Design engineers and architectural consultants
- Government officials from the Project Implementation Unit (PIU) and hospital management

B3.2 Construction Phase Workers

Workers engaged during the construction phase include:

- Civil works contractors and subcontractors
  - Skilled laborers: masons, carpenters, electricians, plumbers, welders
  - Unskilled general laborers
- Construction supervisors and site engineers
  - Procurement and logistics personnel
- Medical waste and hazardous material handling workers
- Security and safety officers assigned to the construction site

B3.3 Operation Phase Workers

Workers engaged during the operation phase include:

- Permanent hospital staff: doctors, nurses, midwives, pharmacists, radiographers, and laboratory technicians
- Administrative and support staff
- Facility management and maintenance workers
- Medical waste and sanitation workers
- Security personnel
- Contracted service providers (catering, laundry, cleaning services)
- Temporary or seasonal workers hired for facility operations

B4. Legal Frameworks

This LMP is formulated based on the following national and international legal and regulatory frameworks:

B4.1 National Legal Frameworks

- Law No. 13 of 2003 on Manpower (Undang Undang Ketenagakerjaan): governs employment contracts, wages, working hours, rest periods, termination, and workers rights
- Law No. 1 of 1970 on Work Safety (Keselamatan Kerja): establishes mandatory occupational safety requirements for all workplaces
- Law No. 24 of 2011 on the Social Security Agency (BPJS): requires all workers to be enrolled in social security programs covering health, occupational accidents, old age, pension, and death

- Government Regulation No. 50 of 2012 on the Implementation of the Occupational Safety and Health Management System (SMK3): requires implementation of OHS management systems for all workplaces with 100 or more employees or high risk activities
- Minister of Manpower Regulation No. 5 of 2018 on OHS in the Work Environment: specifies OHS standards including ergonomics, hazardous chemicals, and physical work environment parameters
- Law No. 12 of 2022 on Sexual Violence Crimes (TPKS): provides comprehensive legal protection against sexual violence including in the workplace
- Law No. 36 of 2009 on Health: provides the basis for occupational health standards in health service institutions
- Presidential Regulation No. 21 of 2010 on Labor Inspection: establishes the framework for monitoring compliance with labor laws and regulations
- Minister of Public Works Regulation No. 14 of 2020 on Standards and Technical Guidelines for Construction Services: includes OHS requirements specifically for construction works

B4.2 AIIB Environmental and Social Framework (ESF) and Other International Best Practices

- AIIB Environmental and Social Policy (ESP) 2021: the overarching framework requiring all AIIB financed projects to meet environmental and social standards throughout the project cycle
- The World Bank ESF of Environmental and Social Standard 2 (ESS2) on Labor and Working Conditions: the primary standard governing labor management, covering terms and conditions of employment, protection of the workforce, OHS, child labor, forced labor, and the grievance mechanism for workers
- World Bank ESF of Environmental and Social Standard 4 (ESS4) on Community Health, Safety, and Security: relevant to construction activities that may impact surrounding community health and safety
- IFC Performance Standard 2 on Labor and Working Conditions: referenced as an international good practice standard for labor management in development projects
- International Labour Organization (ILO) Core Labor Standards: including conventions on freedom of association, collective bargaining, elimination of forced labor, abolition of child labor, and elimination of discrimination in employment
- World Bank Environmental, Health and Safety (EHS) Guidelines for Health Care Facilities: applicable during both construction and operation phases
- AIIB Environmental and Social Framework (ESF), as amended through 26 June 2024, particularly ESS1 on Environmental and Social Assessment and Management, requires the Project to identify, assess and manage relevant social risks, including labor and working conditions, gender-related risks, GBV, SEA and SH, and to establish appropriate prevention, mitigation, grievance and response measures.

B5. Potential Labor Risks

Based on the nature of the project and the types of workers involved, the following labor risks have been identified across the three project phases. Mitigation measures are also proposed for each risk category.

B5.1 Occupational Health and Safety (OHS) Risks

Risk: Workers face potential injuries, illnesses, and fatalities due to physical hazards at construction sites including falls from height, struck by objects, electrical hazards, exposure to dust, noise, and hazardous chemicals. Medical staff face exposure to infectious diseases, needle stick injuries, and patient handling injuries during operation.

Mitigation measures:

- Develop and implement a site specific OHS Management Plan (OHS MP) aligned with Government Regulation No. 50 of 2012 on SMK3
- Conduct regular OHS induction training for all workers prior to commencing work
- Provide adequate and appropriate Personal Protective Equipment (PPE) to all workers free of charge
- Establish and enforce site safety protocols including permit to work systems for high risk activities
- Conduct regular site safety inspections and risk assessments
- Establish emergency response procedures and first aid facilities at all work sites
- Ensure all workers are registered with BPJS Ketenagakerjaan covering work accident insurance (JKK)

B5.2 Child Labor and Forced Labor Risks

Risk: The use of child labor or forced labor may occur through contractor and subcontractor chains, particularly among unskilled workers during construction.

Mitigation measures:

- Establish a minimum age requirement of 18 years for all construction workers
- Require all contractors and subcontractors to submit worker identity documents as part of contract compliance
- Conduct periodic audits of contractor workforce to verify age compliance
- Prohibit deduction of wages as a debt repayment mechanism or any practice amounting to forced labor
- Include anti child labor and anti forced labor clauses in all contractor and subcontractor agreements

B5.3 Discrimination and Non Inclusion Risks

Risk: Workers from marginalized groups including women, persons with disabilities, and migrant workers may face discriminatory hiring practices or unequal treatment in the workplace.

Mitigation measures:

- Adopt and enforce a non discrimination policy in all recruitment, promotion, and compensation processes
- Ensure equal pay for equal work regardless of gender, ethnicity, religion, or disability

- Provide gender sensitive facilities at work sites including separate toilets, rest rooms, and breastfeeding areas
- Include gender and inclusion awareness in worker induction programs
- Track and report on gender disaggregated data for workforce composition

B5.4 Sexual Exploitation, Abuse, and Harassment (SEAH) Risks

Risk: The presence of an influx of construction workers near the hospital and surrounding communities increases the risk of sexual harassment, exploitation, and gender based violence, particularly affecting women workers and community members.

Mitigation measures:

- Develop and enforce a SEAH prevention and response policy applicable to all project workers
- Require all workers to sign the Worker Code of Conduct that includes SEAH prohibitions
- Provide mandatory SEAH awareness training to all workers at induction and periodically thereafter
- Establish a confidential SEAH reporting channel accessible to all workers and community members
- Implement zero tolerance policy with clear consequences for perpetrators including dismissal and referral to legal authorities
- Ensure worker accommodations are separate from community living areas where possible

B5.6 Labor Contract and Wage Related Risks

Risk: Workers engaged directly by Hospital, Contractors, and Sub-contractors or could be engaged by third party (labor recruiters company). This engagement may face irregular or delayed wage payments, unclear contractual terms, illegal deductions, or absence of formal employment contracts, particularly workers hired through third party or subcontractors.

Mitigation measures:

- Ensure all workers receive written employment contracts prior to commencement of work in a language they understandrEnsure wages comply with or exceed the applicable regional minimum wage (UMP or UMK) at all timesrProhibit any unauthorized wage deductions not provided for by law or agreed upon in writing
- Establish a clear and timely wage payment schedule and enforce it across all contractors
- Maintain worker payroll records available for inspection by the PIU and relevant authorities

B6. Roles and Responsibilities

The implementation of this LMP requires clear division of roles and responsibilities across key parties. The following matrix outlines the responsibilities of the main actors:

No	Responsibility Area	Hospital Management and PIU	Contractors and Subcontractors
1	LMP Preparation and Update	Lead preparation and update of LMP. Ensure LMP aligns with national law and AIIB ESF.	Implement LMP requirements in contractor operations.
2	Worker Recruitment	Oversee recruitment practices. Ensure non discriminatory hiring policies are applied.	Conduct recruitment in compliance with LMP. Submit worker lists to PIU for review.
3	Employment Contracts and Wages	Verify all workers have valid contracts. Monitor wage compliance.	Issue written contracts to all workers. Pay wages on time and at or above minimum wage.
4	OHS Management	Approve site OHS plans. Monitor OHS performance. Respond to OHS incidents.	Develop and implement site OHS plan. Provide PPE. Conduct OHS induction training.
5	SEAH Prevention and Response	Adopt SEAH policy. Oversee implementation. Receive and investigate SEAH complaints.	Enforce Code of Conduct. Ensure SEAH training for all workers. Report SEAH incidents to PIU.
6	Grievance Redress Mechanism	Establish and maintain worker GRM. Ensure all workers know how to access GRM.	Inform workers of GRM. Assist workers in submitting grievances. Participate in GRM process.
7	Monitoring and Reporting	Monitor contractor compliance. Prepare quarterly LMP progress reports for AIIB.	Submit monthly labor management reports to PIU. Maintain records of all workers.

B7. Proposed Policies and Procedures

B7.1 Employment and Terms of Work Policy

- All workers must receive written employment contracts before commencing work. Contracts shall specify the nature of work, duration, wages, working hours, and applicable benefits.
- Working hours shall not exceed 8 hours per day and 40 hours per week as stipulated in Law No. 13 of 2003. Overtime shall be compensated in accordance with the applicable law.
- Wages shall be paid regularly on a monthly or agreed schedule and shall not fall below the applicable regional minimum wage.
- Workers shall be entitled to annual leave, sick leave, and religious holiday allowance (THR) as provided under national law.
- All workers shall be registered with BPJS Kesehatan and BPJS Ketenagakerjaan upon commencement of employment.

B7.2 Child Labor and Forced Labor Policy

- The minimum age for employment on this project is 18 years. No child labor shall be permitted under any circumstances.
- No form of forced or compulsory labor shall be used on this project. Workers shall be free to leave employment upon providing reasonable notice.
- All contractors and subcontractors must include anti child labor and anti forced labor provisions in their worker agreements and comply with all verification requirements.

B7.3 OHS Policy and Procedures

- The project shall implement an OHS Management Plan compliant with Government Regulation No. 50 of 2012 on SMK3 and the AIIB ESF standards.
- OHS induction training is mandatory for all workers before commencing any work activities. Refresher training shall be conducted every six months.
- All construction sites shall display safety signage, emergency contacts, and evacuation routes in Bahasa Indonesia.
- Incident reporting is mandatory. All accidents, near misses, and occupational illnesses must be reported to the site OHS officer within 24 hours of occurrence.
- A safety data sheet (SDS) shall be maintained for all hazardous substances used on site and shall be accessible to all relevant workers.

B7.4 SEAH Prevention Policy

- All workers shall sign and adhere to the Worker Code of Conduct prior to commencing work. The Code explicitly prohibits all forms of sexual harassment, exploitation, and abuse.
- Mandatory SEAH awareness training shall be provided to all workers during induction and at least once annually thereafter.
- Any allegation of SEAH shall be treated as a serious matter, investigated promptly and confidentially, and reported to the PIU and relevant authorities.
- Survivors of SEAH shall be provided access to appropriate support services including medical and psychosocial support.

B7.5 Freedom of Association and Collective Bargaining

- Workers have the right to form and join workers organizations and to bargain collectively in accordance with national law and ILO core conventions.
- No worker shall be penalized, discriminated against, or terminated for exercising their rights to freedom of association or collective bargaining.
- Where freedom of association is restricted by national law, workers shall be allowed to elect worker representatives to communicate workplace concerns to management.

B8. Workers Grievance Redress Mechanism (GRM)

A dedicated Workers Grievance Redress Mechanism (GRM) is established to allow all workers to raise concerns, complaints, or grievances in a safe, accessible, and confidential manner. The GRM is distinct from the community grievance mechanism and is specifically designed for project workers.

B8.1 Principles of the Workers GRM

- Accessibility: The GRM shall be accessible to all workers regardless of literacy level, gender, or employment status
- Confidentiality: The identity of complainants shall be protected unless the complainant consents to disclosure
- Non retaliation: Workers who submit grievances in good faith shall be protected from retaliation of any kind
- Transparency: Workers shall be informed of the outcome of their grievance at each step of the process
- Timely resolution: All grievances shall be addressed within established timeframes

B8.2 Grievance Submission Channels

Workers may submit grievances through the following channels:

- Verbal: Directly to the site Grievance Focal Point (GFP) or OHS Officer
- Written: Using the Grievance Form available at the site office and welfare facilities
- Suggestion box: Anonymous suggestion boxes placed at accessible locations on site
- Hotline: A designated grievance phone number or WhatsApp contact managed by the PIU
- Email: Dedicated grievance email address managed by the PIU Environmental and Social Officer

B8.3 Grievance Resolution Steps and Responsible Persons

The grievance resolution process follows five sequential steps:

Step	Action	Responsible Person	Timeframe
Step 1: Grievance Receipt and Registration	Worker submits grievance through any available channel. Grievance is recorded in the Grievance Register with date, details, and contact of complainant.	Site Grievance Focal Point (GFP) or PIU Environmental and Social Officer	Within 2 working days of receipt
Step 2: Acknowledgement	Complainant is notified that their grievance has been received and assigned a reference number. An initial response is provided.	Site GFP in coordination with Contractor Management	Within 3 working days of receipt

Step	Action	Responsible Person	Timeframe
Step 3: Investigation and Assessment	The grievance is reviewed and investigated. Additional information may be requested. Site visit or meeting with relevant parties may be conducted.	PIU Environmental and Social Officer and relevant department heads	Within 7 working days of acknowledgement
Step 4: Resolution and Response	A proposed resolution is communicated to the complainant. If the complainant accepts, the grievance is closed. If not accepted, escalation occurs.	PIU Project Manager and Contractor Management	Within 14 working days of receipt
Step 5: Escalation and External Referral	If a worker remains dissatisfied, the grievance may be escalated through the PIU/Hospital and applicable labor-administration or industrial-relations mechanisms, including Disnaker and, where applicable, the Industrial Relations Court. Use of the worker GRM does not restrict access to lawful remedies. AIIB's Management grievance process and PPM must be disclosed separately; they are not routine worker appeal stages, and PPM eligibility concerns alleged failure by AIIB to implement its Environmental and Social Policy.	PIU/Hospital; Contractor/Employer; Disnaker or other competent industrial-relations authority, as applicable	As required

B9. Evaluation

Regular evaluation of the LMP implementation shall be conducted to assess effectiveness, identify gaps, and make necessary improvements. The following evaluation activities shall be undertaken:

- Monthly internal monitoring: The PIU Environmental and Social Officer shall conduct monthly monitoring visits to construction sites to assess LMP compliance. Findings shall be documented in a monitoring log.
- Semi annual evaluation: A comprehensive evaluation of LMP implementation shall be conducted every six months, covering all risk areas including OHS, labor rights, SEAH prevention, and the GRM.
- Annual performance review: An annual review of the LMP shall be conducted by the PIU together with the Hospital Management and key contractors to assess progress against LMP objectives and revise the plan as needed.
- Incident review: All OHS incidents, grievances, and SEAH cases shall be reviewed and documented as part of a corrective action process. Root cause analysis shall be conducted for serious incidents.
- Worker feedback surveys: Anonymous surveys shall be conducted at least once annually to obtain workers perspectives on working conditions, OHS, and the grievance mechanism.

B9.1 Key Performance Indicators (KPIs)

- Number of OHS incidents (total, by type, and severity) per month
- Percentage of workers who have received OHS induction training
- Percentage of workers with valid written employment contracts
- Percentage of workers enrolled in BPJS Kesehatan and BPJS Ketenagakerjaan
- Number of grievances received, resolved, and pending per reporting period
- Number of SEAH complaints and percentage resolved satisfactorily
- Gender disaggregated breakdown of workforce composition
- Number of child labor or forced labor violations identified and remediated

B10. Reporting

Reporting on LMP implementation is a mandatory obligation under the AIIB ESF and is essential for demonstrating compliance and accountability. The following reporting requirements apply:

- Contractor Monthly Labor Report: All contractors shall submit a monthly labor management report to the PIU by the 5th of every following month. The report shall cover: number of workers by type and gender, OHS incidents and near misses, grievances received and status, training activities conducted, and wage payment status.
- PIU Quarterly Environmental and Social Progress Report: The PIU shall prepare a quarterly Environmental and Social Progress Report to be submitted to AIIB. The LMP implementation section shall include a summary of all monitoring findings, KPI performance, grievance statistics, and any corrective actions taken.
- Incident and Emergency Report: Any serious OHS incident (fatality, permanent disability, or hospitalization), SEAH complaint, or significant labor grievance shall be reported to AIIB within 48 hours of occurrence using the AIIB incident reporting form.Annual LMP Review Report: An annual report summarizing the overall performance of the LMP implementation, lessons learned, and proposed updates to the LMP for the following year shall be prepared by the PIU and submitted to AIIB.

- LMP Completion Report: At the end of each project phase, a phase completion report shall document all labor management activities, outcomes, and remaining issues to be addressed in the next phase.

B10.1 Record Keeping

All labor management records shall be maintained for a minimum of 5 years after project completion and shall be available for review by AIIB upon request

Records to be maintained include: worker contracts, payroll records, BPJS registration documents, OHS training attendance sheets, incident reports, grievance register, and evaluation reports

Records shall be stored securely with appropriate data protection measures to safeguard personal information of workers

B10.2 Worker Code Of Conduct

Self Assessment Checklist on OHS and SEAH

This self assessment checklist is to be completed by every worker at RSST Project prior to commencing work and reviewed periodically. Please tick the appropriate response for each statement. This checklist serves as your personal commitment to uphold safe, respectful, and ethical conduct at all times during your engagement with this project.

Worker Name: _____

Position or Role: _____

Employer or Contractor: _____

Date: _____

PART A: Occupational Health and Safety (OHS)For each statement below, please mark: Y = Yes (I comply) | N = No (I do not comply yet) | NA = Not Applicable to my role

No.	Statement	Y	N	NA
1	I always wear the required PPE (helmet, safety shoes, vest, gloves, mask) when working in the project site			
2	I have attended and understood the OHS induction training before starting work			
3	I know the location of the nearest first aid kit, fire extinguisher, and emergency exit			

No.	Statement	Y	N	NA
4	I report unsafe conditions, near misses, or accidents to my supervisor immediately			
5	I do not perform work activities while under the influence of alcohol or drugs			
6	I follow all site safety rules and procedures as instructed by my supervisor and safety officer			
7	I use tools and equipment only for their intended purpose and ensure they are in good working condition			
8	I participate in all mandatory OHS trainings and toolbox meetings			
9	I keep my work area clean and orderly to prevent accidents (housekeeping)			
10	I understand the emergency procedures and the evacuation assembly point			

PART B: Sexual Exploitation, Abuse, and Harassment (SEAH)

Please read and self assess against each statement below:

No.	Statement	Y	N	NA
1	I have read and signed the Worker Code of Conduct and I understand its requirements			
2	I understand that sexual harassment, sexual exploitation, and sexual abuse are strictly prohibited and will result in disciplinary action			
3	I treat all colleagues, patients, community members, and stakeholders with dignity and respect regardless of gender, ethnicity, religion, or disability			
4	I will report any incident of sexual harassment, exploitation, or abuse that I witness or am subjected to through the available grievance channel			

No.	Statement	Y	N	NA
5	I understand the confidential reporting channels available to me and know how to access them			
6	I will not engage in or condone discriminatory or offensive language, gestures, or behavior in the workplace			
7	I will not use my position to coerce, demand, or receive sexual favors in exchange for employment benefits or preferential treatment			
8	I commit to supporting and not retaliating against any worker who reports a SEAH incident in good faith			

Declaration and Signature

I, the undersigned, declare that I have read, understood, and committed to uphold the Worker Code of Conduct as stated in this document. I understand that any violation of this Code may result in disciplinary action, including immediate termination of employment and, where applicable, referral to law enforcement authorities.

Worker Signature: _____ Date: _____

Supervisor or GFP Signature: _____ Date: _____

Witness Name and Signature: _____ Date: _____

B10.3 Summary List Of Personal Protective Equipment (Ppe)

The following matrix summarizes the required PPE categories, items, and their functions for workers at the RSST Reconstruction and Development Project. All workers shall be provided with appropriate PPE free of charge. Workers are required to always use PPE correctly when in designated work areas.

No.	Category	PPE Items	Function
1	Head Protection	Safety helmet (hard hat)	Protects the head from falling objects, bumps, and impact injuries at construction sites
2	Foot Protection	Safety boots or safety shoes with steel toe cap and puncture resistant sole	Protects feet from crushing injuries, punctures, and slips on wet or uneven surfaces
3	Eye and Face Protection	Safety goggles, safety glasses, face shield	Protects eyes and face from dust, debris, chemical splashes, sparks, and UV radiation during welding or cutting operations
4	Hand Protection	Construction gloves (heavy duty), chemical resistant gloves, cut resistant gloves, latex gloves (for medical staff)	Protects hands from cuts, abrasions, chemical exposure, heat, and infection
5	Hearing Protection	Ear plugs, ear muffs	Protects hearing from excessive noise levels exceeding 85 dB produced by heavy machinery, jackhammers, and drilling
6	Respiratory Protection	Dust mask (N95 or equivalent), respirator with appropriate cartridge, surgical mask (for medical staff)	Protects respiratory system from dust, harmful fumes, chemical vapors, asbestos, cement dust, and airborne biological hazards
7	Body and High Visibility Protection	High visibility (hi vis) safety vest, coveralls, chemical protective suit	Increases worker visibility to equipment operators and drivers; protects body from minor impacts, chemical splash, and contamination
8	Fall Protection	Safety harness, lanyard, lifeline, anchor point equipment	Prevents and arrests falls when working at height (above 1.8 meters). Mandatory for all work involving scaffolding, ladders, or elevated platforms
9	Electrical Hazard Protection	Insulated rubber gloves, insulated tools, arc flash protective clothing	Protects workers from electrical shock, arc flash burns, and electrocution during electrical

No.	Category	PPE Items	Function
			installation and maintenance works
10	Medical and Biological Hazard Protection (Operation Phase)	Gown or apron, face mask, latex gloves, shoe covers, head cover, goggles or face shield (for medical staff and waste handlers)	Protects medical and clinical staff from exposure to bloodborne pathogens, infectious agents, bodily fluids, and contaminated medical waste

Annex C - Stakeholder Mapping

Stakeholder mapping, followed by stakeholder engagement, constitutes two interrelated and inseparable processes in the preparation of the ESIA and the Stakeholder Engagement Plan (SEP). Together, they form a continuous framework for social analysis and management throughout the project lifecycle.

In the context of the RSUP Dr. Sitanala Development Project, stakeholder mapping serves to identify and understand all stakeholders associated with the project, including their positions, levels of interest, influence, and vulnerability in relation to project activities. Stakeholder engagement, meanwhile, represents the process of consultation, participation, and communication carried out based on the results of the stakeholder mapping process.

Accordingly, engagement activities are not conducted randomly, but are developed based on a systematic understanding of:

- parties directly and indirectly affected by the project;
- parties capable of influencing decision-making processes or public perception;
- vulnerable groups requiring specific approaches; and
- stakeholders requiring different forms of information disclosure, consultation, or communication mechanisms.

During the pre-construction stage, stakeholder mapping for the RSUP Dr. Sitanala Development Project was conducted as an analytical process to identify parties associated with the project and to understand the level of interest, influence, vulnerability, and relationships of each stakeholder in relation to project activities. This process was not undertaken arbitrarily, but was structured based on analyses of project activities, potential environmental and social impacts, hospital service functions, institutional structures, the project area of influence, stakeholder characteristics, and potential vulnerabilities and risks that may arise from project implementation.

Stakeholder mapping utilizes a quadrant-based approach to identify which stakeholders are the most important and influential in decision-making processes, determine engagement strategies, and manage social as well as reputational risks associated with the project. In the context of the RSUP Dr. Sitanala Development Project, stakeholder quadrants are determined based on:

- The extent of stakeholders' relationship, dependency, or exposure to The Project project → **interest**
- The extent of stakeholders' ability to influence decisions, operations, legitimacy, or the success of The Project project → **influence/power**

Stakeholders identified during the initial stage include:

- government institutions and regulators
- hospital management and workforce
- patients and patient companions
- communities residing around The Project area
- vulnerable groups and groups with specific social sensitivities
- healthcare service and institutional partners
- financing institutions and safeguard-related entities; and
- academic observers and the general public.

Each stakeholder was analyzed based on:

- level of influence over the project
- level of dependency on hospital services
- potential exposure to environmental and social impacts
- institutional authority
- sensitivity to project-related risks; and
- potential roles in supporting or influencing project implementation.

The analysis resulted in:

- a stakeholder list and categorization
- power-interest mapping
- identification of vulnerable groups; and
- determination of stakeholder engagement priorities for consultation and project engagement processes.

Quadrant

Quadrant 4	**Quadrant 1**
Lower Interest – Lower Influence This category includes stakeholders that have a relatively indirect relationship with the project and more limited influence over project implementation. Indicative stakeholders within this category include: ▪ the general public; ▪ media organizations; and ▪ academic observers. Although initially categorized as having lower interest and influence, these groups remain relevant in terms of: ▪ public transparency; ▪ reputational sensitivity; ▪ information disclosure; and ▪ public perception of the project. The position of these groups may also change as the project progresses, particularly in the event of environmental incidents, service disruptions, social issues, or increased media attention.	**High Interest – High Influence** This category includes stakeholders that have very strong linkages to the project while also possessing the capacity to influence project implementation, legitimacy, safeguard compliance, and decision-making processes. Indicative stakeholders within this category include: ▪ the Ministry of Health; ▪ the safeguard team of the Asian Infrastructure Investment Bank (AIIB); ▪ the management and Board of Directors of RSUP Dr. Sitanala; and ▪ the Spatial Planning Agency. These stakeholders possess strategic influence due to their regulatory authority, financing and safeguard functions, operational responsibilities, and decision-making mandates related to the project.
Quadrant 3	**Quadrant 2**
High Interest – Lower Influence This category includes stakeholders that are directly affected by the project or highly dependent on hospital services, but possess more limited	**Lower Interest – High Influence** This category includes institutions that may not be directly affected by the project's day-to-day activities but possess significant influence over project

institutional influence over project decision-making processes. Indicative stakeholders within this category include: ▪ patient communities and patient companions; ▪ residential communities adjacent to the northern and southern boundaries of The Project area; ▪ workers; and ▪ the former leprosy patient community. These groups may experience direct impacts related to: ▪ changes in accessibility; ▪ noise and dust disturbances; ▪ traffic and safety; ▪ changes in service conditions; ▪ social sensitivities; ▪ livelihood disturbances; and ▪ specific forms of social stigma. Within this category, several groups may also be classified as vulnerable groups, particularly: ▪ elderly persons; ▪ persons with disabilities; ▪ women caregivers; ▪ low-income patients; ▪ socially marginalized groups; and ▪ members of the former leprosy patient community with heightened social sensitivities. Accordingly, this category represents one of the main priorities in subsequent consultation and stakeholder engagement processes through the Stakeholder Engagement Plan (SEP).	implementation from regulatory, operational, supervisory, or reputational perspectives. Indicative stakeholders within this category include: ▪ the Environmental Agency; ▪ the Transportation Agency; ▪ BPJS Kesehatan; ▪ the Culture and Tourism Agency; and ▪ the Health Agency. Their influence is primarily associated with: ▪ environmental compliance; ▪ transportation and access management; ▪ healthcare system coordination; ▪ institutional oversight; ▪ integration of public services; and ▪ project governance aspects.

In the RSUP Dr. Sitanala Development Project, this process is considered important because stakeholder characteristics are dynamic and may change across different project stages in response to changes in impact sources, risk levels, social sensitivities, public healthcare service needs, and hospital operational conditions. Accordingly, stakeholder mapping and engagement are understood as evolving processes that will be progressively updated through the implementation of the Stakeholder Engagement Plan (SEP), public consultations and information disclosure activities, as well as the project communication and grievance mechanism (GRM).

This initial mapping categorizes stakeholders into four interest–influence categories, which will be further refined through the formal preparation of the Stakeholder Engagement Plan (SEP) presented in Chapter 9. In addition, stakeholder mapping serves as the basis for identifying vulnerable groups, determining consultation priorities, and developing differentiated stakeholder engagement approaches based on the characteristics of each stakeholder group.

Stakeholder mapping, followed by stakeholder engagement, constitutes two interrelated and inseparable processes in the preparation of the ESIA and the Stakeholder Engagement Plan (SEP).

Together, they form a continuous framework for social analysis and management throughout the project lifecycle.

In the context of the RSUP Dr. Sitanala Development Project, stakeholder mapping serves to identify and understand all stakeholders associated with the project, including their positions, levels of interest, influence, and vulnerability in relation to project activities. Stakeholder engagement, meanwhile, represents the process of consultation, participation, and communication carried out based on the results of the stakeholder mapping process.

Accordingly, engagement activities are not conducted randomly, but are developed based on a systematic understanding of:

- parties directly and indirectly affected by the project;
- parties capable of influencing decision-making processes or public perception;
- vulnerable groups requiring specific approaches; and
- stakeholders requiring different forms of information disclosure, consultation, or communication mechanisms.

During the pre-construction stage, stakeholder mapping for the RSUP Dr. Sitanala Development Project was conducted as an analytical process to identify parties associated with the project and to understand the level of interest, influence, vulnerability, and relationships of each stakeholder in relation to project activities. This process was not undertaken arbitrarily, but was structured based on analyses of project activities, potential environmental and social impacts, hospital service functions, institutional structures, the project area of influence, stakeholder characteristics, and potential vulnerabilities and risks that may arise from project implementation.

Stakeholder mapping utilizes a quadrant-based approach to identify which stakeholders are the most important and influential in decision-making processes, determine engagement strategies, and manage social as well as reputational risks associated with the project. In the context of the RSUP Dr. Sitanala Development Project, stakeholder quadrants are determined based on:

- The extent of stakeholders' relationship, dependency, or exposure to The Project project → **interest**
- The extent of stakeholders' ability to influence decisions, operations, legitimacy, or the success of The Project project → **influence/power**

Stakeholders identified during the initial stage include:

- government institutions and regulators
- hospital management and workforce
- patients and patient companions
- communities residing around The Project area
- vulnerable groups and groups with specific social sensitivities
- healthcare service and institutional partners
- financing institutions and safeguard-related entities; and
- academic observers and the general public.

Each stakeholder was analyzed based on:

- level of influence over the project
- level of dependency on hospital services
- potential exposure to environmental and social impacts
- institutional authority

- sensitivity to project-related risks; and
- potential roles in supporting or influencing project implementation.

The analysis resulted in:

- a stakeholder list and categorization;
- power-interest mapping;
- identification of vulnerable groups; and
- determination of stakeholder engagement priorities for consultation and project engagement processes.

Quadrant

Quadrant 4	**Quadrant 1**
Lower Interest – Lower Influence This category includes stakeholders that have a relatively indirect relationship with the project and more limited influence over project implementation. Indicative stakeholders within this category include: ▪ the general public; ▪ media organizations; and ▪ academic observers. Although initially categorized as having lower interest and influence, these groups remain relevant in terms of: ▪ public transparency; ▪ reputational sensitivity; ▪ information disclosure; and ▪ public perception of the project. The position of these groups may also change as the project progresses, particularly in the event of environmental incidents, service disruptions, social issues, or increased media attention.	**High Interest – High Influence** This category includes stakeholders that have very strong linkages to the project while also possessing the capacity to influence project implementation, legitimacy, safeguard compliance, and decision-making processes. Indicative stakeholders within this category include: ▪ the Ministry of Health; ▪ the safeguard team of the Asian Infrastructure Investment Bank (AIIB); ▪ the management and Board of Directors of RSUP Dr. Sitanala; and ▪ the Spatial Planning Agency. These stakeholders possess strategic influence due to their regulatory authority, financing and safeguard functions, operational responsibilities, and decision-making mandates related to the project.
Quadrant 3	**Quadrant 2**
High Interest – Lower Influence This category includes stakeholders that are directly affected by the project or highly dependent on hospital services, but possess more limited institutional influence over project decision-making processes. Indicative stakeholders within this category include: ▪ patient communities and patient companions; ▪ residential communities adjacent to the northern and southern boundaries of The Project area;	**Lower Interest – High Influence** This category includes institutions that may not be directly affected by the project's day-to-day activities but possess significant influence over project implementation from regulatory, operational, supervisory, or reputational perspectives. Indicative stakeholders within this category include: ▪ the Environmental Agency; ▪ the Transportation Agency; ▪ BPJS Kesehatan; ▪ the Culture and Tourism Agency; and

▪ workers; and ▪ the former leprosy patient community. These groups may experience direct impacts related to: ▪ changes in accessibility; ▪ noise and dust disturbances; ▪ traffic and safety; ▪ changes in service conditions; ▪ social sensitivities; ▪ livelihood disturbances; and ▪ specific forms of social stigma. Within this category, several groups may also be classified as vulnerable groups, particularly: ▪ elderly persons; ▪ persons with disabilities; ▪ women caregivers; ▪ low-income patients; ▪ socially marginalized groups; and ▪ members of the former leprosy patient community with heightened social sensitivities. Accordingly, this category represents one of the main priorities in subsequent consultation and stakeholder engagement processes through the Stakeholder Engagement Plan (SEP).	▪ the Health Agency. Their influence is primarily associated with: ▪ environmental compliance; ▪ transportation and access management; ▪ healthcare system coordination; ▪ institutional oversight; ▪ integration of public services; and ▪ project governance aspects.

In the RSUP Dr. Sitanala Development Project, this process is considered important because stakeholder characteristics are dynamic and may change across different project stages in response to changes in impact sources, risk levels, social sensitivities, public healthcare service needs, and hospital operational conditions. Accordingly, stakeholder mapping and engagement are understood as evolving processes that will be progressively updated through the implementation of the Stakeholder Engagement Plan (SEP), public consultations and information disclosure activities, as well as the project communication and grievance mechanism (GRM).

This initial mapping categorizes stakeholders into four interest–influence categories, which will be further refined through the formal preparation of the Stakeholder Engagement Plan (SEP) presented in Chapter 9. In addition, stakeholder mapping serves as the basis for identifying vulnerable groups, determining consultation priorities, and developing differentiated stakeholder engagement approaches based on the characteristics of each stakeholder group.

C1. Stakeholder Engagement

Stakeholder engagement is conducted after the project has developed an initial understanding of project activities as well as the potential environmental, social, health, safety, and operational impacts and risks that may arise. In the context of a hospital development project, such issues may include noise, dust, changes in accessibility, ambulance and project vehicle traffic, community safety, sensitivities related to medical waste management, disturbances to patients, and social sensitivities affecting certain groups.

Based on this preliminary understanding, the engagement process is then carried out to obtain direct input, clarification, and validation from stakeholders regarding site conditions and potential project

impacts. Accordingly, stakeholder engagement does not merely function as an information dissemination or project socialization activity, but also as a mechanism to understand stakeholder perceptions, experiences, needs, and concerns in a more contextual manner.

Consultation Between The Project and Communities and Other Stakeholders Conducted / To Be Conducted

As part of the ESIA preparation process and the development of the RSUP Dr. Sitanala Project, The Project has conducted initial consultations and communications with various stakeholders associated with the project. These consultation activities were undertaken to:

- disclose preliminary information regarding the proposed project;
- obtain stakeholder input and perceptions;
- identify issues, concerns, and social sensitivities; and
- support the contextual identification of project impacts and risks.

Initial consultations were conducted progressively with the involvement of:

- relevant government agencies and regulators;
- communities surrounding The Project area;
- patients and patient companions;
- hospital workers and management;
- communities with specific social sensitivities; and
- other technical and institutional stakeholders.

The consultation methods applied included:

- coordination meetings;
- informal consultations;
- interviews;
- small group discussions;
- institutional communications; and
- preliminary information disclosure regarding The Project development plan.

In general, issues and stakeholder concerns initially identified through the consultation process included:

- potential noise and dust disturbances during construction;
- changes in accessibility and traffic conditions around The Project;
- patient and community safety;
- continuity of hospital operational services during construction;

- sensitivities regarding medical waste management;
- comfort and convenience of surrounding communities;
- the need for clear and continuous project information; and
- social sensitivities related to the former leprosy patient community and other vulnerable groups.

In addition, the initial consultations indicated that several stakeholders require differentiated engagement approaches, particularly:

- vulnerable groups;
- patients and patient companions;
- elderly persons and persons with disabilities; and
- communities located directly adjacent to The Project area.

Inputs obtained through the initial consultation process serve as one of the bases for:

- refinement of stakeholder mapping;
- validation of project impacts and risks;
- identification of vulnerable groups; and
- preparation of the Stakeholder Engagement Plan (SEP) and social management mechanisms for subsequent project stages.

This consultation and engagement process will continue progressively throughout the project lifecycle in accordance with project development, evolving risks, and stakeholder information and participation needs.

Example Table of Public Consultation / Interviews / Socialization Activities

No.	Date	Stakeholder Group	Institution / Community	Consultation Method	Main Issues Raised	Key Inputs / Concerns	Follow-Up Actions
1	[Date]	Government Agency	Environmental Agency	Coordination Meeting	Environmental management	Need for compliance monitoring	To be integrated into ESMP
2	[Date]	Local Community	Adjacent Residential Community	Public Consultation	Noise and dust	Concern regarding construction disturbance	Dust and noise mitigation measures
3	[Date]	Patients	Patient Representatives	Interview	Accessibility and comfort	Need to maintain hospital access	Traffic management planning

No.	Date	Stakeholder Group	Institution / Community	Consultation Method	Main Issues Raised	Key Inputs / Concerns	Follow-Up Actions
4	[Date]	Vulnerable Groups	Elderly / Disabled Groups	Small Group Discussion	Accessibility barriers	Request for inclusive access	Accessibility design review
5	[Date]	Hospital Workers	Hospital Staff	Internal Consultation	Operational continuity	Concern regarding service disruption	Construction phasing coordination
6	[Date]	Community with Social Sensitivity	Former Leprosy Patient Community	Informal Consultation	Social stigma and communication	Request for respectful engagement	Inclusive communication approach
7	[Date]	Institutional Stakeholder	BPJS Kesehatan	Institutional Communication	Service continuity	Coordination during construction	Further coordination meetings
8	[Date]	General Public	Public Participants	Information Disclosure	Project transparency	Need for continuous information	GRM and communication updates

Annex C operationalises the stakeholder engagement framework introduced in Chapter 9 into a phased Plan covering scoping, KA-ANDAL, ANDAL, RAP consultation, pre-construction, construction, and operational phases - with stakeholder register, engagement modalities, materials, schedule, and feedback-tracking mechanisms.

Annex D - Stakeholder Engagement Plan

D1. Introduction

This Stakeholder Engagement Plan presents the approach for information disclosure, consultation, participation, and grievance handling for the development of RSST in Tangerang City. The document is prepared to support the Environmental and Social Impact Assessment and the Environmental and Social Management Plan and to ensure that affected parties, interested institutions, and vulnerable groups can participate in a timely, inclusive, and meaningful manner.

The project will be implemented in a socially and environmentally sensitive context that includes patients, health workers, nearby communities, public institutions, and local organizations. Because the hospital serves patients and is being developed under an AIIB financed framework, the engagement process must pay special attention to accessibility, confidentiality, gender sensitivity, cultural appropriateness, and continuous disclosure during preparation, construction, and operation.

D2. Purpose and Objective

- To establish a structured and transparent framework for engagement with all relevant stakeholders throughout the project cycle.
- To provide timely disclosure of project information, potential risks, planned mitigation measures, and implementation progress in a manner understandable to different stakeholder groups.
- To ensure that views, concerns, expectations, and recommendations from stakeholders are considered in project design, environmental and social management, and operational decision making.
- To promote inclusive participation of vulnerable groups, including patients, women, persons with disabilities, caregivers, and neighboring communities.
- To provide a functional grievance redress mechanism that is accessible, confidential, fair, and responsive.

D4. Scope of Application

This SEP applies to stakeholder engagement activities related to the RSST development project during the ESIA stage, detailed design review, construction stage, and operation stage. It covers project affected people, interested government institutions, civil society organizations, service users, workers, contractors, and local businesses that may influence or be influenced by the project.

The SEP covers information disclosure, consultation methods, stakeholder mapping, special measures for vulnerable groups, grievance management, documentation, monitoring, and reporting. The SEP is a living document and may be updated if stakeholder composition, project scope, or environmental and social risks change during implementation.

D4. Legal Frameworks

D4.1 National Framework

- Law No. 17 of 2023 on Health as the overarching legal basis for health service development and hospital strengthening in Indonesia.
- Law No. 32 of 2009 on Environmental Protection and Management which requires environmental management and public participation in environmental decision making.
- Law No. 14 of 2008 on Public Information Disclosure which supports access to public information and transparency.
- Law No. 25 of 2009 on Public Services which emphasizes service quality, complaint handling, and accountability in public service delivery.
- Law No. 39 of 1999 on Human Rights which recognizes equality, dignity, and non discrimination principles.
- Law No. 7 of 1984 ratifying CEDAW as a key basis for eliminating discrimination against women and promoting equal participation.
- Instruction of the President No. 9 of 2000 on Gender Mainstreaming in National Development which requires gender responsive planning, implementation, monitoring, and evaluation.
- Law No. 12 of 2022 on the Crime of Sexual Violence for prevention, complaint referral, and survivor protection related to sexual violence.
- Applicable environmental permitting and cultural heritage requirements under national and local regulations, including coordination with the environmental agency and cultural heritage authority.

D4.2 AIIB Environmental and Social Framework

The SEP is aligned with the AIIB Environmental and Social Framework, which requires meaningful stakeholder engagement, timely disclosure of environmental and social documentation, consultation throughout project implementation, and access to grievance mechanisms. The AIIB framework also requires attention to disadvantaged and vulnerable groups, transparency in decision making, and proportional management of environmental and social risks.

In practical terms, this means that the project will disclose key project information before major decisions are finalized, document stakeholder feedback, integrate relevant comments into the ESIA and ESMP where appropriate, and maintain an accessible grievance mechanism for communities, patients, workers, and other affected persons.

D5. Stakeholder Identification and Analysis

Stakeholder identification for RSST is based on the stakeholder list provided for the project and grouped into project owners and financier, government authorities, directly affected people, and non

government organizations. Stakeholder analysis considers each group's level of influence over project decisions and their level of interest in project outcomes.

D5.1 Identified Stakeholders

No	Category	Stakeholders
1	Provincial and Regency government authorities	Banten Governor Banten Environmental Agency Balai Cagar Budaya Provinsi Banten Tangerang City Tourism and Culture Agency Tangerang City Transportation Agency Sub district head Villages head in Sub district
2	Directly affected people	Patients of RSST including vulnerable patients Staff of RSST Visitors and caregivers Vendors and other business activities surrounding the project location
3	Non government organization	▪ Gerakan Reformasi Masyarakat Banten atau GERAK BANTEN ▪ Perkumpulan Masyarakat Neglasari Centre • Yayasan Silaturrahmi ▪ Gerakan Anti Narkoba Nasional atau GANNAS ▪ BPC Perkumpulan Laskar Nusantara ▪ Lembaga Pengawasan Kebijakan Pemerintah dan Keadilan ▪ Gerakan Rakyat Indonesia Bersatu Jaya atau GRIB JAYA

D5.2 Power Interest Matrix

The power interest matrix below is used to determine the appropriate engagement approach for each stakeholder group.

Power and Interest Category	Stakeholders	Engagement Approach
High power and high interest	Ministry of Health AIIB Banten Environmental Agency Balai Cagar Budaya Provinsi	Manage closely through regular coordination meetings, technical review, formal disclosure, decision support, and periodic reporting.

Power and Interest Category	Stakeholders	Engagement Approach
	Jawa Timur RSST management	
High power and lower direct interest	Banten Governor Tangerang City Transportation Agency Tangerang City Tourism and Culture Agency	Keep satisfied through formal correspondence, targeted coordination, issue based meetings, and disclosure of key decisions or compliance matters.
Lower power and high interest	Patients of RSST including vulnerable patients Staff of RSST Visitors and caregivers Nearby vendors and surrounding business activities Villages head in Sub district Sub district head of Gerakan Reformasi Masyarakat Banten atau GERAK BANTEN Perkumpulan Masyarakat Neglasari Centre Yayasan Silaturrahmi Gerakan Anti Narkoba Nasional atau GANNAS BPC Perkumpulan Laskar Nusantara Lembaga Pengawasan Kebijakan Pemerintah dan Keadilan Gerakan Rakyat Indonesia Bersatu Jaya atau GRIB JAYA	Keep informed and actively consult through public meetings, focused discussions, interviews, printed disclosure, digital disclosure, and grievance channels.
Lower power and lower interest	Wider public not directly affected	Monitor through public information disclosure on notice boards and websites and provide access to grievance channels when needed.

D6. Stakeholder Mapping

Stakeholder mapping distinguishes stakeholders according to their role in governance, technical regulation, project impact, and community interface. This mapping helps define who needs formal coordination, who needs continuous consultation, and who needs targeted support to participate effectively.

Stakeholder Group	Role in the Project	Main Issues or Interests	Priority of Engagement
Ministry of Health	Project ownership, financing, oversight, compliance	Project performance, service outcomes, safeguard compliance, institutional readiness	Very high
Provincial and Regency authorities	Licensing, regulation, local coordination, cultural heritage, transport	Environmental compliance, traffic, cultural heritage, public order, local service alignment	High
Patients and caregivers	Primary service users and directly affected people	Access, safety, confidentiality, service continuity, inclusion of vulnerable patients	Very high
RSST staff and workers	Project implementers and affected workforce	Workplace safety, labor issues, service continuity, grievance access, GBV and SEAH prevention	Very high
Local communities and surrounding businesses	Immediate neighbors and economic actors around the site	Noise, dust, access, traffic, safety, local economic impacts	High
Civil society organizations	Social accountability and community support partners	Vulnerability, rights, inclusion, community welfare, local environmental concerns	Medium to high

D7. Proposed Engagement

D7.1 Engagement during ESIA Stage

Stakeholders	Purpose	Method	Frequency	Responsibility
Ministry of Health and AIIB	Confirm project scope, disclosure approach, and safeguard expectations	Formal meetings, technical workshops, document review	At key milestones	Project proponent and ESIA team
Government authorities	Validate regulatory issues and local constraints including environment, heritage, and traffic	Coordination meetings, formal letters, focused technical discussions	As needed during scoping and draft review	Project proponent and ESIA team
Patients, caregivers, staff, and workers	Identify concerns, access barriers, operational risks, and vulnerable group needs	Focused group discussions, interviews, surveys, notice board disclosure	During scoping and draft ESIA disclosure	ESIA team and hospital focal points
Communities and surrounding businesses	Disclose project concept and collect concerns on construction and operation impacts	Public meetings, community meetings, printed notices, grievance channels	At least two rounds during ESIA	ESIA team and community liaison
Civil society organizations	Receive external views on community issues, rights, and inclusion	Consultation meetings and interviews	At least once during ESIA and follow up as required	ESIA team

D7.2 Engagement during Construction Stage

Stakeholders	Purpose	Method	Frequency	Responsibility
Government authorities	Coordinate permits, traffic management,	Coordination meetings,	Monthly or as required	Contractor, PIU, hospital management

Stakeholders	Purpose	Method	Frequency	Responsibility
	waste management, and compliance matters	inspection visits, formal updates		
Local communities and businesses	Inform schedule, site activities, access arrangements, and mitigation measures	Community meetings, public boards, leaflets, hotline and WhatsApp updates	Monthly and before disruptive works	Contractor and community liaison officer
Patients, caregivers, and visitors	Reduce disruption to health services and public access	Hospital notice boards, announcements, service desk information	Continuous updates	Hospital management
Workers and contractors	Promote safe work, labor compliance, and incident reporting	Toolbox meetings, inductions, labor GRM orientation	Weekly and ongoing	Contractor and hospital OHS team
Civil society organizations	Maintain dialogue on emerging social issues	Targeted meetings when issues arise	As needed	PIU and hospital management

D7.3 Engagement during Operation Stage

Stakeholders	Purpose	Method	Frequency	Responsibility
Patients and caregivers	Receive feedback on service quality, accessibility, and protection issues	Client satisfaction survey, interviews, complaint channels, information desks	Quarterly and ongoing	Hospital management
Staff and workers	Maintain communication on workplace issues, safety, and	Internal meetings, worker	Monthly and ongoing	Hospital management and HR

Stakeholders	Purpose	Method	Frequency	Responsibility
	service improvement	GRM, training sessions		
Government authorities	Report compliance, incidents, and operational updates	Formal reports and coordination meetings	Quarterly or as required	Hospital management
Communities and surrounding businesses	Maintain local communication on operational interface issues	Community meetings, public boards, website updates	Semi annual and as needed	Hospital management
Civil society organizations	Support inclusion and social oversight	Periodic dialogue and issue based consultation	As needed	Hospital management

D8. Grievance Redress Mechanism

RSST will maintain a grievance redress mechanism for communities, patients, caregivers, staff, workers, and other stakeholders. The mechanism will accept complaints through multiple channels including help desk, suggestion boxes, telephone, WhatsApp, email, website, and direct submission to designated focal points.

The grievance process will include acknowledgement, categorization, investigation, response, monitoring, and reporting. General complaints will be handled through the hospital grievance system. Labor and working condition complaints will be handled through a labor specific channel with involvement of human resources and the employer concerned. Complaints related to gender based violence and sexual exploitation, abuse, and harassment will follow a confidential and survivor centered pathway with designated focal points and referral options.

The GRM will apply the principles of accessibility, transparency, independence, confidentiality, gender sensitivity, no retaliation, and no cost to the complainant. Timeframes, escalation routes, and anonymous complaint options will be disclosed publicly through the hospital and project communication materials.

D9. Evaluation

The effectiveness of stakeholder engagement will be reviewed periodically using both process and outcome indicators. Evaluation will consider whether information was disclosed on time, whether consultations reached key stakeholder groups, whether vulnerable groups were able to participate, whether feedback was integrated into project decisions, and whether grievances were handled within the agreed timeframes.

- Number of engagement activities conducted by phase and stakeholder group
- Number of participants, including women and vulnerable groups where appropriate
- Number and type of comments received and addressed
- Number of grievances received, resolved, pending, and escalated
- Stakeholder satisfaction with the engagement process
- Corrective actions taken based on evaluation findings

D10. Reporting

Stakeholder engagement activities will be documented through attendance sheets, photographs where appropriate, consultation notes, formal minutes of meeting, grievance logs, and follow up records. The project will maintain a stakeholder engagement register that records the date, location, participants, key issues raised, responses provided, and actions agreed.

Periodic reporting will be prepared for internal management and project oversight. During ESIA, reporting will focus on disclosure and consultation results. During construction and operation, reporting will include engagement activities, grievances, commitments made, implementation status, and any lessons learned for improvement of the SEP.

Appendix D1. Minutes of Meeting Form

Project Name : _____

Meeting Title : _____

Date : _____

Time : _____

Venue : _____

Facilitator : _____

Recorder : _____

Stakeholder Group : _____

Number of Participants : _____

Purpose of Meeting :

_____

Summary of Information Presented :

_____

Issues Raised by Participants :

_____

Responses Provided :

_____

Agreed Actions and Follow Up :

_____

Prepared by : _____

Reviewed by : _____

Appendix D2. Summary of Engagement Form

No	Date	Location	Stakeholder Group	Method	Key Issues Raised	Project Response	Follow Up Action

Annex E - Asbestos-Containing Material (ACM) Management Procedure

E1. Purpose

This Annex establishes the procedures for identification, management, removal, transportation, storage, and final disposal of asbestos-containing materials (ACM), should such materials be encountered during demolition, renovation, rehabilitation, utility relocation, or construction activities associated with the RSST Development Project.

The objective of this procedure is to prevent occupational and community exposure to airborne asbestos fibers and to ensure compliance with applicable Indonesian regulations, Good International Industry Practice (GIIP), and the environmental and social requirements applicable to the Project.

E2. Scope

At the time of ESIA preparation, no confirmed asbestos-containing material has been identified within the Project area. However, because portions of the existing hospital infrastructure may contain older construction materials, the presence of ACM cannot be fully excluded prior to detailed demolition and renovation activities.

Accordingly, this procedure shall be implemented whenever:

- Suspected ACM is identified during pre-demolition inspections;
- ACM is confirmed through laboratory analysis;
- Previously unidentified materials suspected to contain asbestos are encountered during construction activities; or
- Demolition or renovation activities involve disturbance of older building components with uncertain material composition.

Potential ACM may include, but is not limited to:

- Asbestos cement roofing sheets;
- Ceiling boards and wall panels;
- Pipe and boiler insulation;
- Fireproofing materials;
- Vinyl floor tiles and adhesives;
- Gaskets, seals, and packing materials;
- Electrical insulation materials; and

Other legacy construction materials commonly used in older buildings.

E3. Key Principles

The following principles shall apply to all Project activities:

- No demolition, dismantling, or renovation shall commence in areas containing suspected ACM until an appropriate assessment has been completed.
- Materials suspected to contain asbestos shall be treated as ACM until confirmed otherwise.
- ACM shall not be broken, drilled, sanded, crushed, cut, swept, or handled in a manner that may release fibers into the air.
- Exposure of workers, patients, visitors, hospital staff, and nearby communities shall be prevented through engineering controls, administrative controls, and personal protective equipment (PPE).
- All ACM-related activities shall be performed only by trained and competent personnel.
- ACM waste shall be managed as hazardous waste in accordance with applicable regulations.

E4. Health Risks Associated with Asbestos Exposure

Asbestos consists of naturally occurring mineral fibers that were historically used in construction materials due to their strength, heat resistance, and durability. When asbestos-containing materials deteriorate or are disturbed during demolition, renovation, or maintenance activities, microscopic fibers may become airborne.

These fibers can be inhaled and deposited in the respiratory system. Because asbestos fibers are resistant to biological degradation, they may remain in lung tissue for extended periods and cause progressive damage.

Potential health effects associated with prolonged or repeated exposure include:

- Respiratory irritation;
- Chronic lung scarring (asbestosis);
- Lung cancer; and
- Mesothelioma.

The latency period between exposure and disease manifestation may extend for several decades. Consequently, strict prevention of fiber release and exposure is essential during all Project activities.

E5. Pre-Demolition Inspection and Assessment

Prior to demolition, renovation, or major rehabilitation works, the Contractor shall conduct a building material assessment to identify any suspected ACM. The assessment shall include:

- Visual inspection of buildings and structures;
- Review of available construction records;
- Identification of potentially asbestos-containing components;
- Estimation of material quantity and condition; and

- Determination of potential exposure risks.

Where necessary, representative samples shall be collected by qualified personnel and analyzed by an accredited laboratory. Assessment findings shall be documented in an ACM Assessment Report containing:

- Location maps;
- Photographic records;
- Material descriptions;
- Sampling locations;
- Laboratory results (if applicable);
- Risk classification; and
- Recommended management measures.

No demolition activities shall proceed in affected areas until the findings have been reviewed and approved by the Project Management Unit (PIU) and Supervision Consultant.

E6. Management Plan

Where ACM is confirmed or reasonably suspected, the Contractor shall prepare a site-specific Asbestos Management Plan (AMP). The AMP shall include:

- Inventory of ACM locations;
- Estimated quantities;
- Work methods and sequence;
- Containment arrangements;
- Worker protection measures;
- Air quality monitoring requirements, where applicable;
- Waste handling procedures;
- Temporary storage arrangements;
- Transportation and disposal methods;
- Emergency response procedures; and
- Monitoring and reporting requirements.

The AMP shall be reviewed and approved prior to commencement of ACM-related works.

E7. Work Area Isolation and Protection

Prior to ACM removal, the affected area shall be physically isolated from hospital operations and public access. Control measures shall include:

- Installation of warning signage;
- Restricted access controls;
- Temporary barriers and enclosures;
- Plastic sheeting or containment systems;
- Protection of nearby ventilation systems, air intakes, windows, and doors; and
- Coordination with hospital management to minimize risks to patients, staff, and visitors.

Where ACM work occurs near active healthcare services, activities shall be scheduled and managed to avoid potential exposure to sensitive receptors.

E8. Personal Protective Equipment

Personnel involved in ACM handling shall be provided with appropriate PPE, including:

- Disposable coveralls;
- Protective gloves;
- Safety footwear;
- Eye protection; and
- Suitable respiratory protective equipment.

Workers shall receive training on proper use, removal, decontamination, and disposal of PPE. Eating, drinking, smoking, and storage of personal belongings within ACM work areas shall be strictly prohibited.

E9. ACM Removal Procedures

Removal activities shall be designed to minimize generation of dust and airborne fibers. The following requirements shall apply:

- Wet methods shall be used wherever practicable;
- ACM shall be removed intact whenever possible;
- Materials shall be lowered carefully without dropping;
- Dry sweeping shall be prohibited;
- Compressed air cleaning shall be prohibited;
- Uncontrolled cutting, grinding, or drilling shall be prohibited; and
- Debris shall be cleaned using wet wiping methods or HEPA-filtered vacuum equipment where available.

E10. Packaging and Labeling

All ACM waste shall be securely packaged immediately after removal. Requirements include:

- Double-bagging or double-wrapping using heavy-duty plastic materials;
- Secure sealing of all packages;
- Clear hazardous waste labeling;
- Prevention of fiber release during handling and transport; and
- Immediate replacement of damaged packaging.

ACM waste shall not be mixed with domestic waste, medical waste, recyclable materials, or general construction debris.

E11. Temporary Storage

Packaged ACM waste shall be stored in a designated hazardous waste storage area pending transportation. The storage area shall:

- Be secure and access-controlled;
- Be protected from weather conditions;
- Prevent package damage;
- Display appropriate warning signage; and
- Maintain inventory and tracking records.

Storage duration shall comply with applicable Indonesian hazardous waste management requirements.

E12. Transportation and Final Disposal

ACM waste shall be transported only by authorized hazardous waste service providers where required by law. Transportation arrangements shall ensure:

- Integrity of packaging during loading and unloading;
- Prevention of accidental release;
- Availability of transport documentation; and
- Traceability of waste movements.

Final disposal shall be undertaken only at facilities legally authorized to receive asbestos-containing hazardous waste. Required documentation shall include:

- Waste manifests;
- Transportation records;
- Handover documentation;
- Disposal certificates; and

- Photographic evidence where appropriate.

E13. Decontamination and Site Clearance

Upon completion of ACM removal activities:

- Work areas shall be thoroughly cleaned;
- Disposable PPE and contaminated materials shall be treated as ACM waste;
- Containment systems shall remain in place until cleaning is completed; and
- Final inspection shall be conducted before the area is released for subsequent construction activities.

Additional cleaning shall be undertaken if any visible dust, debris, or contamination remains.

E14. Emergency Response

In the event of accidental ACM disturbance, packaging failure, uncontrolled fiber release, or suspected exposure:

- Work shall cease immediately;
- The affected area shall be isolated;
- Access shall be restricted;
- The incident shall be reported to the Contractor's HSE Officer, Supervision Consultant, Hospital OHS Unit, and PIU; and
- Corrective actions shall be implemented before work resumes.

Corrective actions may include additional containment, cleaning, worker health evaluation, retraining, or revision of work procedures.

E15. Training and Awareness

All personnel involved in demolition, renovation, waste management, and construction activities shall receive asbestos awareness training before commencing work. Training shall cover:

- Identification of suspected ACM;
- Health hazards associated with asbestos;
- Safe work practices;
- PPE requirements;
- Waste management procedures;
- Emergency response measures; and
- Incident reporting requirements.

Relevant hospital personnel shall also be informed regarding ACM risks, restricted areas, and reporting procedures.

E16. Roles and Responsibilities

Contractor

The Contractor shall:

- Conduct ACM assessments;
- Prepare and implement the AMP;
- Provide PPE and training;
- Implement control measures;
- Manage ACM waste; and
- Maintain all required records.

Supervision Consultant

The Supervision Consultant shall:

- Review ACM-related documentation;
- Monitor implementation;
- Verify compliance; and
- Report non-compliance to the PIU.

RSST Management

RSST management, OHS/K3RS Unit, Environmental Health Unit, and IPSRS shall:

- Coordinate with the Contractor;
- Support protection of hospital operations;
- Facilitate access arrangements; and
- Ensure protection of patients, staff, and visitors.

Project Implementation Unit (PIU)

The PIU shall oversee implementation and ensure consistency with the ESMP, ESIA commitments, and applicable regulatory requirements.

E.17 Monitoring and Documentation

The following records shall be maintained:

- ACM Assessment Reports;
- Laboratory test results;
- Asbestos Management Plans;
- Training records;

- PPE inspection records;
- Waste storage records;
- Waste manifests;
- Transportation records;
- Disposal certificates;
- Incident reports; and
- Site clearance records.

These records shall form part of ESMP implementation monitoring and reporting.

E17. Minimum Required Control Measures

At a minimum, the Project shall:

- Conduct ACM screening prior to demolition activities;
- Stop work immediately if suspected ACM is encountered unexpectedly;
- Restrict access to ACM work areas;
- Apply wet removal methods;
- Prohibit dry sweeping and compressed air cleaning;
- Provide suitable PPE and respiratory protection;
- Segregate ACM waste from other waste streams;
- Package and label ACM waste appropriately;
- Use authorized transport and disposal facilities; and
- Maintain complete documentation of ACM management activities.

Annex F - Gender Action Plan

F1. Introduction

F1.1 Background

Rumah Sakit Umum Pusat Dr. Sitanala (RSST) is a government hospital located in Tangerang City, Banten Province, operating under the Ministry of Health of the Republic of Indonesia. The hospital is currently undergoing a major reconstruction and development program to upgrade its physical infrastructure, medical facilities, and service capacity.

The presence of a large construction workforce in proximity to the hospital community creates heightened risk of Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). At the national level, data from Komnas Perempuan (2025) indicates that sexual violence is the most frequently reported form of violence at 37.51 percent of all direct complaints, followed by psychological violence at 32.48 percent, physical violence at 18.93 percent, and economic violence at 11.07 percent.

F1.2 Gender Baseline of RSST

RSUP Dr. Sitanala is undergoing a major institutional transition from its historical role as a leprosy hospital to a Class B national referral hospital with planned advanced services in central surgery, integrated oncology, neurology, and urology. The proposed project includes three new buildings with an aggregate area of approximately 55.950 m², planned for implementation in 2027. It is also intended to strengthen RSUP Dr. Sitanala's role as a teaching hospital and provider of hospital-based specialist medical education.dThe newly provided workforce table shows that women constitute a slight majority of the recorded hospital workforce. The totals workforce as of March 2026 is 1,647 with 1,001 female workers (60.8 percent) and 646 male workers (39.2 percent). Women are strongly represented in several professional and patient facing categories. They account for 67 of 111 medical personnel, 192 of 249 nursing personnel, all 15 midwifery personnel, 50 of 69 other health personnel such as pharmacists, laboratory analysts, and radiographers, and 10 of 14 rehabilitation and physiotherapy personnel. These figures indicate that women play a central role in RSUP Dr. Sitanala's clinical workforce and will be important to the delivery of the planned surgical, oncology, neurology, urology, and general referral services.dHowever, gender representation differs substantially across occupational categories. Men form the majority in management and administration, with 149 of 239 personnel, or 62.3 percent. Men also dominate technical and support functions such as IT and medical equipment technicians, with 10 of 13 personnel, or 76.9 percent. They also constitute 154 of 271 personnel in general services, including cleaning, laundry, and food services, and 86 of 100 security personnel. This pattern suggests occupational gender segregation. Women are more concentrated in nursing, midwifery, and other clinical health professions, whereas men are more represented in administration, technical functions, security, and some operational support roles. The available information does not demonstrate discrimination, but it identifies areas where recruitment, job assignments, training access, working conditions, and career advancement should be reviewed from a gender perspective.

Accordingly, the key gender issue for RSUP Dr. Sitanala is not women's overall exclusion from employment. Rather, it is the potential for vertical inequality and gendered occupational segregation. The hospital should verify women's and men's representation at each management level and review promotion, remuneration, employment conditions, and training outcomes. It should also ensure

equitable access to specialist education, technical training, digital health training, medical equipment training, leadership development, and participation in hospital committees and the project implementation unit.

F1.3 Service Access and Patient Needs

RSUP Dr. Sitanala's planned service expansion has high gender relevance. The proposed Oncology Center, for example, will serve a population in which breast and cervical cancers are significant concerns. The feasibility study notes that, in Indonesia, breast cancer is the most common cancer among women and cervical cancer is also among the most frequent cancers affecting women. It further records 288,471 women aged 30–50 years in Tangerang City in 2023, of whom 165,621 underwent IVA screening.

The hospital also provides obstetric and gynecological care, gynecologic oncology services, child health services, rehabilitation, and a maternal-and-child programme. These services create an opportunity for RSUP Dr. Sitanala to integrate gender-responsive referral, diagnosis, treatment, counselling, and continuity-of-care arrangements, including for women with cancer, women with disabilities, older women, female caregivers, and patients facing financial or mobility barriers. Women patients and caregivers may face particular constraints related to:

- Caregiving responsibilities that limit their time, mobility, and ability to attend repeat appointments.
- Out-of-pocket travel, accommodation, food, and informal-care costs associated with specialist referral services.
- Privacy and dignity needs during examination, inpatient treatment, chemotherapy, surgery, and reproductive-health-related care.
- Fear of stigma associated with cancer, reproductive conditions, leprosy-related history, disability, or mental-health concerns.
- Lower access to health information, digital registration, telehealth, complaint mechanisms, and informed-consent processes among some groups.

The planned buildings should incorporate gender-responsive and inclusive design, including private and lockable toilets; adequate lighting; visible and accessible wayfinding; separate and safe changing areas; lactation rooms; safe overnight facilities or waiting spaces for caregivers where appropriate; accessible sanitation for persons with disabilities; and confidential consultation and counselling spaces. WHO's guidance on gender equality and social inclusion in healthcare facilities emphasizes meaningful participation of women and vulnerable groups, gender-sensitive infrastructure, staff capacity development, and monitoring indicators.

F1.4 Key Risks and Responses

Risk area	Relevance to RSUP Dr. Sitanala	Required response
Leadership and decision-	No sex-disaggregated information is available on directors, senior managers, clinical leadership,	Establish a sex-disaggregated leadership baseline; set targets for women's representation in PIU, committees, senior management, and specialist leadership; introduce

Risk area	Relevance to RSUP Dr. Sitanala	Required response
making inequality	project governance, medical committees, or budget authority	transparent nomination, mentoring, and promotion-review processes
Workforce segregation	The hospital has major nursing, medical, midwifery, pharmacy, technical, and non-health workforce categories, but no gender breakdown is available	Conduct gender analysis by cadre, grade, contract type, pay, promotion, training, specialty, shift pattern, and attrition; address barriers to women's entry into surgical, technical, digital, and management pathways
Unequal training access	The project plans training for 710 staff, with 65 percent women targeted, but the type and seniority of training are not specified	Track participation and completion by sex, job category, specialty, training cost, scholarship, certification, promotion, and retention; ensure women receive equitable access to high-value technical and specialist training
Gender-responsive service access	Expansion includes oncology, surgery, neurology, and urology, with relevance to women's cancer and reproductive-health-related needs	Collect sex-, age-, disability-, and location-disaggregated patient data; provide patient navigation, culturally appropriate information, flexible appointments, and referral support for women and caregivers
SEAH and GBV	Construction, worker presence, hospital power imbalances, and patient vulnerability can increase risk	Establish codes of conduct, training, confidential complaints channels, survivor-centred referral procedures, contractor sanctions, and monitoring of incidents without disclosing survivor-identifying information
Privacy, dignity, and safety	New inpatient, outpatient, surgery, chemotherapy, imaging, and critical-care spaces require strong privacy safeguards	Apply universal design and gender-responsive facility standards: lockable toilets, adequate lighting, private examination spaces, secure changing rooms, lactation rooms,

Risk area	Relevance to RSUP Dr. Sitanala	Required response
		accessible WASH, and safe waiting areas
Housing and access impacts	Demolition of 26 staff houses could disproportionately affect women, caregivers, and lower-income staff households	Conduct census and social assessment; ensure meaningful consultation, gender-responsive eligibility documentation, equitable assistance, and a functioning grievance mechanism before displacement
Consultation exclusion	The feasibility study identifies stakeholder discussion as pending/prepared, but does not demonstrate targeted engagement with women or vulnerable users	Consult women patients, female staff, nurses, female medical trainees, caregivers, disability groups, residents of staff housing, and local community representatives separately where necessary

F1.5 SEAH and GBV Incident Profile at RSST

Based on the internal complaint and grievance log covering 2023 to 2025, RSST recorded 10 grievance incidents related to human rights, gender, and social issues. Of these, the following are most relevant to GBV and SEAH concerns:In 2023, a complaint was filed regarding patient privacy including lack of privacy in toilets, broken locks, and the absence of diverse clothing options for female Muslim patients. A separate allegation of physical harm by a nurse was investigated and cleared through CCTV review. In 2024, a complaint was recorded concerning male visitors entering a female ward while patients were undressed and visible from the outside. In 2025, complaints included a security guard physically mishandling a patient and a report regarding potential food exploitation of patients by interns.

These incidents reflect systemic gaps in privacy protection, gender sensitive facility design, staff conduct standards, and safeguarding procedures. The hospital workforce totals 1,647 as of March 2026, with 1,001 female workers (60.8 percent) and 646 male workers (39.2 percent). The female majority workforce further underscores the need for a robust Gender Action Plan that protects the rights, dignity, and safety of all workers and patients throughout all project phases.

F2. Purpose and Objective

This Gender Action Plan (GAP) has been prepared to ensure that gender equality and the prevention of GBV and SEAH are systematically integrated into all phases of the RSST Reconstruction and Development Project. The GAP establishes clear commitments, actions, responsibilities, and timelines to address gender risks throughout pre construction, construction, and operation phases.

The specific objectives of this GAP are as follows:

- To prevent and respond to GBV, SEA, and SH risks associated with project activitiesoTo promote gender equality and non discrimination in employment and service delivery at RSSToTo strengthen institutional capacity for gender responsive planning and management
- To establish a confidential, accessible, and survivor centered Grievance Redress Mechanism (GRM) for GBV and SEAH cases
- To ensure compliance with applicable Indonesian national legislation and the Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (ESF)
- To monitor, evaluate, and report on gender action plan implementation throughout the project lifecycle.

F3. Scope of Application

This Gender Action Plan applies to all individuals engaged in or affected by the RSST Reconstruction and Development Project across three phases. The scope covers the following categories of workers and stakeholders:

- Civil servants and permanent hospital staff including medical, nursing, administrative, and support staff

▪ Contracted laborers hired directly by RSST or the Project Implementation Unit (PIU)

- Construction contractors and subcontractors including skilled and unskilled construction workers

▪ Consultants and technical assistance providers engaged during pre construction and construction phases

- Outsourced service workers including cleaning, security, gardening, waste handling, and catering staff
- Patients and their families who access services at RSST
- Community members in the vicinity of the project site who may be affected by construction activities

The GAP is applicable during all three project phases as follows:

▪ Pre Construction Phase covering planning, design, procurement, and baseline assessment activities.

- Construction Phase covering civil works, infrastructure development, and facility upgrading,

▪ Operation Phase covering hospital services, patient care, and facility management after construction completion.

F4. Legal Frameworks

F4.1 National Legal Frameworks

The following national laws and regulations form the legal basis for gender equality and GBV prevention in Indonesia:

- Law No. 7 of 1984 on Ratification of CEDAW (Convention on the Elimination of All Forms of Discrimination Against Women): the foundational national instrument for gender equality

- Law No. 23 of 2004 on the Elimination of Domestic Violence (PKDRT): criminalizes domestic violence and mandates protection for survivors
- Law No. 13 of 2003 on Manpower: prohibits discrimination in employment and protects workers from harassment and violence in the workplace
- Government Regulation No. 78 of 2015 on Wages: ensures equal pay provisions and protection for all workers
- Ministry of Health Regulation No. 66 of 2016 on Occupational Health and Safety in Hospitals: mandates safe working environments for all hospital personnel
- Presidential Regulation No. 59 of 2017 on Implementation of Sustainable Development Goals (SDGs): includes Goal 5 on Gender Equality and Goal 8 on Decent Work
- Law No. 12 of 2022 on Sexual Violence Crimes (Tindak Pidana Kekerasan Seksual): the most recent comprehensive law criminalizing sexual violence and establishing rights and protections for survivors

F4.2 AIIB Environmental and Social Framework (ESF) and other International Best Practices

- The RSST Reconstruction and Development Project is financed with support from the Asian Infrastructure Investment Bank (AIIB). The following AIIB ESF standards are directly applicable:AIIB Environmental and Social Standard 1 (ESS1) on Assessment and Management of Environmental and Social Risks and Impacts: requires identification and mitigation of gender risks including GBV and SEAH.
- AIIB Environmental and Social Framework (ESF), as amended through 26 June 2024, particularly ESS1 on Environmental and Social Assessment and Management, requires the Project to identify, assess and manage relevant social risks, including labor and working conditions, gender-related risks, GBV, SEA and SH, and to establish appropriate prevention, mitigation, grievance and response measures
- World Bank ESF Environmental and Social Standard 2 (ESS2) on Labor and Working Conditions: mandates non discrimination and equal opportunity in the workforce, prohibition of forced labor, child labor, and workplace harassment
- World Bank ESF Environmental and Social Standard 5 (ESS5) on Land Acquisition, Displacement and Resettlement: requires attention to gender specific impacts of displacement and resettlement

F5. Gender Action Plan

The Gender Action Plan is structured by project phase. For each phase, specific gender risks are identified, followed by proposed actions, responsible parties, and estimated timeframes.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
Safe project implementation	Develop, approve, and enforce a SEAH and GBV prevention protocol for staff, consultants, contractors, subcontractors, students, interns, suppliers, and service providers. Require codes of conduct, induction, reporting duties, sanctions, and survivor centred procedures.	Approved protocol. Percentage of relevant workers who sign and receive orientation on the code of conduct.	No dedicated SEAH and GBV prevention protocol was evidenced in reviewed project documents.	Protocol approved before construction begins. One hundred percent of relevant workers sign the code of conduct and receive orientation before starting work.	Hospital Director, Human Resources Unit, Procurement Unit, Project Implementation Unit, contractor management team, supervision consultant.	Before contractor mobilization and throughout construction and operation.
Safe reporting and remedy	Establish confidential and accessible grievance channels for patients, workers, caregivers, affected residents, and communities. Provide safe referral pathways for survivors of SEAH, GBV, discrimination,	Functional grievance mechanism with confidential channels, referral directory, trained focal points, and quarterly reporting using anonymous aggregated data.	General institutional documentation exists, but no dedicated gender responsive grievance mechanism has been evidenced.	Gender responsive grievance mechanism operating within six months. At least one trained female focal point is available. Quarterly reports are reviewed by management.	Quality Unit, Human Resources Unit, legal unit, ethics committee, social safeguards team, Project Implementation Unit.	Within six months of project initiation and throughout implementation.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
	harassment, violence, and privacy violations.					
Inclusive planning and consultation	Conduct targeted consultation with female staff, women patients, caregivers, women with disabilities, female students and trainees, staff housing occupants, local women's groups, and other vulnerable groups. Record how consultation findings inform decisions.	Percentage of women participating in consultation. Number of recommendations incorporated into project decisions. Consultation records by sex and stakeholder group.	Stakeholder engagement is identified as a project requirement, but systematic consultation with women and vulnerable groups is not evidenced.	Women constitute at least 40 percent of formal consultation participants. Follow up actions are documented in project records.	Planning Unit, Project Implementation Unit, design consultant, supervision consultant, management, social safeguards team.	During design, before construction, throughout construction, and before operation.
Equitable workforce development	Conduct a gender audit of recruitment, promotion, training, scholarships, specialist education, remuneration, contract status, and retention. Identify barriers to	Gender audit completed. Gender responsive Human Resources procedures issued. Workforce, training, promotion, and leadership data	Women are 51.6 percent of the recorded workforce and are strongly represented in medical, nursing, midwifery,	Gender responsive Human Resources policy issued within one year. Annual review of recruitment, promotion, scholarship, and	Hospital Director, Human Resources Unit, Education and Training Unit, Medical Committee, Nursing Committee,	First project year, then annually.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
	women's participation in leadership, technical roles, surgical specialties, medical equipment training, digital health, and project management.	available by sex and job category.	rehabilitation, and other health roles. Men predominate in management, administration, technical functions, general services, and security.	training outcomes by sex and occupational category.	Project Implementation Unit.	
Women's economic participation during construction	Include gender responsive employment and procurement provisions in bidding and contract documents. Require equal pay for equal work, recruitment outreach to local women, safe work arrangements, suitable protective equipment, secure sanitation, skills training, and access for women led enterprises to eligible procurement opportunities.	Percentage of women in eligible project jobs. Percentage of women trainees. Equal pay compliance. Number and value of eligible contracts awarded to women led enterprises. Availability of gender responsive worker facilities.	No construction workforce baseline or women's employment target has been established. The project will create construction, logistics, catering, cleaning, administration, security, and support opportunities.	At least 30 percent women in eligible roles where qualifications and labour availability permit. At least 40 percent women among trainees. One hundred percent equal pay compliance. At least 20 percent of eligible local small value procurement opportunities made accessible to women led enterprises where feasible.	Project Implementation Unit, Procurement Unit, contractors, supervision consultant, Human Resources Unit, hospital management.	Before procurement and contractor mobilization, throughout construction, and during early operation.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
Women in leadership and decision making	Establish mentoring, coaching, and leadership development for qualified female staff. Use gender balanced candidate lists for managerial, committee, and project governance appointments where qualified candidates are available.	Number and percentage of women in leadership positions, strategic committees, and management candidate pools. Number of women completing leadership development activities.	Women form a slight majority of the recorded workforce, but sex disaggregated data for top management, middle management, and strategic committees are unavailable.	Sex disaggregated leadership data completed in the first year. At least 30 percent women represented in strategic project committees within two years, subject to qualified candidate availability.	Hospital Director, Human Resources Unit, Medical Committee, Nursing Committee, supervisory bodies, Project Implementation Unit.	Years one and two, then annually.
Gender responsive service delivery	Develop a routine dashboard that records service use and patient satisfaction by sex for outpatient, inpatient, emergency, surgery, oncology, neurology, urology, referral, teleconsultation, and grievance services.	Functional dashboard with sex disaggregated indicators. Quarterly management review of service access and patient experience.	The feasibility study presents service volume information, but no routine sex disaggregated service utilization dashboard is evidenced.	Dashboard operational within nine months. Quarterly review completed by service directors and management.	Medical Records Unit, Information Technology Unit, service directors, Quality Unit, Planning Unit.	Within nine months and continuing throughout operation.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
Women's access to care	Improve referral information, appointment scheduling, counselling, patient navigation, teleconsultation support, and caregiver communication for women facing mobility, caregiving, distance, stigma, disability, or financial barriers.	Number of women using selected services. Patient satisfaction scores by sex. Number of women receiving navigation, counselling, referral, or teleconsultation support.	RSUP Dr. Sitanala plans to expand oncology, surgery, neurology, and urology services. No sex disaggregated utilization baseline is available.	Baseline established during the first operational year. Annual increase in women's use of targeted services where unmet need is identified. Improved satisfaction among women and caregivers.	Clinical service units, Public Health Promotion Unit, Medical Records Unit, Information Technology Unit, Quality Unit.	First operational year and ongoing.
Respectful and gender responsive infrastructure	Apply a gender responsive design checklist to the Central Surgery Installation, Integrated Oncology Center, and Neurology Urology Center. Include safe lighting, accessible lockable toilets, private examination and counselling spaces, secure changing areas, lactation facilities, caregiver waiting areas, disability access, clear wayfinding, and secure staff rest spaces.	Design checklist completed. Gender responsive features included in drawings, bills of quantities, construction inspections, and handover records.	Project design is under development. The feasibility study identifies requirements for new buildings, service integration, patient access, and disability friendly facilities.	Design checklist integrated before final design approval. Compliance verified during construction supervision and handover.	Planning Unit, Engineering Unit, design consultant, Project Implementation Unit, hospital management, supervision consultant.	Detailed design, construction, and handover.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
Gender responsive occupational health and safety	Update the occupational health and safety plan to assess gender specific risks for staff, students, contractors, and support personnel. Address shift work, safe commuting, workplace violence, reproductive health, protective equipment, psychosocial stress, fatigue, nursing and lactation needs, and clinical or construction exposure.	Gender responsive occupational health and safety plan approved. Number of workers trained. Number of gender related safety concerns reported and addressed.	No gender specific occupational health and safety plan was evidenced in reviewed documents.	Plan updated within 12 months. Annual training completed for staff, contractors, supervisors, and workers.	Occupational Health and Safety Unit, Human Resources Unit, service supervisors, contractors, Project Implementation Unit.	Within 12 months and annually thereafter.
Protection of staff housing occupants	Before demolition of the 26 staff houses planned for the Integrated Oncology Center, conduct a census and social assessment of occupants and households. Identify women, female headed households, caregivers, persons with disabilities, older	Census and social assessment completed. Consultation records available. Assistance and grievance arrangements documented. Number of affected households receiving agreed support.	The feasibility study proposes demolition of 26 staff houses for construction of the Integrated Oncology Center. The social and gender profile of affected occupants is not provided.	No demolition before census, consultation, assistance planning, and accessible grievance arrangements are completed. All affected occupants receive agreed support.	Hospital management, Project Implementation Unit, Human Resources Unit, Planning Unit, social safeguards team, local government coordination team.	Before design confirmation and before demolition.

Objective	Action	Indicator	Baseline	Target	Responsibility	Timing
	persons, children, tenure status, and special support needs.					
Community accountability	Prepare and disclose an annual Gender Action Plan progress summary. Include achievements, gaps, sex disaggregated indicators, complaint trends, consultation outcomes, corrective actions, and lessons learned. Protect confidentiality and survivor identity.	Annual Gender Action Plan progress report produced and reviewed by management.	No Gender Action Plan monitoring report is currently available.	One report produced each year, reviewed by management, and used to update the following year's implementation plan.	Hospital Director, Planning Unit, Monitoring and Evaluation Unit, Quality Unit, Project Implementation Unit, Human Resources Unit.	Annually.

F6. Stakeholder Mapping

Effective implementation of the GAP requires clear identification of all relevant stakeholders, their roles in GBV and SEAH prevention, and their engagement approach. The following stakeholders are identified for the RSST project:

- RSST Hospital Director and Senior Management: Overall accountability for hospital wide GBV and SEAH policy enforcement, staff conduct standards, patient safety protocols, and facility compliance. Engagement approach: direct leadership accountability, monthly management review meetings.
- Project Implementation Unit (PIU): Responsible for GAP implementation across all project phases, contractor oversight, ESO coordination, and AIIB reporting. Engagement approach: weekly coordination meetings, monthly GAP progress reviews.
- Environmental and Social Officer (ESO): Day to day monitoring of GAP implementation, SEAH incident tracking, C ESMP compliance auditing, GRM coordination, and quarterly reporting to PIU and AIIB. Engagement approach: field presence at construction site and hospital, regular stakeholder consultations.
- RSST Human Resources Department: Workforce gender data management, recruitment and promotion equity monitoring, staff GBV and SEAH training coordination, and handling of GBV related HR complaints. Engagement approach: monthly HR review, annual gender audit.
- Main Contractor and Subcontractors: Responsible for SEAH prevention at construction sites including Code of Conduct implementation, site safety, worker orientation, and C ESMP compliance. Engagement approach: contractual obligations, site inspections, and monthly reporting to PIU.

Hospital Medical and Nursing Staff: Frontline staff accountable for patient dignity, privacy, and protection from abuse. Engagement approach: annual GBV training, departmental sensitization sessions, inclusion in the SEAH Response Team.

- Security Guards and Outsourced Service Workers: Play a frontline role in ward access control, patient safety, and recognizing early warning signs of GBV or SEAH. Engagement approach: induction training, periodic refresher training, integration into the GRM as first points of contact.
- Patients and Patient Families: Primary beneficiaries of gender sensitive hospital services and the GRM. Engagement approach: patient rights information dissemination, feedback mechanisms, and accessible complaint channels in all wards.

Local Government and Referral Services: Including the Dinas Pemberdayaan Perempuan (DP3A) Tangerang City, UPTD PPA (Integrated Service Center for Women and Children Protection), and local police. Engagement approach: referral pathway agreements, periodic coordination meetings, capacity building on GBV response.

AIIB: Financing institution with oversight responsibility for ESF compliance including GAP implementation. Engagement approach: quarterly progress reports, supervision missions, and disclosure of GAP documents.

F7. Policy and Procedures

The following policies and procedures shall govern GBV and SEAH prevention and response for the RSST project:

- Zero Tolerance Policy: RSST and all project contractors maintain a zero tolerance policy toward all forms of GBV, SEA, and SH. Any worker found to have committed or facilitated GBV or SEAH shall face immediate disciplinary action up to and including termination of employment and referral to competent legal authorities.
- Mandatory Code of Conduct: All project workers regardless of contract type or employing entity shall sign a Code of Conduct prior to commencing work. The Code of Conduct shall explicitly prohibit SEA, SH, and all forms of GBV and shall outline consequences of violations.
- Survivor Centered Approach: All responses to GBV and SEAH incidents shall prioritize the safety, confidentiality, dignity, and agency of the survivor. No action shall be taken without the informed consent of the survivor except where mandatory reporting requirements under Indonesian law apply.
- Confidentiality: All information regarding GBV and SEAH complaints shall be treated as strictly confidential. Only authorized personnel within the SEAH Response Team and GRM shall have access to complaint details. Breaches of confidentiality shall constitute a disciplinary offense.
- Non Retaliation: No person who reports in good faith a GBV or SEAH complaint or who cooperates in an investigation shall face retaliation, discrimination, or adverse employment action. Retaliation is itself a disciplinary offense.
- Referral Pathway Activation: All confirmed GBV or SEAH incidents shall trigger a referral pathway linking the survivor to available support services including medical care, psychosocial support, legal assistance, and shelter if needed, through coordination with UPTD PPA Tangerang City.
- Incident Documentation and Reporting: All GBV and SEAH incidents reported through the GRM shall be recorded in the GBV Incident Log (Appendix 2) and reported to the PIU and ESO within 24 hours of receipt. A summary report shall be included in the monthly GAP progress report.

F8. Grievance Redress Mechanism

A dedicated, survivor centered, and confidential GBV and SEAH Grievance Redress Mechanism (GRM) is established for the RSST project. This GRM is separate from, and complementary to, the general project GRM described in the Labor Management Plan.

F8.1 Guiding Principles

The GBV and SEAH GRM shall operate according to the following principles:

- Safety: The safety of the survivor and reporter is the first priority at all times
- Confidentiality: Identity of complainants and details of complaints shall not be disclosed without informed consent
- Non retaliation: Reporters and witnesses are fully protected from any form of retaliation
- Survivor centered: All processes are designed around the needs and wishes of the survivor
- Accessibility: The GRM shall be accessible to all workers, patients, and community members through multiple channels

F8.2 Reporting Channels

Complaints may be submitted through the following channels:

- In person report to the SEAH Focal Point at the construction site or within the hospital
- Written complaint submitted using the standard Complaint Form (see Appendix 1) deposited in complaint boxes placed at construction site offices and hospital wards
- Anonymous reporting via WhatsApp or telephone hotline managed by the ESO
- Direct report to the RSST Humas or HR Department
- Report to UPTD PPA Tangerang City as an external referral option

F8.3 Response Timeline and Procedures

Upon receipt of a GBV or SEAH complaint, the following steps shall be taken:

- Day 1: SEAH Focal Point or GRM Officer receives the complaint, ensures immediate safety of the complainant, and notifies the ESO and PIU
- Day 1 to Day 3: Initial case assessment is conducted. If the survivor requires immediate medical or psychosocial support, referral to UPTD PPA or hospital medical services is arranged immediately
- Day 3 to Day 7: Investigation is initiated with informed consent of the survivor. The accused is notified and a fair process is ensured
- Day 7 to Day 14: Findings are documented and shared with the PIU and relevant management. Disciplinary measures are applied where warranted
- Day 14 to Day 21: The complainant is informed of the outcome in accordance with their consent and preferences. Psychosocial follow up is arranged if needed
- Day 30: Case is reviewed for lessons learned and entered into the GBV Monthly Log

F9. Implementation Arrangements

RSUP Dr. Sitanala should place overall accountability for the Gender Action Plan with the Hospital Director and designate a senior gender focal point supported by the Human Resources Unit, Planning Unit, clinical service units, Medical Records Unit, legal and ethics functions, Quality Unit, Occupational Health and Safety Unit, Procurement Unit, and Project Implementation Unit. A cross functional gender working group should meet at least quarterly to review progress, resolve bottlenecks, and ensure that gender actions are integrated into construction oversight, workforce recruitment and training, specialist education, service improvement, consultation, grievance management, and development of the Central Surgery Installation, Integrated Oncology Center, and Neurology Urology Center. The working group should monitor implementation of SEAH and GBV prevention measures, confidential reporting mechanisms, women's participation in leadership and technical training, gender responsive service data, safe access for women and caregivers, and the needs of persons with disabilities and other vulnerable groups. RSUP Dr. Sitanala should also allocate a dedicated budget for consultation, staff and contractor training, grievance mechanism strengthening, communication materials, gender responsive design adjustments, data system improvements, leadership mentoring, occupational health and safety measures, and specialist technical support, so that gender actions are integrated into

routine hospital management and project implementation rather than treated as stand alone commitments.

F10. Monitoring Framework

Monitoring of the Gender Action Plan at RSUP Dr. Sitanala should combine process indicators and outcome indicators to assess both compliance during implementation and measurable gender results. The hospital should monitor women's participation in consultations related to the development of the Central Surgery Installation, Integrated Oncology Center, and Neurology Urology Center, as well as grievances received and resolved through confidential channels, contractor compliance with SEAH and GBV prevention requirements, women's representation in project committees and hospital leadership, recruitment and promotion trends by sex, access to specialist and technical training, workforce participation in construction and operational roles, use of outpatient, inpatient, oncology, surgery, neurology, urology, referral, and teleconsultation services by sex, and patient and worker satisfaction by sex. Monitoring findings should be reviewed quarterly by the gender working group and used to identify gaps, implement corrective actions, and update the Gender Action Plan annually

F11. Evaluation

The implementation of this Gender Action Plan shall be monitored and evaluated on a regular basis to assess progress, identify gaps, and enable adaptive management. The following evaluation framework is applied:

F11.1 Key Performance Indicators

The following indicators shall be used to evaluate GAP performance:

- Number of GBV and SEAH awareness training sessions conducted versus planned, disaggregated by target group
- Percentage of project workers who have signed the Code of Conduct
- Number of GBV and SEAH complaints received and resolved through the GRM per month
- Average resolution time for GBV and SEAH complaints
- Number of female workers in supervisory or management positions disaggregated by department
- Proportion of gender sensitive facilities operational at construction site and hospital (sanitation, rest areas, breastfeeding rooms)
- Number of C ESMP SEAH compliance audits conducted per quarter
- Survivor satisfaction with GRM response where consent to feedback is provided

F11.2 Evaluation

- Schedule Monthly: ESO reviews GRM logs, SEAH incident reports, training records, and C ESMP compliance reports. Findings are included in monthly GAP progress reports to PIU.
- Quarterly: PIU reviews GAP implementation progress against all KPIs. Corrective actions are documented and communicated to responsible parties. Quarterly report submitted to AIIB.
- Annually: An independent gender audit is conducted covering workforce composition, grievance patterns, facility adequacy, training coverage, and policy compliance. Results are disclosed to AIIB and project stakeholders.

- End of Phase: A phase end evaluation is conducted at the close of each project phase to assess overall GAP performance and inform the next phase's GAP updates.

F12. Reporting

Regular reporting on GAP implementation shall be conducted as follows:

- Monthly GAP Progress Report: Prepared by the ESO and submitted to the PIU by the 10th of each month. The report covers: number and types of GBV and SEAH complaints received and resolved, training activities conducted, C ESMP compliance status, any critical incidents or escalations, and updates to the GBV Monthly Log (Appendix 2).
- Quarterly Social Safeguard Report: Prepared by the PIU and submitted to AIIB. Includes a GAP implementation section covering all KPIs, corrective actions, and any emerging gender risks.
- Annual Gender Audit Report: Prepared by the PIU with support from an independent auditor. Submitted to AIIB and disclosed to relevant stakeholders.
- Incident Reporting: Critical GBV or SEAH incidents (defined as incidents involving serious harm, criminal acts, or systematic abuse) shall be reported to the AIIB within 48 hours of the PIU becoming aware of the incident, with a full incident report submitted within 7 days.
- All reports shall comply with strict confidentiality standards and shall not disclose personally identifiable information about survivors, complainants, or witnesses. Aggregated anonymized data may be used in reports for monitoring and evaluation purposes.

Appendix F1. GBV and SEAH Complaint Form

RUMAH SAKIT UMUM PUSAT DR. SITANALA (RSST) CONFIDENTIAL GBV AND SEAH COMPLAINT FORM

This form is strictly confidential. Your information will be kept private and protected. You may submit this form anonymously. Submission of this form does not commit you to any further action.

PART A: COMPLAINANT INFORMATION (Optional)

Full Name (or leave blank for anonymous submission):

Date of Submission:

Preferred Contact Method (if you wish to be contacted): Phone [ ] WhatsApp [ ] In Person [ ] Do not contact me [ ]

Contact Number or Location (optional):

Complainant Category:

Hospital Staff [ ]

Construction Worker [ ]

Patient or Patient Family [ ]

Community Member [ ]

Other (please describe):

PART B: INCIDENT INFORMATION

Date of Incident (approximate if not certain):

Location of Incident:

Type of Incident (please tick all that apply):

Sexual Harassment (unwanted sexual remarks, gestures, or physical contact) [ ]

Sexual Exploitation (someone using their authority or power to obtain sexual favors) [ ]

Sexual Abuse (unwanted sexual acts or coerced sexual acts) [ ]

Physical Violence or Abuse [ ]

Psychological or Emotional Violence [ ]

Privacy Violation (unauthorized entry to ward, exposure of patient) [ ]

Discrimination based on Gender [ ]

Other (please describe):

Was the incident a single event or ongoing: Single Event [ ] Ongoing [ ]

Was anyone else present as witness: Yes [ ] No [ ] Not sure [ ]

Description of the Incident (describe what happened in your own words):

_____

PART C: INFORMATION ABOUT THE ALLEGED PERPETRATOR (if known)

Name or description of alleged perpetrator (if known):

Position or Role: _____

Employer of alleged perpetrator (if known): _____

PART D: SUPPORT NEEDS

Do you require immediate medical attention: Yes [ ] No [ ]

Do you require psychosocial or counselling support: Yes [ ] No [ ] Not sure [ ]

Do you require legal assistance or referral: Yes [ ] No [ ] Not sure [ ]

PART E: CONSENT

I consent to RSST investigating this complaint: Yes [ ] No [ ] I want to report for information only [ ]

I consent to being contacted by the SEAH Focal Point: Yes [ ] No [ ]

I understand that my complaint will be kept confidential and my identity will not be disclosed without my consent: Yes [ ] No [ ]

Signature (or leave blank for anonymous): _____ Date:

FOR OFFICIAL USE ONLY

Date Received: _____ Received by: _____

Reference Number: _____ Case Assigned to: _____

Initial Action Taken:

_____

Appendix F2. GBV and SEAH Monthly Incident Log

Reporting Month: _____ Year: _____ Prepared by:

This log is strictly confidential and for authorized use only. All entries use anonymized case codes. No personally identifiable information shall be recorded in this log.

Case Code	Date Reported	Type of Incident	Location	Complainant Category	Immediate Action Taken	Referral Made	Resolution Status	Days to Resolve	Remarks	Example 1
DD/MM/YYYY	Sexual Harassment	Ward A	Hospital Staff	Complaint received and referred to ESO	UPTD PPA	Resolved	14	Follow up counseling provided	Example 2	DD/MM/YYYY
Privacy Violation	Female Ward	Patient	Ward access restricted pending investigation	Internal HR	Under Review	7	Investigation ongoing	Example 3	DD/MM/YYYY	Physical Abuse
Construction Site	Construction Worker	Worker suspended pending investigation	UPTD PPA and Police	Resolved	21	Perpetrator dismissed	MONTHLY TOTAL			

Note: For each month, complete one row per incident. All entries must use anonymized case codes. The total row at the bottom shall capture monthly statistics for reporting. This log shall be retained securely by the ESO for a minimum of 5 years.

Appendix F3. Proposed Training Material for Staff on GBV and SEAH Handling & Response

RUMAH SAKIT UMUM PUSAT DR. SITANALA (RSST) GBV AND SEAH AWARENESS TRAINING FOR HOSPITAL STAFF AND CONSTRUCTION WORKERS

Proposed Training Outline and Content Guide

Training Overview

Duration: 3 hours (can be adapted to half day or full day) Target Audience: All RSST staff (medical, nursing, administrative, security, outsourced), construction workers, and subcontractor personnel

Facilitator: RSST HR or ESO, or an accredited GBV facilitator from UPTD PPA or a certified NGO

Language: Bahasa Indonesia (with materials available in simple language for low literacy participants)

Frequency: At induction for all new workers, and annually for all existing staff

Module 1: Understanding GBV and SEAH (45 minutes) Learning Objectives: By the end of this module, participants will be able to define GBV, SEA, and SH and understand why they are wrong.

Key Topics:

Definitions of GBV (Gender Based Violence), SEA (Sexual Exploitation and Abuse), and SH (Sexual Harassment) in simple, clear language

Examples of behaviors that constitute GBV and SEAH in the hospital and construction site context

Why GBV and SEAH cause serious harm to survivors, families, communities, and institutions

Power dynamics and how unequal power relationships create risk of GBV and SEAH

Indonesian national law on GBV and SEAH and consequences of violations

Facilitation Methods: Group discussion, short video clip (if available), illustrated case scenarios using role play

Module 2: Recognition and Prevention (45 minutes)Learning Objectives: Participants will be able to recognize warning signs of GBV and SEAH and understand how to prevent them.

Key Topics:

Early warning signs of GBV and SEAH in the workplace and ward environment

Risk factors specific to the RSST context including power imbalances between staff and patients, construction worker presence near hospital, female majority workforce vulnerability

The role of bystanders and how bystander intervention can prevent GBV and SEAH

Understanding the Code of Conduct and what it requires of all workers

Privacy and dignity rights of patients including the right to private sanitation, culturally appropriate clothing, and protection from unauthorized entry to female wards

Facilitation Methods: Case study review based on RSST incident log (anonymized), small group discussion, quiz

Module 3: Reporting and Response (45 minutes)Learning Objectives: Participants will know how to report GBV and SEAH, and understand what happens after a report is made.

Key Topics:

How to make a complaint: the GRM channels available including in person, written form, hotline, and anonymous reporting

What happens after a report is made: the step by step response process

Confidentiality and non retaliation protections for reporters and witnesses

Referral services available including UPTD PPA Tangerang City, psychosocial support, medical care, and legal assistance

Role of the SEAH Focal Point and how to contact them

Facilitation Methods: Role play of a reporting scenario, Q and A session, handout with GRM contact information

Module 4: Survivor Support and Do No Harm Principles (30 minutes) Learning Objectives: Participants in supervisory or HR roles will understand how to apply a survivor centered approach and the Do No Harm principle in responding to GBV and SEAH.

Key Topics:

The survivor centered approach: what it means and why it matters

Do No Harm in practice: actions to avoid that could re traumatize survivors or expose them to further risk

First response: how to listen, believe, and support a survivor who discloses an incident

Maintaining confidentiality and managing information carefully

Emotional support and self care for staff handling GBV and SEAH cases

Facilitation Methods: Facilitator presentation, reflective exercise, peer discussion

Training Evaluation Pre and post assessment: A short knowledge assessment questionnaire is administered before and after the training to measure learning gain.

Participant feedback form: All participants complete a brief satisfaction and feedback survey at the end of the training.

Training records: Attendance list signed by all participants. Training records are kept by the ESO and reported in the monthly GAP progress report. Completion of training is a mandatory requirement for all workers before commencing work at RSST.

Key Contacts and Reference Materials SEAH Focal Point at RSST: Name and contact to be filled in prior to training delivery

ESO Contact: Name and contact to be filled in prior to training delivery

UPTD PPA Tangerang City: Available for referrals and survivor support

National GBV Hotline (Komnas Perempuan): 021 3903963

SIMFONI PPA Application: Available for reporting gender based violence to the government system

This training material shall be reviewed and updated annually by the ESO and RSST HR to reflect any changes in national legislation, AIIB requirements, or lessons learned from GBV and SEAH incidents at RSST

Annex G - Exisiting SOP Gap Analysis and Recommended SOP with AIIB Standard

G1. Introduction

This document presents a gap analysis of the hospital Standard Operating Procedures (SOPs) against the requirements and expectations of the Asian Infrastructure Investment Bank (AIIB) and Good International Industry Practice (GIIP). The analysis is intended to support the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) by identifying whether existing procedures adequately address risk-based management, clear responsibilities, occupational and community health and safety, infection prevention and control, waste segregation, monitoring, incident reporting, emergency preparedness, documentation, corrective action, and contractor/vendor control.

The reviewed SOPs have been classified into the main operational aspects relevant to hospital environmental, health, safety and social management: solid waste management, WWTP/STP operation, medical and non-medical B3 waste management, infection prevention and control, emergency response, and patient movement. Each entry below retains the original Indonesian SOP name and number and provides an English version of the SOP name for use in the ESIA report to AIIB. The gap and recommendation columns have been translated and refined in English to provide a clear basis for SOP updates and implementation follow-up.

Where an SOP is relevant to more than one aspect, it is presented under the most relevant dominant aspect. Cross-cutting procedures such as STP emergency response or B3 spill response may also be referenced under emergency preparedness. No SOP entry related specifically to patient movement was identified in the reviewed document; this should be confirmed during subsequent SOP review and hospital operational readiness assessment.

G2. Summary of SOP Entries by Aspect

No.	Aspect	Number of SOP Entries
1	Solid Waste Management	5
2	STP Operation	7
3	Medical and Non-Medical B3 Waste Management	20
4	Infection Prevention and Control (IPC)	15
5	Emergency Response	16
6	Patient Movement	None identified
TOTAL		**63**

G3. Solid Waste Management

Note: Includes SOPs related to domestic/non-B3 waste, 3R, medical solid waste, and vector control associated with sanitation and temporary waste storage areas.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
1	Organic and Inorganic Waste Management - OT.02.02/XXXI.4.5/MFK/0107/2022 (*Pengelolaan Sampah Organik dan Anorganik* - OT.02.02/XXXI.4.5/MFK/0107/2022)	The SOP does not sufficiently distinguish domestic waste from medical/B3 waste. It does not yet include container colour coding, signage, contamination audits, vector control, or waste-reduction targets.	Update it as a Non-B3 Domestic Waste SOP covering definitions of organic/inorganic/residual waste, container colours, signage, prohibition of mixing with medical waste, collection schedule, cleanliness of the temporary storage area, odour/vector control, volume recording, and 3R targets.
2	3R Management - OT.02.02/XXXI.4.5/MFK/0106/2022 (*Pengelolaan 3R* - OT.02.02/XXXI.4.5/MFK/0106/2022)	The SOP still focuses on sorting flabot/jericans and cooperation with third parties. It does not yet include a waste-minimisation programme, targets, decontamination validation, approval of recycling recipients, or prohibition of recycling high-risk waste.	Consolidate the documents into one controlled SOP. Add the 3R hierarchy, list of recyclable and non-recyclable materials, evidence of decontamination, licensed vendors, MoU/permit of recycling recipient, volume recording, audits, annual targets, and prohibition on recycling infectious waste that has not been rendered safe.
3	Fly Density Measurement - OT.02.02/XXXI.4.5/MFK/024/2021 (*Pengukuran Kepadatan Lalat* - OT.02.02/XXXI.4.5/MFK/024/2021)	The SOP calculates a fly index, but it is not yet linked to Integrated Pest Management, risk-control points, corrective actions, control of food/waste sources, or evaluation of the pest-control vendor.	Revise it as part of the Integrated Pest Management programme: map high-risk points, define monitoring frequency and action thresholds, improve sanitation/temporary storage areas, retain evidence of pest-control actions, evaluate effectiveness, and report trends.
4	Rodent Pest Control Procedure - OT.02.02/XXXI.4.5/MFK/018/2021 (*Prosedur Pengendalian Binatang Pengganggu Tikus* - OT.02.02/XXXI.4.5/MFK/018/2021)	The SOP includes visual inspection and cooperation with a pest-control vendor, but it has not adopted an Integrated Pest Management approach. It does not yet include mapping of high-risk points, action thresholds, prioritisation of non-chemical controls, pesticide SDS, protection of patients/workers from chemical exposure, result records, vendor evaluation, and corrective action.	Update it as a Rodent IPM SOP: map high-risk areas, conduct risk-based inspections, prioritise sanitation and access closure, require bait/pesticide use only by competent staff/vendor, make SDS and PPE mandatory, prohibit application in patient areas without controls, keep finding logs and population trends, obtain vendor reports, and evaluate monthly effectiveness.
5	Cockroach Pest Control Procedure - OT.02.02/XXXI.4.5/MFK/015/2021 (*Prosedur Pengendalian Serangga Kecoa* - OT.02.02/XXXI.4.5/MFK/015/2021)	The SOP still focuses on physical/chemical extermination. It does not yet include IPM, control of food/moisture sources, selection of low-toxicity pesticides, safeguarding of clinical and kitchen areas, communication before spraying, monitoring of results, or contractor control.	Revise it as a Cockroach IPM SOP: identify sources, improve sanitation, seal cracks and crevices, monitor traps, define action thresholds, use safer gel bait where possible, require pesticide SDS, schedule application outside service hours when needed, use PPE and ventilation, prohibit contamination of food/medical equipment, keep action logs, and audit the pest-control vendor.

G4. WWTP/STP Operation

Note: Includes operation, maintenance, self-monitoring, reuse, shutdown/start-up, WWTP sludge, and emergency response for WWTP/STP facilities.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
1	Submersible Pump Inspection - OT.02.02/XXXI.4.5/MFK/03/2021 (*Pengecekan Pompa Submersible*-OT.02.02/XXXI.4.5/MFK/03/2021)	The SOP remains a simple technical checklist. It does not yet include lockout-tagout, confined-space/work permit requirements for WWTP tanks, electrical hazards, H2S/gas risks, clamp-meter calibration, preventive maintenance, or downtime recording.	Update it to require LOTO before work, electrical/biological PPE, gas testing when entering tank areas, preventive-maintenance schedules, ampere/flow parameters, spare pumps, inspection logs, escalation triggers, and reporting of pump failures.
2	Root Blower Inspection - OT.02.02/XXXI.4.5/MFK/02/2021 (*Pengecekan Root Blower* - OT.02.02/XXXI.4.5/MFK/02/2021)	The SOP does not yet regulate lockout-tagout, guarding of rotating parts, noise exposure, operating temperature/pressure, preventive maintenance, spare units, or emergency action if aeration stops.	Add LOTO, machine guarding, hearing protection, blower operating parameters, lubrication, belt/filter inspection, PM schedules, failure alarms, standby blowers, and bypass/escalation procedures to maintain effluent compliance.
3	WWTP Operation When Shut Down/Relocated - OT.02.02/XXXI.4.5/MFK/05/2021 (*Pengoperasian IPAL Bila Dihentikan/Dipindahkan* - OT.02.02/XXXI.4.5/MFK/05/2021)	The SOP only describes internal pumping. It does not yet include approval for operational shutdown, bypass prohibition, temporary containment, regulator notification, effluent monitoring, odour/aerosol risks, or recovery planning.	Revise it as a WWTP Shutdown/Start-up SOP: require management/HSE approval, prohibit untreated discharge, provide temporary holding tanks, use licensed vacuum trucks where needed, monitor pH/BOD/COD/TSS, notify regulators, communicate internally, and validate restart.
4	WWTP Sludge Removal - OT.02.02/XXXI.4.5/MFK/04/2021 (*Pengurasan Lumpur IPAL* - OT.02.02/XXXI.4.5/MFK/04/2021)	The SOP is incomplete for WWTP sludge as potentially infectious/B3 waste. It does not yet include sludge characterisation, dewatering, storage, manifests, licensed vendors, gas risks, or biological exposure controls.	Update it to include sludge classification, biological/chemical PPE, LOTO and gas testing, dewatering, labelled packaging, temporary storage, manifests, licensed transporters/processors, sampling if required, and volume reporting.
5	Reuse/Recycling for Garden Irrigation - OT.02.02/XXXI.4.5/MFK/027/2021 (*Recycle/Daur Ulang untuk Penyiraman Taman* - OT.02.02/XXXI.4.5/MFK/027/2021)	The SOP mentions reuse of treated WWTP water for landscaping, but it does not yet specify reuse-water quality criteria, microbiological parameters, residual chlorine, restricted irrigation areas, aerosol prevention, “non-potable water” signage, worker protection, or actions when test results do not comply.	Update it as a Treated WWTP Effluent Reuse for Landscape Irrigation SOP: set internal standards before reuse, conduct routine physical-chemical-microbiological testing, use only for non-contact landscaping, avoid aerosol irrigation during busy periods, require PPE, label pipes/tanks as “non-potable water”, record reuse volume, stop reuse if results are non-compliant, and conduct investigation/CAPA.
6	Wastewater Self-Monitoring - OT.02.02/XXXI.4.5/MFK/013/2021 (*Swapantau Air Limbah* - OT.02.02/XXXI.4.5/MFK/013/2021)	The SOP includes monitoring of flow, pH, temperature, and DO, but does not yet cover mandatory hospital effluent parameters such as BOD, COD, TSS, ammonia, oil and grease, and total coliform according to permit/standards. It also lacks equipment calibration, chain of custody, data trending, alarm limits, and corrective actions.	Update it as a WWTP Effluent Self-Monitoring SOP: define the official outlet, daily/monthly frequency, field and laboratory parameters, calibration of DO meter/pH meter/flowmeter, trend recording, internal alert limits before regulatory limits, regulatory reporting, exceedance investigation, and CAPA.
7	WWTP Emergency Response - OT.02.02/XXXI.4.5/MFK/01/2021 (*Tanggap Darurat Instalasi Pengolahan Air Limbah/IPAL* - OT.02.02/XXXI.4.5/MFK/01/2021)	The SOP addresses effluent exceedance, power outage for more than one hour, leakage/cracks in tanks, and flowmeter failure. However, it has not become a complete WWTP emergency response plan. It lacks incident-level classification, an incident commander, prohibition of unauthorised bypass, temporary containment, tested genset/backup power, regulator notification, additional sampling, H2S/biogas controls, PPE, LOTO, spill containment, incident documentation, and after-action review.	Revise it as a WWTP Emergency Response Plan. Add minor/moderate/major emergency levels, designate an incident commander, define emergency contacts and escalation to management, IPSRS, K3RS, Environmental Health, and regulators. Include backup power procedures, prohibition of untreated wastewater discharge, use of holding tanks/licensed vacuum trucks where needed, additional effluent sampling, gas testing before entering tank areas, biological/chemical PPE, LOTO, leakage containment, exceedance reporting, root-cause investigation, CAPA, and periodic drills.

G5. Medical and Non-Medical B3 Waste Management

Note: Includes medical hazardous waste, sharps/infectious waste, non-medical B3 chemicals, labelling, storage, spills, exposure response, and eyewash facilities.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
1	Hazardous and Toxic Materials (B3) Labelling - OT.02.02/XXXI.4.5/MFK/034/2022 (*Pelabelan Bahan Berbahaya dan Beracun/B3* - OT.02.02/XXXI.4.5/MFK/034/2022)	The SOP already includes identity and MSDS information, but it is not yet fully based on GHS/SDS. It does not yet include a B3 inventory, hazard classification, label inspection, responsibility of the material owner, or a reporting mechanism for damaged/missing labels.	Update it as a GHS-based B3 labelling SOP: chemical name, hazard pictogram, signal word, hazard statement, precautionary statement, receipt/expiry dates, storage location, SDS availability at the location, periodic label audits, and corrective action when labels are not appropriate.
2	Handling of Medical Solid Waste in Safety Boxes - OT.02.02/XXXI.4.5/MFK/028/2021 (*Penanganan Limbah Padat Medis Safety Box* - OT.02.02/XXXI.4.5/MFK/028/2021)	The SOP is generally good because it includes leak-proof/puncture-resistant safety boxes and a 3/4 fill limit. However, it is not yet complete against GIIP because it lacks prohibition of needle recapping, needle-stick injury response, vaccination/monitoring of workers, placement of safety boxes near points of care, segregation audits, and evaluation of transporters/processors.	Add sharps procedures: place safety boxes at service points, prohibit opening/compacting contents, prohibit needle recapping, define blood exposure/needle-stick injury flow including PEP where needed, require PPE, use manifests, use licensed transporters, audit compliance, and report incidents.
3	Handling of Medical Solid Waste in Yellow Bags - OT.02.02/XXXI.4.5/MFK/014/2021 (*Penanganan Limbah Padat Medis Plastik Kuning* - OT.02.02/XXXI.4.5/MFK/014/2021)	The SOP appears in several files/duplicates. Substantively, it has not differentiated infectious, pathological, pharmaceutical, chemical, cytotoxic, and sharps waste. It lacks maximum weight standards, storage time, secondary containers, and internal transport routes.	Consolidate it into one controlled document. Add waste segregation according to GIIP categories, biohazard labels, volume/weight limits, temporary storage time, worker PPE, medical waste spill response, manifests, licensed contractors, segregation audits, and non-compliance reporting.
4	Management of Flabot and HD Jerrycan Waste - OT.02.02/XXXI.4.5/MFK/0108/2022 (*Pengelolaan Limbah Flabot dan Jerigen HD* - OT.02.02/XXXI.4.5/MFK/0108/2022)	The SOP regulates cutting and disinfection, but it has not assessed cut hazards, aerosol generation, residual chemicals/medicines, chlorine-level validation, liquid residue, or third-party safety.	Revise it so that only non-B3 and non-cytotoxic flabot/jerrycans may be processed; drain residues, validate decontamination, require complete PPE, use safe cutting tools, maintain batch logs, inspect third parties, and prohibit recycling when contaminated with blood or hazardous medicines.
5	Accident Response due to Alcohol Exposure - OT.02.02/XXXI.4.5/MFK/039/2022 (*Penanganan Kecelakaan karena Alkohol* - OT.02.02/XXXI.4.5/MFK/039/2022)	The SOP contains general first aid, but it is not SDS-based and does not yet include flammability controls, eyewash/shower, medical referral criteria, exposure recording, or root-cause investigation.	Update first aid according to the SDS: rinse eye/skin exposure for at least 15 minutes, move inhalation cases to fresh air, refer ingestion cases to medical services/poison centre, prohibit unsafe actions, and require incident reporting and CAPA.
6	Alcohol Storage - OT.02.02/XXXI.4.5/MFK/040/2022 (*Penyimpanan Alkohol* - OT.02.02/XXXI.4.5/MFK/040/2022)	The SOP does not yet regulate maximum stock, flammable cabinets, segregation from oxidisers, bonding/grounding for large volumes, signage, spill kits, fire extinguishers, or periodic inspection.	Revise it as a Flammable Liquid Storage SOP: store in a flammable cabinet/area, ensure adequate ventilation, keep away from heat/oxidisers, set unit stock limits, provide GHS labels and SDS, provide Class B fire extinguishers and spill kits, conduct monthly inspections, and train workers.
7	Accident Response due to Aseptic Gel - OT.02.02/XXXI.4.5/MFK/050/2022 (*Penanganan Kecelakaan karena Aseptic Gel* - OT.02.02/XXXI.4.5/MFK/050/2022)	The SOP only contains general first aid. It does not yet include SDS, exposure routes, medical referral criteria, eyewash/shower, near-miss recording, investigation, prevention of repeated exposure, or linkage to chemical storage.	Revise it as an Aseptic Gel Chemical Exposure SOP: require SDS reference, rinse eyes/skin for at least 15 minutes, remove contaminated clothing, move inhalation cases to fresh air, prohibit medical actions without competence, consult doctors/ER, document events, investigate root causes, and train users.
8	Aseptic Gel Handling - OT.02.02/XXXI.4.5/MFK/052/2022 (*Penanganan Aseptic Gel* - OT.02.02/XXXI.4.5/MFK/052/2022)	The SOP is very brief and does not explain material characteristics, SDS, flammability/irritation risks, PPE, use limits, storage, spills, or first aid.	Integrate it with the chemical/hand hygiene product SOP: refer to SDS, use GHS labels, ensure ventilation, prohibit eating/drinking/smoking, keep away from ignition sources, define spill procedures, first aid, exposure reporting, and staff training.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
9	Fire Response due to Sulfur Oxide - OT.02.02/XXXI.4.5/MFK/059/2022 (*Penanganan Kebakaran karena Belerang Oksida* - OT.02.02/XXXI.4.5/MFK/059/2022)	The material identification is unclear; "sulfur oxide" is generally a hazardous gas rather than a stored material. The SOP does not yet include SDS, appropriate extinguishing media, toxic gas risks, SCBA, isolation zones, evacuation, air monitoring, or containment of firefighting water.	Clarify the material name and SDS. Revise it as a Fire Response for Chemicals Generating SOx Gases SOP: activate alarm, evacuate the area, allow firefighting only by trained personnel using SCBA, cool containers from a safe distance, isolate ventilation if needed, prohibit re-entry, conduct exposure health checks, contain residues, and report the incident.
10	Accident Response due to Sulfur Oxide Exposure - OT.02.02/XXXI.4.5/MFK/060/2022 (*Penanganan Kecelakaan karena Belerang Oksida* - OT.02.02/XXXI.4.5/MFK/060/2022)	First aid is not SDS-based and does not emphasise that oxygen/artificial respiration may only be provided by competent personnel. It also lacks eyewash/shower, monitoring of delayed inhalation effects, medical escalation, occupational-disease reporting, and investigation.	Revise it as a Sulfur Oxide/SOx Exposure SOP: move the victim to fresh air, have trained personnel evaluate ABC, provide oxygen only by competent personnel, rinse eyes/skin for 15-30 minutes, observe delayed pulmonary symptoms, refer to ER, record exposure, investigate, and implement preventive action.
11	Fire Response due to Chlorine/Disinfectant Tablets/Granules - OT.02.02/XXXI.4.5/MFK/062/2022 (*Penanganan Kebakaran karena Chlorin/Desinfectant Tablets/Granules*-OT.02.02/XXXI.4.5/MFK/062/2022)	The SOP does not yet emphasise oxidiser/chlorine gas release risks, incompatible materials, area isolation, SCBA, containment of runoff, or hazard communication to affected staff/community.	Update it with reference to SDS: isolate the area, avoid contact with acids/ammonia/organic materials, allow firefighting only by trained personnel using SCBA, cool containers if safe, prevent runoff to drains, evacuate smoky areas, conduct exposure health checks, and report the incident.
12	Accident Response due to Klosept/Presept Disinfectant Tablets/Granules - OT.02.02/XXXI.4.5/MFK/063/2022 (*Penanganan Kecelakaan karena Klosept/Presept Disinfectant Tablets/Granules* - OT.02.02/XXXI.4.5/MFK/063/2022)	The SOP recommends drinking water/milk after ingestion, but it does not yet include reference to SDS/poison centre, prohibition of vomiting unless instructed by medical personnel, ER referral criteria, exposure reporting, and investigation.	Revise first aid according to SDS: rinse mouth, do not induce vomiting unless instructed by medical personnel, do not give anything by mouth to an unconscious victim, contact doctor/ER/poison centre, rinse eyes/skin for at least 15 minutes, provide fresh air for inhalation, record exposure, and implement CAPA.
13	Klosept Disinfectant Tablets/Granules Handling - OT.02.02/XXXI.4.5/MFK/064/2022 (*Penanganan Klosept Disinfectant Tablets/Granules* - OT.02.02/XXXI.4.5/MFK/064/2022)	The handling SOP is still general. It does not yet include SDS, GHS labels, PPE, ventilation, exposure limits, incompatibility, spill response, management of residues/packaging, and personnel training.	Merge or harmonise it with SPO 063 and 065 as a Chlorine Disinfectant Tablets Management SOP: receipt, labelling, storage, use, PPE, ventilation, prohibition of mixing, spill response, first aid, packaging waste, inspection, and training.
14	Storage of Chlorine Disinfectant Tablets/Granules - OT.02.02/XXXI.4.5/MFK/065/2022 (*Penyimpanan Chlorin Disinfectant Tablets/Granules* - OT.02.02/XXXI.4.5/MFK/065/2022)	The SOP mentions dry and closed storage away from acids/ammonia/urea, but it does not yet include maximum inventory, compatibility segregation, secondary containment, signage, restricted access, on-site SDS, periodic inspection, or integration with emergency response.	Revise it as an Oxidiser/Chlorine Disinfectant Storage SOP: store in a cool, dry, ventilated place; keep away from acids/ammonia/organics/reducers; maintain minimum stock; provide GHS labels and SDS; use locked cabinets/areas; conduct monthly inspections; provide spill kits; prohibit burning of packaging; train staff; and provide emergency contacts.
15	Accident Response due to Alcohol Handrub - OT.02.02/XXXI.4.5/MFK/093/2022 (*Penanganan Kecelakaan karena Alcohol Handrub* - OT.02.02/XXXI.4.5/MFK/093/2022)	The SOP only covers first aid and does not control documents; duplicate files with the same title and number were identified. It does not yet include SDS, flammability, poison centre, eyewash, reporting, or prevention of repeated exposure.	Retain only one controlled document. Revise it as an Alcohol Handrub Exposure SOP: refer to SDS, rinse eyes/ears with running water, move inhalation cases to fresh air, give nothing by mouth to an unconscious victim, refer for medical care, record incidents, investigate, and link it with spill and storage SOPs.
16	Alcohol Handrub Storage - OT.02.02/XXXI.4.5/MFK/095/2022 (*Penyimpanan Alcohol Handrub* - OT.02.02/XXXI.4.5/MFK/095/2022)	The SOP mentions cool/ventilated areas away from ignition sources, but it does not yet include storage quantity limits, flammable cabinets, signage, segregation from oxidisers, spill kits, suitable fire extinguishers, inspections, grounding/bonding for bulk dispensing, or training.	Revise it as an Alcohol Handrub/Flammable Liquid Storage SOP: store in flammable cabinets/areas where volumes are large, limit unit stock, keep away from oxidisers/heat, provide GHS labels and no-smoking signs, provide fire extinguishers and spill kits, inspect monthly, define spill procedures and dispensing controls, and train staff.
17	Thinner Storage - OT.02.02/XXXI.4.5/MFK/099/2022 (*Penyimpanan Tiner* - OT.02.02/XXXI.4.5/MFK/099/2022)	The SOP mentions temperature control and segregation from oxidisers/acids/alkalis, but it does not yet include flammable cabinets, stock limits, vapour/VOC detection, fire extinguishers, spill kits, local ventilation, or hot-work permits.	Update it as a Solvent/VOC Storage SOP: use flammable cabinets, keep minimum stock, provide SDS and GHS labels, ensure ventilation, prohibit ignition sources, inspect caps/packaging, provide spill kits and fire extinguishers, manage contaminated rags/tissues as B3 waste, and link with fire/spill emergency procedures.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
18	Accident Response due to Thinner Exposure - OT.02.02/XXXI.4.5/MFK/098/2022 (*Penanganan Kecelakaan karena Tiner* - OT.02.02/XXXI.4.5/MFK/098/2022)	First aid has not covered VOC inhalation risks, aspiration if swallowed, neurological effects, or immediate medical referral. Worker exposure monitoring is also absent.	Update solvent first aid: move the victim to fresh air, do not induce vomiting if swallowed, rinse eyes/skin, refer to ER/poison centre, record exposure, evaluate workplace ventilation, and provide occupational-health follow-up.
19	Accident Response due to Surface/Equipment Disinfectant Exposure - OT.02.02/XXXI.4.5/MFK/084/2022 (*Penanganan Kecelakaan Desinfektan Permukaan/Alat* - OT.02.02/XXXI.4.5/MFK/084/2022)	The SOP does not yet mention active ingredients, concentration, mixing risks, SDS, eyewash, medical referral, or exposure reporting.	Add disinfectant classification, SDS, PPE, prohibition of mixing with acids/ammonia, rinsing of eyes/skin for at least 15 minutes, ventilation, medical referral, exposure log, and cause investigation.
20	Use of Eyewash and Maintenance of Eyewash Dispenser - OT.02.02/XXXI.4.5/MFK/0118/2022 (*Penggunaan Eye Wash dan Pemeliharaan Dispenser Eye Wash* - OT.02.02/XXXI.4.5/MFK/0118/2022)	The written flushing duration is approximately six minutes, which is not aligned with common practice for chemical exposure that usually requires longer flushing. The SOP does not yet include weekly inspection, flow testing, maximum distance from hazard points, or signage.	Update it to require eye/skin flushing for at least 15 minutes or according to SDS, access within approximately 10 seconds of risk areas, clear signage, weekly inspections, fluid replacement according to manufacturer instructions, records, and medical referral after exposure.

G6. Infection Prevention and Control (IPC)

Note: Includes surface cleaning, hand hygiene, linen, indoor air, clean/drinking/HD/RO water, food, PPE, and respiratory infection protocols.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
1	Management of Staff with ILI Symptoms and Close Contact - OT.02.02/XXXI.4.5/MFK/0130/2022 (*Tata Laksana Pegawai dengan Gejala ILI dan Kontak Erat* - OT.02.02/XXXI.4.5/MFK/0130/2022)	The SOP is still based on COVID-19 in 2022 and specific isolation duration. It should be updated into an adaptive respiratory infectious disease protocol. It does not yet include periodic updates of case definitions, vaccination, fit-for-work assessment, contract workers, ventilation, PPE, data confidentiality, and outbreak response.	Convert it into a Staff Management SOP for ILI/Respiratory Infectious Disease: use the latest case definitions from health authorities, symptom screening, occupational health referral, standard/droplet/airborne precautions, policy for staying off work while infectious, return-to-work based on symptoms/doctor assessment, exposure recording, and non-stigmatising communication.
2	Surface Cleaning - OT.02.02/XXXI.4.5/MFK/0111/2022 (*Pembersihan Permukaan* - OT.02.02/XXXI.4.5/MFK/0111/2022)	The SOP does not yet differentiate low/medium/high-risk areas, disinfectant contact time, chemical concentration, PPE, aerosol risks, cleaning of blood/body-fluid spills, and cleanliness validation.	Revise it based on IPC and GIIP: risk zoning, clean-to-dirty/top-to-bottom sequence, contact time, disinfectant concentration, PPE, management of cloths/wipes, blood/body-fluid spill procedure, cleanliness audits, and records.
3	Indoor Air Quality Monitoring/Air Microbiology Sampling - OT.02.02/XXXI.4.5/MFK/012/2021 (*Pemantauan Kualitas Udara Ruangan/Pengambilan Sampel Mikrobiologi Udara* - OT.02.02/XXXI.4.5/MFK/012/2021)	The SOP does not yet differentiate critical/non-critical rooms and does not regulate ACH, room pressure, HEPA, CO2, temperature/humidity, equipment calibration, or HVAC corrective actions.	Update it as a Hospital Indoor Air Quality SOP: room zoning, microbiological and physical parameters, sampling methods, equipment calibration, comparison standards, HVAC/ventilation evaluation, corrective actions, and trend reporting.
4	Room Humidity Measurement - OT.02.02/XXXI.4.5/MFK/020/2021 (*Pengukuran Kelembaban Ruangan*-OT.02.02/XXXI.4.5/MFK/020/2021)	The SOP does not yet include standards by room type, hygrometer calibration, monitoring frequency, HVAC corrective action, or trend recording.	Add humidity standards by area, calibrated equipment, measurement points, frequency, trend forms, alarm limits, corrective actions, and escalation to IPSRS/HVAC.
5	Room Temperature Measurement - OT.02.02/XXXI.4.5/MFK/025/2021 (*Pengukuran Suhu Ruangan* - OT.02.02/XXXI.4.5/MFK/025/2021)	The SOP still mentions mercury thermometers, which should be avoided because of mercury risk. It does not yet include temperature standards by room, calibration, or corrective actions.	Replace mercury thermometers with calibrated digital/infrared thermometers or data loggers. Set temperature standards by area, frequency, measurement points, trend logs, HVAC corrective actions, and procedures if any remaining mercury device breaks.
6	Microbiological Quality Monitoring/Linen Swab - OT.02.02/XXXI.4.5/MFK/030/2021 (*Pemantauan Kualitas Mikrobiologi Linen/Swab Linen* - OT.02.02/XXXI.4.5/MFK/030/2021)	The SOP only explains swab technique. It does not yet include risk-based sampling points, frequency, microbiological limits, chain of custody, storage/shipping conditions, laundry corrective actions, and investigation of non-compliant results.	Update it as a Linen Microbiological Monitoring SOP: define linen types and sampling locations, routine and investigative frequencies, standard swab methods, labelling, chain of custody, cold box, result criteria, corrective actions in washing/drying/storage processes, resampling, and reporting to IPC/Environmental Health.
7	Microbiological Quality Monitoring/Hand Swab - OT.02.02/XXXI.4.5/MFK/010/2021 (*Pemantauan Kualitas Mikrobiologi/Swab Tangan* - OT.02.02/XXXI.4.5/MFK/010/2021)	The procedure content is not relevant because the steps resemble water-sampling procedures rather than hand-swab procedures. This is a significant AIIB/GIIP gap because the document does not match its purpose and could mislead hand-hygiene monitoring implementation.	Replace the SOP content entirely with a Staff Hand Swab SOP: identify staff targets based on risk, define timing before/after hand hygiene, swab palm-fingers-between nails, use transport media, labelling, chain of custody, acceptance limits, result feedback, retraining on hand hygiene, and compliance audits.
8	Food Quality Monitoring/Food Sampling - OT.02.02/XXXI.4.5/MFK/029/2021 (*Pemantauan Kualitas Makanan/Pengambilan Sampel Makanan* - OT.02.02/XXXI.4.5/MFK/029/2021)	The SOP focuses on sampling, but it does not yet cover HACCP/food safety, storage temperatures, holding time, food-handler hygiene, chain of custody, laboratory result criteria, and corrective actions.	Revise it as a Food Safety Monitoring SOP: identify critical points, cooking/storage/serving temperatures, food-handler hygiene, representative samples, labelling, chain of custody, cold transport, microbiological limits, food recall, and CAPA.
9	Hemodialysis/HD Water Sampling - OT.02.02/XXXI.4.5/MFK/021/2021 (*Pengambilan Sampel Air Hemodialisa/HD* - OT.02.02/XXXI.4.5/MFK/021/2021)	The HD water sampling SOP is still general, similar to ordinary water sampling. It does not yet include dialysis-water-specific standards, critical sampling points, endotoxin, microbiology, disinfectant residue, chain of custody, risk-based frequency, stop-use action, or notification to the HD unit when results are non-compliant.	Revise it as a Hemodialysis Water Quality Sampling SOP: set sampling points at pre-treatment, post-RO, distribution loop, and HD machines; include microbiology, endotoxin, critical chemicals, conductivity/TDS, disinfectant residue; require labelling and chain of custody, cold chain, delivery time limits, acceptance criteria, stop-use/resampling, and follow-up documentation.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
10	Reverse Osmosis (RO) Water Sampling - OT.02.02/XXXI.4.5/MFK/022/2021 (*Pengambilan Sampel Air RO/Reverse Osmosis* - OT.02.02/XXXI.4.5/MFK/022/2021)	The RO sampling SOP does not yet differentiate RO use for drinking water, process water, and possible clinical use. It lacks sampling points before/after RO, chemical-microbiological parameters, equipment calibration, chain of custody, actions when RO fails, and controls for post-RO contamination risks.	Revise it as an RO Water Sampling and Verification SOP: define inlet, outlet, storage, and distribution sampling points; include microbiological parameters, TDS/conductivity, pH, residual chlorine, and chemical parameters according to use; use sterile/preserved bottles; require chain of custody and cold delivery; interpret results; perform flushing/disinfection, resampling, and stop-use if non-compliant.
11	Physical Monitoring of Clean Water - OT.02.02/XXXI.4.5/MFK/09/2021 (*Pemantauan Fisik Air Bersih* - OT.02.02/XXXI.4.5/MFK/09/2021)	The SOP only covers simple physical parameters: odour, colour, and clarity. It does not yet include chemical/microbiological parameters, representative sampling points, quality limits, result trends, equipment calibration, or measurable corrective actions.	Integrate it with a Water Safety Plan: sampling points, frequency, physical-chemical-microbiological parameters, current quality standards, trend recording, investigation when results are non-compliant, flushing/disinfection, and risk communication to units.
12	Clean Water Sampling - OT.02.02/XXXI.4.5/MFK/07/2021 (*Pengambilan Sampel Air Bersih* - OT.02.02/XXXI.4.5/MFK/07/2021)	The SOP includes sterile bottles and delivery, but it does not yet include chain of custody, blank/control samples, preservation, test parameters, priority sampling points, and safety regarding the use of flame/alcohol at taps.	Revise it to use hygienic sampling procedures without fire risk where possible, complete labelling, chain of custody, delivery temperature, test parameters, risk-based sampling points, sample quality control, and follow-up for non-compliant results.
13	Use of Clean Water - OT.02.02/XXXI.4.5/MFK/06/2021 (*Air Bersih* - OT.02.02/XXXI.4.5/MFK/06/2021)	The SOP does not yet include water balance, water conservation, supply shortage risk, cross-contamination, backflow prevention, emergency water supply, or communication when water is unsafe.	Update it as a Water Safety and Conservation SOP: map sources, reservoirs, and distribution; protect against backflow; inspect networks; maintain emergency water stock; conserve water; conduct routine sampling; flush and disinfect; and notify units when quality is disrupted.
14	Drinking Water Sampling Procedure - OT.02.02/XXXI.4.5/MFK/08/2021 (*Prosedur Pengambilan Sampel Air Minum* - OT.02.02/XXXI.4.5/MFK/08/2021)	The SOP does not adequately differentiate clean water and drinking water. It lacks chain of custody, mandatory parameters, residual chlorine, delivery temperature, and risk communication when results do not comply.	Revise it to define drinking-water sampling points, microbiological/chemical/physical parameters, sterile bottles and preservation, labelling, chain of custody, cold box, laboratory holding time, result interpretation, stop-use/boil-water notice, flushing/disinfection, and resampling.
15	Use of Personal Protective Equipment (PPE) for OHS Officers - OT.02.02/XXXI.4.5/MFK/0115/2022 (*Penggunaan Alat Pelindung Diri/APD pada Petugas K3* - OT.02.02/XXXI.4.5/MFK/0115/2022):	The SOP already mentions hazard identification, PPE provision, awareness, obligation to use PPE, and supervision. However, it remains too general and has not met the GIIP/AIIB approach because it lacks the hierarchy of control, PPE matrix by work type, PPE selection standards, respirator fit testing, donning-doffing training, PPE inspection, replacement of damaged PPE, storage, and compliance audits.	Update it as a K3RS PPE Management SOP. Add the principle that PPE is the last control after elimination, substitution, engineering controls, and administrative controls. Develop a PPE matrix based on work risks such as WWTP, B3 waste, fire, chemicals, pest control, and evacuation. Add procedures for PPE selection, user training, fit testing, pre-use inspection, cleaning, storage, replacement, minimum stock, compliance audit, and records of non-compliance/corrective action.

G7. Emergency Response

Note: Includes facility emergency response, fire, earthquake, flood, security threats, evacuation, and technical emergency response related to WWTP and waste/B3.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
1	Work Instruction for Fire Extinguishers - OT.02.02/XXXI.4.5/MFK/0112/2022 (*Instruksi Kerja APAR* - OT.02.02/XXXI.4.5/MFK/0112/2022)	The SOP only contains operational steps for using fire extinguishers. It does not yet include fire-risk assessment, fire-extinguisher mapping, extinguisher type according to fire class, periodic inspection, training, drills, alarm/evacuation, incident reporting, and post-incident follow-up.	Update it as a Fire Extinguisher Use, Inspection, and Preparedness SOP: add fire classification, extinguisher locations on evacuation maps, monthly visual inspections, periodic maintenance, PASS/RACE training, prohibition on use when the fire grows, alarm activation, evacuation, incident reporting, and root-cause investigation.
2	Flood Response - OT.02.02/XXXI.4.5/MFK/0125/2022 (*Penanggulangan Jika Terjadi Kebanjiran* - OT.02.02/XXXI.4.5/MFK/0125/2022)	The SOP is still reactive. It does not yet include early warning, trigger levels, command structure, protection of vulnerable patients, safeguarding of electricity/oxygen utilities, contamination risk for water/B3 waste, business continuity, external coordination, and post-flood recovery.	Update it as a Flood and Extreme Weather Emergency Response SOP: set alert thresholds, command team, flood-prone area maps, evacuation routes for non-ambulatory patients, priorities for critical services, safe electrical shutdown, protection of waste/B3 materials, clean-water supply, post-flood disinfection, incident documentation, and annual simulations.
3	Code Green/Mass Emergency Procedure - OT.02.02/XXXI.4.5/MFK/0146/2022 (*Prosedur Code Green / Kegawatdaruratan Massal* - OT.02.02/XXXI.4.5/MFK/0146/2022)	The uploaded document appears to include only page 1 of 2. Its content focuses only on earthquakes and does not yet cover mass-casualty incidents, incident command, triage, emergency communication, continuity of care, safeguarding of medicines/equipment, patients with disabilities, or regular drills.	Complete it as a Code Green - Natural Disaster and Mass Emergency SOP: add HICS/incident commander, triage zones, patient tracking, internal-external communication channels, activation of ER/ICU/operating theatre, resource lists, protection of vulnerable patients, assembly points, media statement, drills, and after-action review.
4	Security Disturbance/Riot Code Grey - OT.02.02/XXXI.4.5/MFK/0145/2022 (*Gangguan Keamanan / Huru-Hara Code Grey* - OT.02.02/XXXI.4.5/MFK/0145/2022)	The SOP assigns roles to staff/security guards, but it has not yet met AIIB security principles: risk assessment, proportionality, de-escalation, restrictions on use of force, training on human rights/GBV, protection of vulnerable patients, documentation, and grievance mechanism.	Revise it as a Code Grey - Violence, Riot, and Security Threat SOP: make de-escalation the first step, limit use of force to defensive and proportionate actions, define criteria for calling police, protect victims/witnesses, train security guards, apply a body-safe approach, report incidents, investigate, and provide a GRM for patients/families/workers.
5	Evacuation Order - OT.02.02/XXXI.4.5/MFK/0144/2022 (*Perintah Evakuasi* - OT.02.02/XXXI.4.5/MFK/0144/2022)	The SOP does not yet include evacuation maps, assembly-point capacity, horizontal/vertical evacuation methods, patient categories, attendance list, missing-patient procedure, needs of persons with disabilities/elderly/children, safeguarding of medical records/medicines, drills, and re-entry authorisation.	Update it as a Hospital Facility Evacuation SOP: add route maps, assembly points, floor wardens, patient evacuation triage, evacuation chairs/stretchers, lists of patients-staff-visitors, family communication, prohibition on re-entry before all-clear, at least annual drills, and post-drill evaluation.
6	Protection against Infant Abduction - OT.02.02/XXXI.4.5/MFK/0126/2022 (*Perlindungan terhadap Penculikan Bayi* - OT.02.02/XXXI.4.5/MFK/0126/2022)	The SOP is still limited to checks, CCTV, and door supervision. It does not yet include a Code Pink system, mother-baby identification, visitor control, area lockdown, rapid response, police coordination, documentation, family communication, and proportional security principles.	Revise it as a Code Pink - Infant and Child Protection SOP: add mother-baby identification bands, verification during handover/discharge, restricted access to nursery areas, visitor control, CCTV audit, alarm/lockdown, non-discriminatory suspect description, police coordination, family communication, drills, and incident reporting.
7	Work Instruction for Earthquake - OT.02.02/XXXI.4.5/MFK/0116/2022 (*Instruksi Kerja Terjadi Gempa* - OT.02.02/XXXI.4.5/MFK/0116/2022)	The SOP contains basic instructions such as taking cover, staying away from glass/falling objects, shutting off gas/water, not using elevators, and evacuation. The gaps include absence of emergency command structure, building-risk zoning, evacuation procedures for non-ambulatory patients, assembly points, headcount of patients-staff-visitors, inspection of structural/utility damage, family communication, casualty handling, drills, and after-action review.	Revise it as a Hospital Earthquake Emergency Response SOP. Add stages before, during, and after an earthquake. During an earthquake, use drop-cover-hold on where safe. After the earthquake, activate emergency command, conduct horizontal/vertical evacuation according to building condition, prioritise ICU/OR/ER/inpatient patients, prohibit elevator use, shut down gas/electricity only by authorised staff, conduct headcount, inspect buildings and utilities, determine safe re-entry status, document the event, and conduct post-incident evaluation.
8	Bomb Threat for Building Security Officers - OT.02.02/XXXI.4.5/MFK/0117/2022 (*Ancaman Bom bagi Petugas Keamanan Gedung* - OT.02.02/XXXI.4.5/MFK/0117/2022)	The SOP covers reporting to supervisors, recording information, coordination with police, and possible evacuation. However, it is not complete against AIIB/GIIP because it lacks a bomb-threat checklist, preservation of evidence, suspicious-object procedure, safe zones, evacuation distance, prohibition of touching/moving packages, restrictions on radio/mobile-phone use near suspicious objects, protection of vulnerable patients, crisis communication, and drills.	Revise it as a Bomb Threat and Suspicious Package Response SOP. Add a call-receiver checklist: time, phone number, voice, exact wording, background sound, stated location, and call duration. For suspicious objects: do not touch, isolate the area, secure routes, contact police, limit radio/mobile-phone use near the object, conduct risk-based evacuation, prepare evacuation of vulnerable patients, conduct controlled internal communication, document, report, and conduct drills.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
9	Self-Rescue in Case of Fire - OT.02.02/XXXI.4.5/MFK/0114/2022 (*Penyelamatan Diri Bila Terjadi Kebakaran* - OT.02.02/XXXI.4.5/MFK/0114/2022)	The SOP only contains general principles for escape routes, alternative paths, fire doors, evacuation signs, and emergency lighting. It does not yet include a fire command system, alarms, assembly points, floor warden roles, patient evacuation priority, horizontal/vertical evacuation, headcount, safeguarding of patients with disabilities/elderly/children, prohibition of re-entry, and drill evaluation.	Update it as a Hospital Fire Evacuation SOP. Add evacuation maps by floor, assembly points, floor wardens, evacuation methods for walking patients, wheelchair users, bedridden patients, ICU patients, and infants/children. Add elevator prohibition, door closing to limit smoke, headcount of patients-staff-visitors, family communication, safeguarding of medical records/critical medicines where safe, "all clear" authorisation, and at least annual drills.
10	Work Instruction When Seeing Fire - OT.02.02/XXXI.4.5/MFK/0113/2022 (*Instruksi Kerja Jika Melihat Api* - OT.02.02/XXXI.4.5/MFK/0113/2022)	The SOP instructs staff not to panic, activate the alarm, call emergency 888, use a fire extinguisher when possible, evacuate, proceed to assembly point, and not re-enter. The gaps include no criteria for small/large fires, RACE/PASS concepts, extinguisher type according to fire class, Code Red activation, isolation of electricity/medical gases, smoke protection, incident reporting, investigation, and corrective actions.	Revise it as an Initial Fire Response/Code Red SOP. Apply RACE: Rescue, Alarm, Contain, Extinguish/Evacuate. Fire extinguishers should only be used when the fire is still small, the exit route is safe, and personnel are trained. Add PASS: Pull, Aim, Squeeze, Sweep. Add fire-class identification, extinguisher types, alarm/call 888 activation, door closing, shutdown of electricity/medical gas by authorised personnel, evacuation, incident reporting, root-cause investigation, and CAPA.
11	STP Emergency Response - OT.02.02/XXXI.4.5/MFK/01/2021 (*Tanggap Darurat Instalasi Pengolahan Air Limbah/IPAL* - OT.02.02/XXXI.4.5/MFK/01/2021) EN:	The SOP addresses effluent exceedance, power outage for more than one hour, leakage/cracks in tanks, and flowmeter failure. However, it has not become a complete WWTP emergency response plan. It lacks incident-level classification, an incident commander, prohibition of unauthorised bypass, temporary containment, tested genset/backup power, regulator notification, additional sampling, H2S/biogas controls, PPE, LOTO, spill containment, incident documentation, and after-action review.	Revise it as a WWTP Emergency Response Plan. Add minor/moderate/major emergency levels, designate an incident commander, define emergency contacts and escalation to management, IPSRS, K3RS, Environmental Health, and regulators. Include backup power procedures, prohibition of untreated wastewater discharge, use of holding tanks/licensed vacuum trucks where needed, additional effluent sampling, gas testing before entering tank areas, biological/chemical PPE, LOTO, leakage containment, exceedance reporting, root-cause investigation, CAPA, and periodic drills.
12	Emergency Response Procedure for Medical B3 Waste Handling - OT.02.02/XXXI.4.5/MFK/047/2022 (*Prosedur Tanggap Darurat Penanganan Limbah B3 Medis* - OT.02.02/XXXI.4.5/MFK/047/2022)	The SOP is lengthy but repetitive and has not followed the ICWMP/GIIP approach. It does not yet include detailed segregation of infectious waste, sharps, chemical, pharmaceutical, cytotoxic and radioactive waste; spill kits, specific PPE, temporary storage maps, training, licensed contractors, reporting, and monitoring.	Reorganise it as a Medical B3 Waste Emergency Response and Spill Management SOP: colour/symbol segregation, sharps procedures, decontamination of infectious liquids, risk-based PPE, spill kits in temporary storage/units, safe internal transport routes, manifest records, vendor control, worker exposure response, communication to affected areas, audits, and after-action review.
13	Radioactive waste procedure	Not available	radioactive-specific segregation and decay-storage protocol before any RIRA/radiopharmacy operations begin; Dedicated decay-tank system for RIRA excreta separate from the general WWTP; Explicit BAPETEN utilization-license status.
14	B3 Spill Handling - OT.02.02/XXXI.4.5/MFK/0119/2022 (*Tumpahan B3* - OT.02.02/XXXI.4.5/MFK/0119/2022)	The SOP is more complete, but it does not yet include an escalation decision tree, emergency contacts, SDS at work points, spill-kit inventory, team competence, drills, and evaluation of CAPA effectiveness.	Make it the master B3 Spill SOP: spill classification, escalation flow, staff roles, PPE by hazard type, standard spill kits, SDS, drain containment, decontamination, residual-waste management, incident forms, root-cause investigation, and drills.
15	Alcohol Spill Handling - OT.02.02/XXXI.4.5/MFK/041/2022 (*Penanganan Tumpahan Alkohol*- OT.02.02/XXXI.4.5/MFK/041/2022)	The SOP does not yet distinguish small/large spills, mention SDS/MSDS, flammability, isolation of ignition sources, ventilation, spill kits, PPE, waste labelling, incident reporting, or investigation.	Update it as an Alcohol/Flammable Liquid Spill Handling SOP: classify spill volume, secure the area, eliminate ignition sources, provide ventilation, use SDS-based PPE, use non-reactive absorbents, place waste in labelled flammable B3 containers, prohibit discharge to drains, escalate to K3/B3 teams, report incidents, and implement CAPA.
16	Cleaning Service Chemical Spill Handling - OT.02.02/XXXI.4.5/MFK/0123/2022 (*Penanganan Tumpahan Bahan Cleaning Service* - OT.02.02/XXXI.4.5/MFK/0123/2022)	The SOP refers to cleaning chemicals, but it does not differentiate acids, bases, oxidisers, disinfectants, and solvents. It does not yet include SDS, chemical compatibility, specific PPE, neutralisers, and detailed prevention of entry to drains.	Revise it based on SDS for each chemical group: small/large spill response, area isolation, PPE, ventilation, prohibition of chemical mixing, appropriate absorbents/neutralisers, management of cleaning residues as B3 waste, reporting, and CAPA.
17	Liquid Hand Sanitizer Spill Handling - OT.02.02/XXXI.4.5/MFK/091/2022 (Penanganan Tumpahan Liquid Hand Sanitizer - OT.02.02/XXXI.4.5/MFK/091/2022)	The SOP is not yet adequate for flammable materials: it lacks isolation of ignition sources, bonding/grounding, volume classification, absorbent-waste management, and near-miss reporting.	Revise it as a flammable liquid spill SOP: shut off ignition sources, ventilate, use PPE, apply non-reactive absorbents, place waste in closed B3 containers, prohibit discharge to drains, provide fire extinguishers, and prepare incident/near-miss reports.

G8. Patient Movement

Note: No SOP entry was identified in the reviewed document under this aspect.

No.	SOP Name (Indonesian / English)	Gap against AIIB/GIIP	Recommended SOP Updates / Improvements
-	No SOP identified in the reviewed document.	No specific patient-movement SOP was listed in the reviewed classification. This represents a documentation gap if patient flow, patient transfer, emergency transfer, ambulance movement, or movement of infectious/vulnerable patients is managed through separate procedures that were not included in the review.	Confirm whether SOPs for patient flow, inter-unit patient transfer, patient tracking during emergencies, ambulance referral, and movement of infectious/non-ambulatory/vulnerable patients exist. If unavailable, develop SOPs aligned with GIIP covering safe routes, communication, infection control, accessibility, patient dignity, tracking, and emergency evacuation coordination.

Annex H - Land Use Right

H1. KKPR Approval




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H2. Due Diligence Review Of The Relocation Of 26 Staff Housing

H2.1 Background

The relocation of 26 staff housing units within the RSUP Dr. Sitanala compound was completed in 2024. Because AIIB's Environmental and Social Policy requires consideration of involuntary resettlement undertaken within the three years preceding identification of a Project for possible AIIB financing when such resettlement is directly linked to the Project, this ESIA treats the relocation as a legacy matter requiring a documented linkage assessment and due diligence. Completion before AIIB financing does not, by itself, make ESS2 inapplicable.

In response to the comments received during the AIIB review process, this **Due Diligence Review** has been prepared to provide an objective assessment of the completed relocation process, document the measures undertaken by the hospital, identify any remaining social issues, if any, and evaluate the extent to which the relocation process is aligned with the relevant principles and requirements of **AIIB Environmental and Social Standard 2 (ESS2) on Involuntary Resettlement**.

H2.2 Summary of Relocation Process

The review indicates that the relocation was undertaken as an internal institutional relocation involving official staff housing owned by the Ministry of Health. The relocation was carried out based on the hospital/institutional asset management requirements. The main characteristics of the relocation are summarized below.

No.	Item	Findings
1.	Type of relocation	Internal relocation of official staff housing
2.	Number of affected households	26 staff housing units
3.	Land ownership	Ministry of Health
4.	Timing	Completed in 2024 (prior to the proposed Project)
5.	Reason for relocation	Hospital redevelopment under the asset management
6.	Replacement location	Ministry of Health land under RSUP Dr. Sitanala management
7.	Physical displacement of surrounding community	None
8.	Land acquisition	None

H2.3 Due Diligence Findings

Based on available documentation, interviews, and information provided by the hospital, the following observations were identified.

H2.3.1 Consultation and Communication

The hospital conducted communication with occupants prior to relocation through socialization meetings, notification letters and direct discussions. Information provided included the purpose of relocation schedule, replacement location, and opportunities for occupants to raise questions and concerns.

H2.3.2 Replacement Accommodation

Replacement housing was provided on land remaining under the ownership and management of the Ministry of Health. Selection of the relocation site considered accessibility to the workplace, safety, availability of basic infrastructure, and suitability for continued residential use. Relocation was implemented in stages to provide sufficient transition time.

H2.3.3 Livelihood and Employment

The review found no evidence that relocation resulted in loss of employment or livelihood. All occupants remain employees of RSUP Dr. Sitanala, and their employment status, salaries, allowances, and employment benefits remain unchanged following relocation. Access to the workplace has also been maintained.

Temporary changes associated with relocation included relocation costs, house construction expenses on the designated leased plots, adjustment to the new location, and temporary inconvenience during the transition period. These temporary changes were managed through phased relocation and transitional arrangements.

H2.3.4 Grievance Mechanism

No formal grievance mechanism was specifically developed for the relocation of the 26 households. However, the relocation process was supported by ongoing two-way communication between the management and the 26 affected households. Through regular discussions and direct communication, the 26 households had opportunities to seek information, raise concerns, and discuss relocation-related matters. The communication proceeded smoothly, and mutual understanding.

H2.4 Review against AIIB ESS2

The Due Diligence Review indicates that the relocation was undertaken as an institutional management measure rather than land acquisition from third parties.

The review concludes that:

- no privately owned land or assets were acquired;
- no surrounding communities were physically displaced;
- no economic displacement or loss of livelihood was identified;
- employment conditions of affected staff remained unchanged;
- replacement accommodation was provided before demolition of the former staff housing;
- consultation and communication were undertaken during the relocation process; and
- Based on the evidence reviewed, the 2024 staff-housing relocation may be considered broadly consistent with relevant ESS2 objectives only after the Project confirms (i) whether the relocation was directly linked to the AIIB-financed redevelopment, (ii) that all 26 affected households were adequately consulted and assisted, and (iii) that no residual physical or economic displacement impacts remain. Any evidence gaps or residual impacts should be addressed through time-bound corrective actions agreed with AIIB.

H2.5 Outstanding Issues and Corrective Actions

Based on the information available during preparation of this ESIA, no unresolved relocation-related social impacts have been identified from the evidence reviewed; however, this conclusion remains subject to completion of the linkage assessment and verification of the affected-household records, assistance provided, grievance history, and any residual impacts. Accordingly:

- A standalone Resettlement Action Plan (RAP) for the legacy staff-housing relocation is not proposed at this stage, subject to AIIB acceptance of the due diligence and confirmation that no residual impacts remain; any identified gaps should be closed through a time-bound corrective action plan/ESAP or other instrument agreed with AIIB.
- A standalone Livelihood Restoration Plan (LRP) for the legacy staff-housing relocation is not proposed at this stage because no livelihood loss has been identified in the evidence reviewed; this conclusion is limited to the legacy staff-housing matter and is subject to verification and AIIB acceptance.

H2.6 Conclusion

The Due Diligence Review has not identified unresolved loss of employment or permanent livelihood impacts arising from the 2024 staff-housing relocation in the evidence reviewed. This conclusion is limited to that legacy relocation and remains subject to confirmation of direct linkage to the Project and complete verification of all 26 affected households. It does not determine ESS2 applicability for current or future Project impacts. Temporary or permanent loss of access or income affecting street vendors or other formal or informal economic activities must be screened separately under ESS2 and, if economic displacement is confirmed, managed through proportionate compensation/livelihood-restoration measures and any AIIB-required instrument before the impact occurs.

The relocation of the 26 staff housing units was assessed against the relevant principles of AIIB Environmental and Social Standard ESS 2 Involuntary. The assessment focuses on the extent to which the relocation process, although completed prior to the proposed AIIB-financed Project, demonstrates alignment with the objectives and key requirements of the applicable standards.

H2.7 Assessment of Alignment with AIIB ESS 2

No.	Principle / Requirement	Assessment Findings	Evidence Reviewed	Alignment	Gap Identified
			AIIB ESS 2		
1	Avoid or minimize involuntary resettlement wherever feasible.	The relocation was completed in 2024 before AIIB financing. This timing does not by itself make ESS2 inapplicable. The ESIA must determine whether the relocation was	Hospital management records; Project/master-plan chronology; relocation decision documents;	To be confirmed	Document the direct-linkage assessment and close any evidence or residual-impact gaps through time-bound corrective actions agreed with AIIB.

No.	Principle / Requirement	Assessment Findings	Evidence Reviewed	Alignment	Gap Identified
		directly linked to the proposed AIIB-financed redevelopment and, if so, assess it as a legacy resettlement matter under the ESP/ESS2 and identify any residual gaps.	household interviews		
2	Identify and engage affected persons throughout the relocation process.	The hospital maintained continuous communication with all 26 affected households during the relocation process. Affected persons were informed of relocation arrangements and had opportunities to discuss their concerns directly with hospital management.	Interview with households	Aligned	None.
3	Provide appropriate relocation assistance.	Relocation arrangements were provided according to the circumstances of each household. 8 (eight) households were relocated to Ministry of Health land through formal lease agreements, while others had already secured alternative housing	Lease agreements; list of affected households;	Aligned	None

No.	Principle / Requirement	Assessment Findings	Evidence Reviewed	Alignment	Gap Identified
		or had relocated independently.			
4	Restore or improve livelihoods of affected persons.	The relocation did not affect employment status or primary sources of income. All remained hospital employees, retirees, or had alternative accommodation without evidence of livelihood disruption.	Employment records; interviews	Aligned	None
5	Timely disclosure of relevant information.	Information regarding the relocation process was communicated directly to households through meetings and individual communication.	Interviews with households	Aligned	None
7	Accessible grievance mechanism.	A formal project-specific grievance mechanism was not established. Nevertheless, affected households were able to raise questions, requests, and concerns directly with hospital management. Available information indicates that issues were addressed through continuous two-way	Interviews	Partially aligned	No formal relocation-specific GRM was documented. Verify grievance records/outcomes and ensure any residual relocation concerns can access the current Project GRM without retaliation.

No.	Principle / Requirement	Assessment Findings	Evidence Reviewed	Alignment	Gap Identified
		communication and mutual agreement.			
8	Monitoring and follow-up.	Interviews with affected households did not identify outstanding relocation-related complaints requiring corrective action. No significant unresolved social issues were identified during the due diligence review.	Household interviews; field verification;	To be confirmed	Confirm completeness of household verification and whether any residual impacts or unresolved claims remain; document closure evidence.

H2.8 List of 26 Relocated heads of households

No	Nama	Status	Realokasi
1	Desi Eldiana, S.Kep, Ners	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
2	Sri Paryani	pns aktif	tempat tinggal masing-masing
3	Sumarno, S.Kep	pns aktif	tempat tinggal masing-masing
4	Idang Sudrajat, S.Kep, Ners	pns aktif	tempat tinggal masing-masing
5	Pudji Nurhayati, AMF	pns aktif	tempat tinggal masing-masing
6	Judi Novian, S.Kep, Ners	pns aktif	tempat tinggal masing-masing
7	Teguh Sultoni	pns aktif	tempat tinggal masing-masing
8	Yuni	pindah	tempat tinggal masing-masing
9	Sarbini	pensiun	tempat tinggal masing-masing
10	Frans Hendry Daniel Sembiring, AMK	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
11	Nurlaelah, S.Kep., Ners	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
12	Rista Sembiring, S.Kep,Ns	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
13	Agus Dwi Saputro, AMK	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
14	dr. Filipus Dasawala, Sp.B	pns aktif	tempat tinggal masing-masing

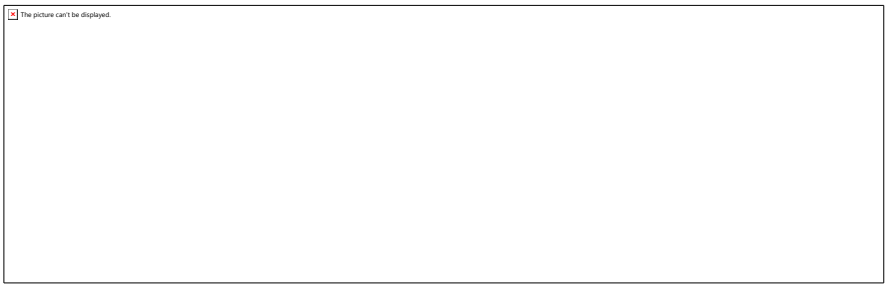
No	Nama	Status	Realokasi
15	Wiji Wahyuningsih, S.Kep., Ners	pns aktif	tempat tinggal masing-masing
16	Nia Triani Kurniawati, S.Kep. Ners	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
17	Ahmad Hadi Ardiansyah, A.Md.Kep	pns aktif	tempat tinggal masing-masing
18	Grista yuntara / uun	pindah	tempat tinggal masing-masing
19	Elisabet, S.Kep.,Ners	pns aktif	tempat tinggal masing-masing
20	H.Cecep Bhuhori, SKM, MSi	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
21	Junaedi	pensiun	tempat tinggal masing-masing
22	dr. Ruliana Margina	pns aktif	tempat tinggal masing-masing
23	Ns. Siti Khoirun Nisa, S.Kep, MKM	pns aktif	realokasi ke Lahan Kementerian Kesehatan berada di luar area Rumah Sakit
24	Siti Nuraeni, S.Kep, Ns	pns aktif	tempat tinggal masing-masing
25	Michael	pensiun	tempat tinggal masing-masing
26	dr. Isabella Febrina Lumbantoruan, Sp.GK	pns aktif	tempat tinggal masing-masing



AUDIT ASBESTOS

RUMAH SAKIT UMUM PUSAT DR. SITANALA

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TRUST Project

Funding: Asian Infrastructure Investment Bank (AIIB)

Implementer: Ministry of Health of the Republic of Indonesia

Prepared by:

Dr. Ir. Yuwono Budi Pratiknyo, MT, C.EIA, IPM

Juni 2026

KATA PENGANTAR

Puji syukur kami panjatkan ke hadirat Tuhan Yang Maha Esa, karena atas rahmat dan karunia-Nya, Laporan Audit Asbestos RSUP Dr. Sitanala Tangerang ini dapat disusun dengan baik. Laporan ini disusun sebagai bentuk dokumentasi atas pelaksanaan kegiatan identifikasi, pemeriksaan, pengambilan sampel, analisis, serta penilaian terhadap potensi keberadaan material yang mengandung asbestos atau Asbestos Containing Material (ACM) pada area fasilitas RSUP Dr. Sitanala Tangerang.

Kegiatan audit asbestos ini dilaksanakan sebagai upaya untuk mendukung pengelolaan lingkungan kerja dan fasilitas rumah sakit yang aman, sehat, dan sesuai dengan prinsip keselamatan dan kesehatan kerja. Pemeriksaan dilakukan melalui pendekatan inspeksi lapangan, observasi kondisi material bangunan, dokumentasi area, serta analisis laboratorium terhadap sampel yang diambil dari lokasi yang berpotensi mengandung asbestos.

Laporan ini memuat gambaran umum fasilitas, dasar hukum dan standar acuan, metodologi audit, hasil identifikasi lapangan, hasil analisis laboratorium, penilaian risiko, serta rekomendasi pengelolaan yang diperlukan. Hasil audit ini diharapkan dapat menjadi dasar bagi pihak pengelola RSUP Dr. Sitanala Tangerang dalam menetapkan langkah pengendalian, pemantauan, dan tindak lanjut terhadap material yang terindikasi atau berpotensi mengandung asbestos.

Kami menyampaikan terima kasih kepada seluruh pihak yang telah memberikan dukungan, data, akses lapangan, serta informasi yang diperlukan selama pelaksanaan kegiatan audit ini. Kerja sama yang baik dari pihak rumah sakit, tim auditor, dan pihak terkait lainnya sangat membantu kelancaran proses pemeriksaan dan penyusunan laporan.

Kami menyadari bahwa laporan ini masih memiliki keterbatasan, baik dari sisi cakupan pemeriksaan, akses area, maupun keterbatasan pengambilan sampel di lapangan. Oleh karena itu, saran dan masukan yang membangun sangat diharapkan untuk penyempurnaan pelaksanaan audit dan pengelolaan asbestos di masa mendatang.

Akhir kata, semoga laporan ini dapat memberikan manfaat bagi RSUP Dr. Sitanala Tangerang dalam mendukung pengelolaan fasilitas yang aman, terkendali, dan berkelanjutan, khususnya dalam upaya pencegahan risiko paparan asbestos terhadap pekerja, pasien, pengunjung, dan lingkungan sekitar.

Jakarta, Juni 2026
Auditor



Dr. Ir. Yuwono Budi Pratiknyo, MT, C.EIA, IPM

EXECUTIVE SUMMARY

Audit asbestos di RSUP Dr. Sitanala Tangerang dilaksanakan untuk mengidentifikasi potensi keberadaan material yang mengandung asbestos atau Asbestos Containing Material (ACM) pada area bangunan dan fasilitas pendukung rumah sakit. Kegiatan ini merupakan bagian dari upaya pengelolaan risiko keselamatan dan kesehatan kerja, perlindungan lingkungan, serta pencegahan potensi paparan serat asbestos terhadap pekerja, pasien, pengunjung, dan masyarakat sekitar.

RSUP Dr. Sitanala Tangerang merupakan fasilitas pelayanan kesehatan yang memiliki berbagai bangunan utama dan fasilitas penunjang, meliputi gedung pelayanan medis, gedung rawat inap, klinik, ruang administrasi, gedung gizi, unit pemeliharaan, gudang, area utilitas, WWTP, fasilitas pengolahan limbah, perumahan staf, area parkir, serta ruang terbuka. Berdasarkan peta tata letak fasilitas eksisting, area rumah sakit berada di lingkungan perkotaan yang dikelilingi oleh kawasan permukiman, sehingga pengelolaan material berpotensi asbestos perlu dilakukan secara hati-hati dan terkendali.

Pelaksanaan audit dilakukan dengan mengacu pada peraturan perundang-undangan Indonesia dan standar teknis internasional yang relevan. Acuan nasional meliputi regulasi keselamatan kerja, K3 lingkungan kerja, K3 rumah sakit, kesehatan lingkungan rumah sakit, serta pengelolaan limbah B3 apabila ditemukan material yang mengandung atau diduga mengandung asbestos. Sementara itu, standar internasional digunakan sebagai rujukan teknis dalam identifikasi material, strategi sampling, analisis laboratorium, serta interpretasi risiko paparan asbestos.

Metodologi audit dilakukan melalui pendekatan inspeksi lapangan, identifikasi visual material terduga ACM, pengambilan sampel secara selektif, dokumentasi lokasi, penerapan Chain of Custody, analisis laboratorium, serta penilaian risiko berdasarkan kondisi material dan potensi gangguan. Area yang menjadi perhatian meliputi elemen bangunan seperti atap, plafon, dinding partisi, panel, lantai, pipa, insulasi, ruang utilitas, gudang, serta bangunan lama atau area yang berpotensi menggunakan material berbasis asbestos.

Hasil pengamatan mikroskopik menggunakan Scanning Electron Microscope (SEM) menunjukkan adanya beberapa sampel dengan morfologi berserat, berupa struktur memanjang, bundel serat, fragmen halus, dan permukaan yang tidak homogen. Beberapa citra SEM memperlihatkan serat yang saling berikatan, tersusun sejajar, serta mengalami fragmentasi atau pelapukan. Kondisi tersebut mengindikasikan bahwa material memiliki karakteristik fibrous yang perlu dievaluasi lebih lanjut dalam konteks identifikasi material terduga asbestos.

Analisis SEM-EDS, Quant Map, Count Map, dan Elemental Mapping menunjukkan terdeteksinya unsur-unsur seperti C, O, Mg, Al, Si, Ca, serta pada beberapa sampel juga terdeteksi N. Unsur C dan O umumnya terdeteksi sebagai unsur dominan yang dapat berkaitan dengan komponen karbonat, oksida, material pengikat, atau matriks permukaan. Unsur Ca menunjukkan kemungkinan adanya komponen berbasis kalsium seperti semen, filler mineral, atau senyawa karbonat. Sementara itu, keberadaan Si dan Mg menjadi perhatian karena keduanya dapat berasosiasi dengan kelompok mineral silikat, termasuk beberapa jenis mineral berserat yang berpotensi terkait dengan asbestos.

Meskipun demikian, hasil SEM dan SEM-EDS tidak dapat digunakan secara tunggal untuk menyatakan bahwa suatu sampel positif mengandung asbestos. Penetapan akhir status material sebagai Asbestos Containing Material (ACM) perlu dikorelasikan dengan hasil morfologi serat, komposisi unsur kuantitatif, elemental mapping, serta metode konfirmasi laboratorium lainnya seperti PLM, XRD, atau TEM apabila diperlukan. Oleh karena itu, material yang menunjukkan indikasi berserat dan belum memiliki hasil konfirmasi definitif perlu diperlakukan sebagai material terduga ACM.

Berdasarkan hasil audit, potensi risiko utama berkaitan dengan material berserat yang berada dalam kondisi terbuka, rusak, rapuh, lapuk, atau berpotensi terganggu oleh aktivitas pemeliharaan, renovasi, pemotongan, pengeboran, pembersihan kasar, maupun pembongkaran. Material dengan kondisi tersebut berpotensi melepaskan serat atau partikel halus ke udara apabila tidak dikelola dengan prosedur yang tepat.

Secara umum, kegiatan audit ini menunjukkan bahwa diperlukan pengelolaan asbestos secara sistematis di lingkungan RSUP Dr. Sitanala Tangerang, khususnya pada area atau material yang terindikasi memiliki karakteristik berserat. Langkah pengendalian yang direkomendasikan meliputi pendataan dan pelabelan material terduga ACM, pembatasan akses pada area berisiko, pemantauan kondisi material secara berkala, pengendalian pekerjaan pemeliharaan atau renovasi, penggunaan alat pelindung diri, penerapan prosedur kerja aman, serta pengelolaan limbah sesuai ketentuan apabila dilakukan pembongkaran atau pengangkatan material.

Dengan adanya hasil audit ini, RSUP Dr. Sitanala Tangerang diharapkan memiliki dasar teknis dalam mengambil keputusan terkait pengendalian risiko asbestos, prioritas tindak lanjut, dan rencana pengelolaan material bangunan yang berpotensi mengandung asbestos. Laporan ini juga menjadi dokumen pendukung dalam memastikan bahwa kegiatan operasional, pemeliharaan, dan pengembangan fasilitas rumah sakit tetap memperhatikan aspek keselamatan kerja, kesehatan lingkungan, dan perlindungan terhadap seluruh pengguna fasilitas rumah sakit

1. INTRODUCTION

Kegiatan audit asbestos di RSUP Dr.Sitanala Tangerang dilaksanakan sebagai upaya untuk mengidentifikasi, menilai, dan memastikan potensi keberadaan material yang mengandung asbestos pada area bangunan maupun fasilitas pendukung rumah sakit. Audit ini bertujuan untuk memperoleh gambaran kondisi aktual material bangunan, tingkat risiko paparan asbestos, serta kesesuaian pengelolaan terhadap aspek keselamatan dan kesehatan kerja serta perlindungan lingkungan.

Pelaksanaan audit dilakukan melalui pemeriksaan visual, pendataan area yang berpotensi mengandung asbestos, penilaian kondisi fisik material, serta evaluasi terhadap potensi pelepasan serat asbestos ke lingkungan kerja. Hasil audit ini diharapkan dapat menjadi dasar dalam penyusunan rekomendasi pengendalian, pengelolaan, maupun tindak lanjut penanganan asbestos secara aman, terencana, dan sesuai dengan prinsip pencegahan risiko terhadap pekerja, pasien, pengunjung, serta lingkungan sekitar RSUP Sitanala Tangerang.

1.1 Profil Fasilitas

RSUP Dr. Sitanala Tangerang merupakan fasilitas pelayanan kesehatan yang memiliki berbagai bangunan dan sarana pendukung operasional rumah sakit. Fasilitas yang tersedia mencakup area pelayanan medis, ruang perawatan, instalasi penunjang, gedung administrasi, area utilitas, serta fasilitas pendukung lainnya yang digunakan untuk menunjang kegiatan pelayanan kesehatan kepada pasien, aktivitas tenaga medis, tenaga nonmedis, maupun pengunjung.

Dalam konteks audit asbestos, profil fasilitas ini menjadi bagian penting untuk menggambarkan kondisi umum area yang diperiksa, termasuk jenis bangunan, fungsi ruangan, umur atau karakteristik konstruksi, serta material bangunan yang berpotensi mengandung asbestos. Identifikasi terhadap fasilitas tersebut dilakukan untuk mengetahui lokasi-lokasi yang memerlukan perhatian lebih lanjut, khususnya pada elemen bangunan seperti atap, plafon, dinding partisi, lantai, pipa, insulasi, maupun komponen lain yang secara historis berpotensi menggunakan material berbasis asbestos.

Secara umum, fasilitas di RSUP Sitanala Tangerang terdiri atas bangunan utama pelayanan rumah sakit dan beberapa bangunan pendukung yang memiliki fungsi berbeda-beda. Setiap area memiliki potensi risiko yang berbeda tergantung pada kondisi fisik bangunan, tingkat kerusakan material, intensitas penggunaan ruangan, serta kemungkinan terjadinya gangguan terhadap material yang dapat menyebabkan pelepasan serat asbestos ke udara. Oleh karena itu, pendataan profil fasilitas menjadi dasar dalam menentukan prioritas inspeksi, penilaian risiko, dan rekomendasi pengelolaan asbestos secara aman dan terkendali.

1.2 Lokasi dan Deskripsi Area

RSUP Dr. Sitanala Tangerang merupakan fasilitas pelayanan kesehatan yang berlokasi di Kota Tangerang, Provinsi Banten. Berdasarkan peta tata letak fasilitas eksisting, kawasan rumah sakit mencakup beberapa bangunan utama dan fasilitas pendukung yang tersebar dalam satu area operasional. Batas kawasan rumah sakit ditampilkan secara jelas pada peta sebagai acuan dalam penentuan ruang lingkup pemeriksaan lapangan.

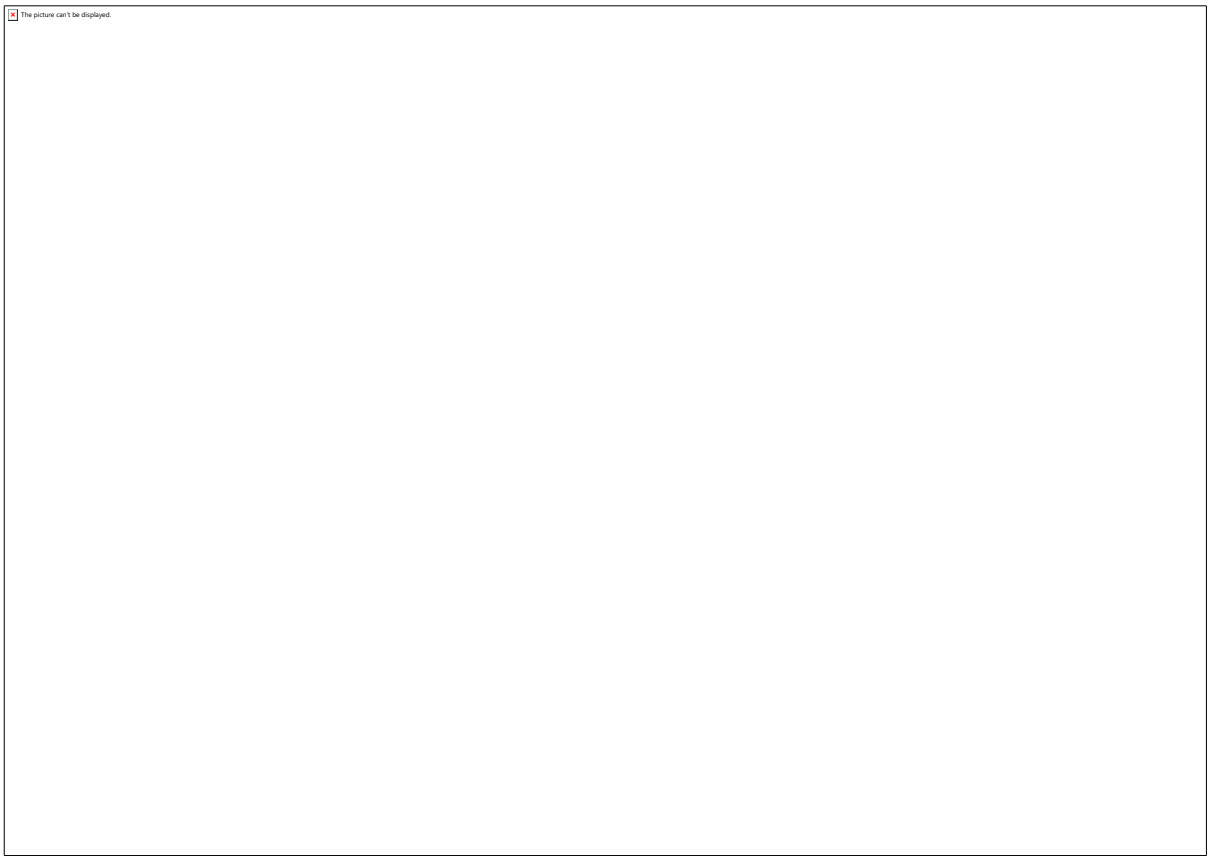


Figure 1 Layout RSUp Dr. Sitanala

Area fasilitas RSUP Dr. Sitanala terdiri atas bangunan utama rumah sakit, bangunan pelayanan medis, ruang rawat inap, klinik, laboratorium, gedung administrasi, instalasi gizi, gudang, area utilitas, tempat pengolahan limbah, area parkir, ruang terbuka hijau, lapangan, serta fasilitas hunian atau perumahan staf. Setiap bangunan memiliki fungsi dan karakteristik yang berbeda, sehingga perlu dilakukan identifikasi secara menyeluruh terhadap kondisi fisik bangunan dan material konstruksi yang digunakan.

Dalam pelaksanaan audit asbestos, peta tata letak ini menjadi dasar penting untuk menentukan area pemeriksaan, mengidentifikasi lokasi bangunan yang berpotensi mengandung material berbasis asbestos, serta menyusun prioritas inspeksi. Area yang menjadi perhatian meliputi elemen bangunan seperti atap, plafon, dinding partisi, lantai, pipa, insulasi, gudang, bangunan lama, serta fasilitas utilitas yang berpotensi menggunakan material mengandung asbestos.

Dengan adanya informasi spasial pada peta ini, kegiatan audit dapat dilaksanakan secara lebih sistematis, terarah, dan terdokumentasi. Peta tersebut juga membantu dalam memahami hubungan antarbangunan, akses area kerja, serta potensi area berisiko yang perlu dikelola untuk mencegah paparan serat asbestos terhadap pekerja, pasien, pengunjung, maupun lingkungan sekitar rumah sakit.

1.3 Dasar Hukum dan Standar Acuan

Pelaksanaan audit asbestos di RSUP Dr. Sitanala Tangerang dilakukan dengan mengacu pada ketentuan peraturan perundang-undangan serta standar teknis yang berkaitan dengan keselamatan dan kesehatan kerja, kesehatan lingkungan rumah sakit, serta pengelolaan material berbahaya. Dasar hukum tersebut digunakan sebagai pedoman dalam melakukan identifikasi potensi material mengandung asbestos, penilaian kondisi fisik material, evaluasi risiko paparan, serta penyusunan rekomendasi pengendalian yang aman dan sesuai ketentuan

Secara umum, audit ini mengacu pada ketentuan keselamatan kerja nasional, termasuk kewajiban penyediaan tempat kerja yang aman, pengendalian faktor bahaya di lingkungan kerja, serta penerapan sistem manajemen K3 berbasis identifikasi bahaya dan pengendalian risiko. Ketentuan khusus mengenai pemakaian asbestos juga menjadi acuan penting, khususnya dalam hal pencegahan paparan serat asbestos, penggunaan alat pelindung diri, pengendalian debu, serta perlindungan tenaga kerja dari potensi penyakit akibat kerja.

1.3.1 Peraturan Nasional

Peraturan Nasional yang digunakan dalam Audit Asbestos antara lain adalah :

1. Undang-Undang No. 1 Tahun 1970 tentang Keselamatan Kerja

   Digunakan sebagai dasar umum pelaksanaan keselamatan kerja, khususnya kewajiban pengendalian bahaya di tempat kerja, perlindungan tenaga kerja, serta pencegahan kecelakaan dan penyakit akibat kerja.

2. Permenaker No. PER.03/MEN/1985 tentang Keselamatan dan Kesehatan Kerja Pemakaian Asbes

   Menjadi acuan khusus terkait pengendalian risiko penggunaan atau keberadaan asbestos di tempat kerja, termasuk pencegahan paparan serat asbestos, pengendalian debu, penggunaan alat pelindung diri, serta ketentuan larangan penggunaan asbestos tertentu.

3. Permenaker No. 5 Tahun 2018 tentang Keselamatan dan Kesehatan Kerja Lingkungan Kerja

   Digunakan sebagai acuan pengendalian faktor bahaya lingkungan kerja, termasuk faktor kimia dan fisika, agar berada di bawah nilai ambang batas serta mendukung terciptanya lingkungan kerja yang aman dan sehat.

4. PP No. 50 Tahun 2012 tentang Penerapan Sistem Manajemen Keselamatan dan Kesehatan Kerja

   Digunakan sebagai dasar penerapan sistem manajemen K3 melalui identifikasi bahaya, penilaian risiko, pengendalian risiko, pemantauan, serta perbaikan berkelanjutan.

5. Permenkes No. 66 Tahun 2016 tentang Keselamatan dan Kesehatan Kerja Rumah Sakit

   Menjadi acuan K3 khusus untuk fasilitas rumah sakit, karena rumah sakit merupakan tempat kerja yang memiliki risiko terhadap sumber daya manusia rumah sakit, pasien, pengunjung, maupun lingkungan rumah sakit.

6. Permenkes No. 7 Tahun 2019 tentang Kesehatan Lingkungan Rumah Sakit dan Permenkes No. 2 Tahun 2023

   Digunakan sebagai acuan aspek kesehatan lingkungan rumah sakit. Permenkes No. 2 Tahun 2023 mencabut sebagian ketentuan Permenkes No. 7 Tahun 2019 sepanjang mengatur standar baku mutu kesehatan lingkungan dan persyaratan kesehatan media lingkungan di rumah sakit.

7. PP No. 22 Tahun 2021 dan Permen LHK No. 6 Tahun 2021 tentang Pengelolaan Limbah B3

   Digunakan apabila hasil audit menemukan material asbestos yang rusak, dibongkar, atau berpotensi menjadi limbah. PP No. 22 Tahun 2021 mengatur pengelolaan limbah B3 dan non-B3, sedangkan Permen LHK No. 6 Tahun 2021 mengatur tata cara dan persyaratan pengelolaan limbah B3.

1.3.2 Standar Internasional dan Acuan Teknis

Standar Internasional dan Acuan Teknis Peraturan Nasional yang digunakan dalam Audit Asbestos antara lain adalah:

1.WHO – Asbestos Fact Sheet

Digunakan sebagai acuan bahaya kesehatan asbestos, karena seluruh bentuk asbestos, termasuk chrysotile, diklasifikasikan sebagai karsinogenik bagi manusia.

2.ISO 22262-1: Air Quality – Bulk Materials – Sampling and Qualitative Determination of Asbestos

Digunakan sebagai acuan teknis untuk pengambilan sampel material padat dan identifikasi asbestos pada material bangunan menggunakan metode laboratorium seperti polarized light microscopy dan dispersion staining.

3.ISO 16000-7: Indoor Air – Sampling Strategy for Determination of Airborne Asbestos Fibre Concentrations

Digunakan sebagai acuan strategi pengambilan sampel udara dalam ruangan untuk menentukan konsentrasi serat asbestos di udara, terutama pada area bangunan yang berpotensi mengalami pelepasan serat.

4.NIOSH Method 7400 dan NIOSH Method 7402

NIOSH 7400 digunakan untuk analisis serat di udara menggunakan phase contrast microscopy, sedangkan NIOSH 7402 digunakan sebagai metode konfirmasi asbestos menggunakan transmission electron microscopy.

5.OSHA Asbestos Standard

Digunakan sebagai acuan pembanding batas paparan kerja asbestos, yaitu 0,1 fiber/cc sebagai rata-rata tertimbang 8 jam dan 1,0 fiber/cc untuk paparan jangka pendek selama 30 menit

2. METODOLOGI AUDIT.

Metodologi audit asbestos disusun untuk memastikan kegiatan identifikasi, pemeriksaan, pengambilan sampel, penilaian risiko, serta analisis laboratorium dilakukan secara sistematis, terdokumentasi, dan dapat dipertanggungjawabkan. Pendekatan ini bertujuan untuk memperoleh informasi mengenai keberadaan material yang diduga mengandung asbestos atau Asbestos Containing Material (ACM), kondisi fisik material, potensi pelepasan serat asbestos, serta tingkat risiko paparan terhadap pekerja, pasien, pengunjung, dan lingkungan sekitar.

Pelaksanaan audit dilakukan melalui kombinasi pemeriksaan visual lapangan, pencatatan kondisi bangunan, identifikasi material berpotensi asbestos, pengambilan sampel secara selektif, pengamanan sampel, pengiriman ke laboratorium, serta evaluasi hasil berdasarkan parameter teknis dan tingkat risiko. Metodologi ini juga mempertimbangkan keterbatasan akses, kondisi operasional rumah sakit, serta aspek keselamatan selama proses audit berlangsung

2.1 Pendekatan Audit

Pendekatan audit asbestos dilakukan secara bertahap dengan menggabungkan metode inspeksi visual, verifikasi lapangan, penelusuran fungsi bangunan, serta identifikasi material yang secara historis berpotensi mengandung asbestos. Audit difokuskan pada area bangunan dan fasilitas yang memiliki kemungkinan penggunaan material berbasis asbestos, seperti atap, plafon, dinding partisi, lantai, pipa, insulasi, gasket, panel, ruang utilitas, gudang, serta bangunan lama atau area yang pernah mengalami perubahan konstruksi.

Kegiatan audit dilaksanakan dengan prinsip kehati-hatian, yaitu memperlakukan material yang dicurigai mengandung asbestos sebagai material berisiko sampai hasil identifikasi atau analisis laboratorium menunjukkan kondisi yang sebenarnya. Pendekatan ini penting untuk mencegah gangguan terhadap material yang dapat menyebabkan pelepasan serat asbestos ke udara.

Selain itu, audit juga mempertimbangkan kondisi operasional rumah sakit sehingga kegiatan pemeriksaan dilakukan tanpa mengganggu pelayanan medis, aktivitas pasien, maupun kegiatan kerja di masing-masing area. Hasil dari pendekatan audit ini menjadi dasar dalam menentukan kebutuhan sampling, prioritas penilaian risiko, dan rekomendasi pengelolaan asbestos

2.2 Metode Identifikasi ACM

Identifikasi Asbestos Containing Material (ACM) dilakukan untuk mengetahui keberadaan material yang berpotensi mengandung asbestos pada bangunan dan fasilitas pendukung. Identifikasi dilakukan melalui pemeriksaan visual terhadap jenis material, bentuk fisik, umur bangunan, lokasi pemasangan, pola penggunaan material, serta kondisi kerusakan atau pelapukan yang terlihat di lapangan.

Material yang menjadi perhatian dalam identifikasi ACM antara lain material atap bergelombang, plafon, papan semen, panel dinding, insulasi pipa, pelapis panas, lantai vinyl, perekat, gasket, serta material bangunan lain yang secara umum memiliki potensi mengandung asbestos. Setiap temuan dicatat berdasarkan lokasi, jenis material, kondisi fisik, tingkat keterpaparan, dan potensi gangguan akibat aktivitas operasional atau pemeliharaan.

2.3 Metode Sampling

Pengambilan sampel dilakukan secara selektif terhadap material yang dicurigai mengandung asbestos dan dianggap mewakili jenis material, lokasi, serta kondisi fisik tertentu. Sampling tidak dilakukan secara acak penuh, melainkan berdasarkan hasil inspeksi visual dan pertimbangan risiko, terutama pada material yang menunjukkan karakteristik ACM atau berada pada area yang berpotensi menimbulkan paparan.

Sebelum pengambilan sampel, area kerja dipastikan dalam kondisi aman dan tidak menimbulkan gangguan terhadap aktivitas rumah sakit. Petugas menggunakan alat pelindung diri yang sesuai, serta menerapkan langkah pengendalian untuk meminimalkan pelepasan debu atau serat selama proses sampling. Sampel diambil dalam jumlah yang cukup untuk kebutuhan analisis laboratorium, kemudian dimasukkan ke dalam wadah tertutup, diberi label, dan dicatat dalam formulir pengambilan sampel.

Setiap sampel diberi kode identifikasi yang memuat informasi lokasi, jenis material, tanggal pengambilan, nama petugas, serta deskripsi singkat kondisi material. Setelah pengambilan sampel, titik bekas sampling diamankan kembali untuk mencegah pelepasan serat atau kerusakan lanjutan pada material.

2.4 Metode Penilaian Risiko

Penilaian risiko dilakukan untuk menentukan tingkat potensi paparan asbestos berdasarkan kondisi material, lokasi, aksesibilitas, dan kemungkinan terganggunya material selama kegiatan operasional, pemeliharaan, renovasi, atau pembongkaran. Penilaian ini menjadi dasar dalam menentukan prioritas pengendalian dan rekomendasi tindak lanjut.

Faktor yang dipertimbangkan dalam penilaian risiko meliputi kondisi fisik material, tingkat kerusakan, sifat material apakah mudah rapuh atau tidak, potensi pelepasan serat, frekuensi aktivitas di sekitar material, jumlah orang yang berpotensi terpapar, serta kemungkinan material mengalami gangguan mekanis. Material dengan kondisi rusak, rapuh, terbuka, atau berada pada area dengan aktivitas tinggi memiliki tingkat risiko yang lebih besar dibandingkan material yang masih utuh dan terlindungi.

Hasil penilaian risiko dapat diklasifikasikan ke dalam kategori rendah, sedang, atau tinggi. Kategori tersebut digunakan untuk menentukan tindakan pengelolaan, seperti pemantauan berkala, pelabelan, pembatasan akses, perbaikan sementara, enkapsulasi, pengamanan area, atau pengangkatan material oleh pihak yang kompeten sesuai ketentuan yang berlaku.

2.5 Metode Analisis Laboratorium

Analisis laboratorium dilakukan untuk memastikan ada atau tidaknya kandungan asbestos pada material yang telah diambil sebagai sampel. Sampel dianalisis oleh laboratorium yang memiliki kompetensi, peralatan, dan prosedur kerja yang sesuai untuk identifikasi asbestos pada material padat maupun media lain yang relevan.

Metode analisis dapat dilakukan menggunakan teknik mikroskopi atau metode lain yang sesuai dengan standar teknis yang berlaku. Pemeriksaan laboratorium bertujuan untuk mengidentifikasi jenis serat asbestos, seperti chrysotile, amosite, crocidolite, atau jenis asbestos lainnya apabila terdeteksi. Hasil analisis laboratorium digunakan sebagai dasar konfirmasi status material, apakah termasuk ACM atau bukan ACM.

Laporan hasil laboratorium harus memuat kode sampel, deskripsi sampel, metode analisis, hasil identifikasi, batas deteksi atau keterangan teknis yang relevan, serta kesimpulan hasil pengujian. Data tersebut kemudian diintegrasikan dengan hasil inspeksi lapangan dan penilaian risiko untuk menyusun rekomendasi pengelolaan asbestos

2.6. Keterbatasan Pengambilan Sampel

Pengambilan sampel dalam audit asbestos memiliki beberapa keterbatasan yang perlu diperhatikan dalam interpretasi hasil. Sampling dilakukan secara selektif berdasarkan area yang dapat diakses, kondisi operasional rumah sakit, keamanan petugas, serta izin akses pada masing-masing lokasi. Oleh karena itu, hasil sampling mewakili material yang diperiksa pada titik tertentu dan tidak selalu menggambarkan keseluruhan material sejenis pada seluruh area bangunan.

Beberapa area mungkin tidak dapat diperiksa secara menyeluruh karena keterbatasan akses, adanya aktivitas pelayanan rumah sakit, posisi material yang sulit dijangkau, risiko keselamatan, atau potensi gangguan terhadap sistem bangunan. Material yang tertutup lapisan lain, berada di balik plafon, di dalam dinding, di ruang terbatas, atau pada area utilitas tertentu mungkin memerlukan pemeriksaan lanjutan apabila akan dilakukan renovasi, pembongkaran, atau pekerjaan pemeliharaan besar.

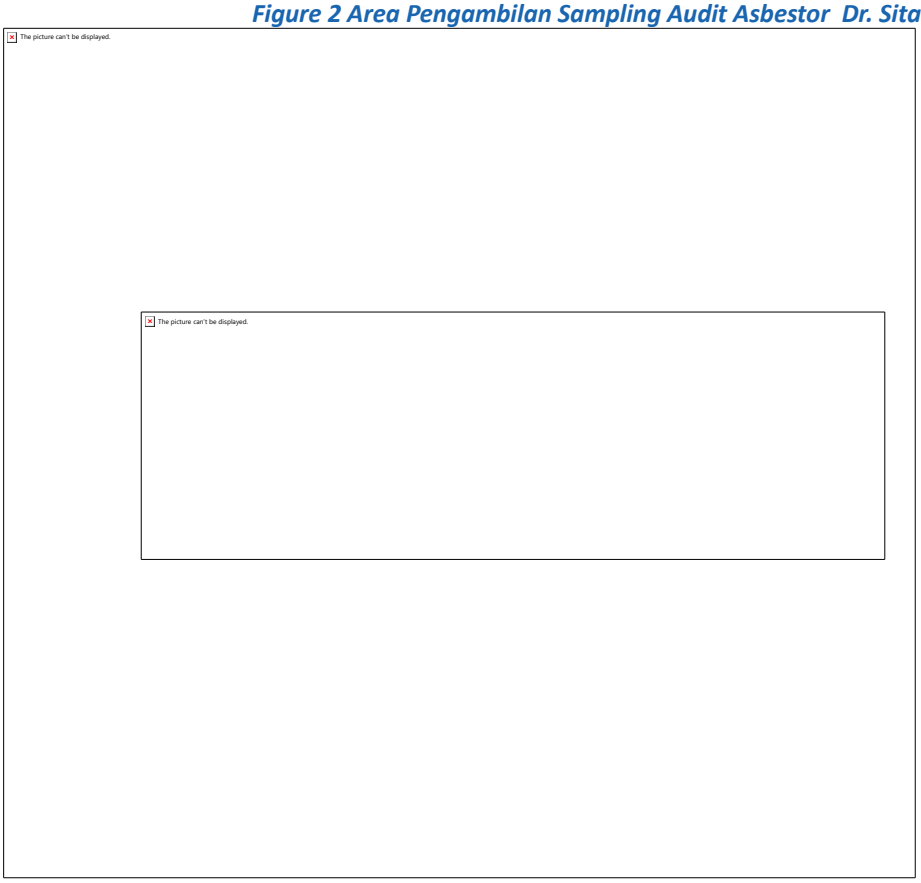
3.DESKRIPSI LOKASI DAN AREA YANG DIPERIKSA.

3.1 Daftar Area yang di Inspeksi.

Berdasarkan peta tata letak fasilitas eksisting RSUP Dr. Sitanala Tangerang, kawasan rumah sakit terdiri atas beberapa gedung utama, gedung pelayanan medis, gedung rawat inap, unit penunjang, fasilitas utilitas, area terbuka, serta fasilitas pendukung operasional rumah sakit. Beberapa bangunan yang teridentifikasi pada peta antara lain Gedung Utama Rumah Sakit, Klinik MCU dan Eksekutif, Gedung Staf Medis, Gedung Radiologi, Gedung Rawat Inap, Gedung Pelayanan Gizi, Klinik Kusta, Unit Pemeliharaan Rumah Sakit, Gedung Penyimpanan Arsip, Gedung ULP, Gedung Carnation, Gedung Linen Infeksius, Gedung Kamar Jenazah, serta Gedung Pengolahan Limbah.

Selain bangunan utama dan penunjang, terdapat pula fasilitas lain seperti area parkir, lapangan, ruang terbuka hijau, masjid, WWTP, perumahan staf, unit infrastruktur, gudang, gardu listrik, dan area perawatan kusta. Informasi ini dapat digunakan sebagai dasar dalam menentukan cakupan area inspeksi pada kegiatan audit asbestos, khususnya untuk mengidentifikasi bangunan atau fasilitas yang berpotensi memiliki material mengandung asbestos (yang diarsir dengan warna kuning)

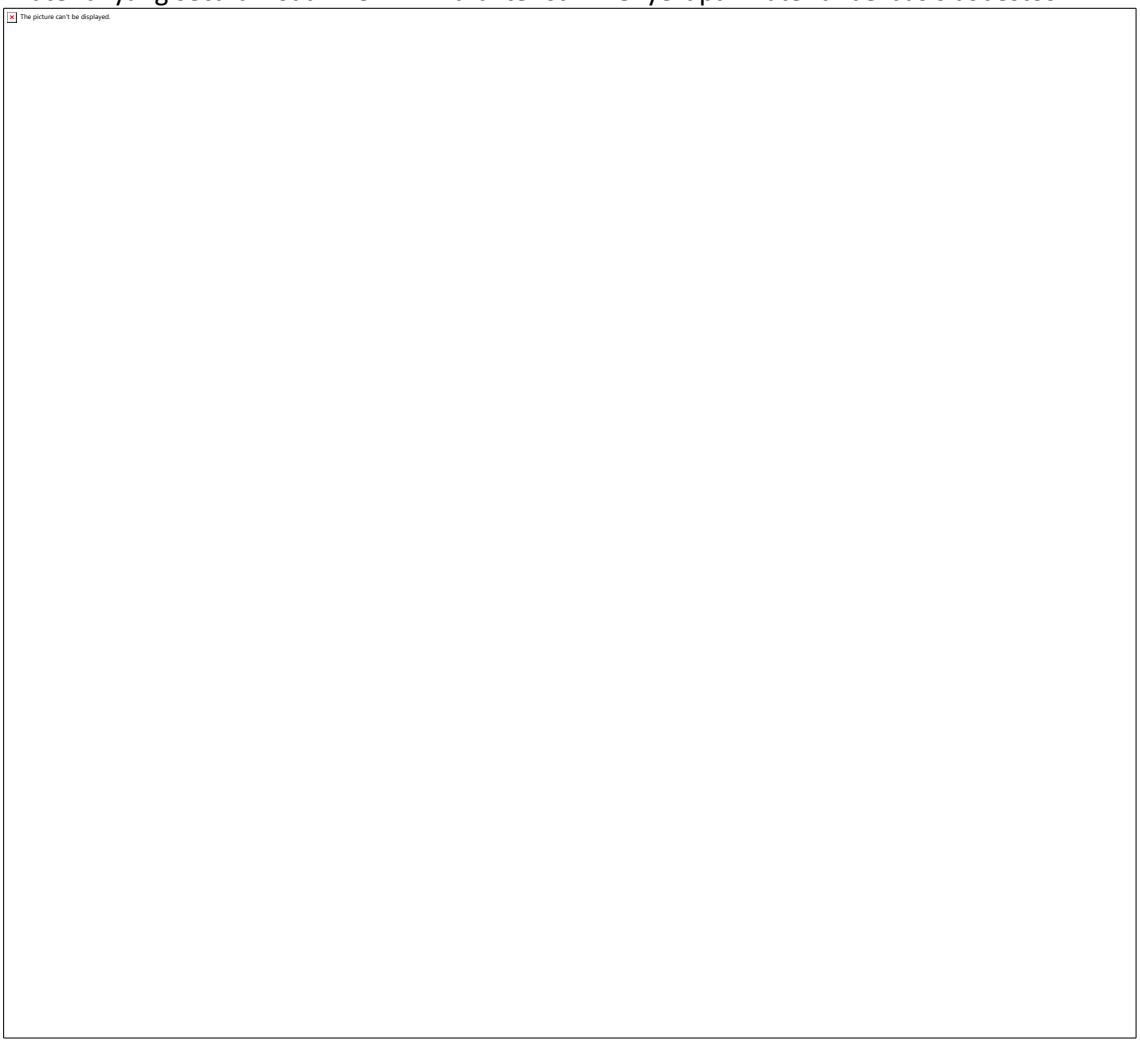
Figure 2 Area Pengambilan Sampling Audit Asbestor Dr. Sitanala



3.3 Peta Sebaran ACM dan Suspect ACM

Berdasarkan hasil pemetaan lokasi pada area RSUP Dr. Sitanala Tangerang, telah dilakukan identifikasi terhadap beberapa titik yang diduga mengandung Asbestos Containing Material (ACM). Titik-titik tersebut ditandai pada peta dengan simbol khusus untuk membedakan antara lokasi material terduga ACM dan titik pengambilan sampel. Penandaan ini bertujuan untuk memberikan gambaran spasial mengenai sebaran material yang berpotensi mengandung asbestos di area fasilitas rumah sakit.

Pada peta, simbol berwarna kuning menunjukkan lokasi material yang terindikasi sebagai suspect ACM, sedangkan simbol berwarna merah menunjukkan titik lokasi pengambilan sampel. Informasi ini menjadi dasar dalam menentukan area prioritas pemeriksaan, khususnya pada bagian bangunan atau material yang secara visual memiliki karakteristik menyerupai material berbasis asbestos.



Keterangan

= Suspect ACM = Pengambilan sampling

4.HASIL AUDIT DAN ASBESTOS REGISTER.

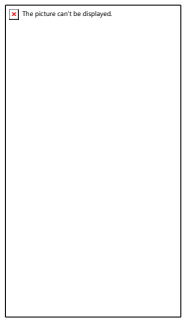
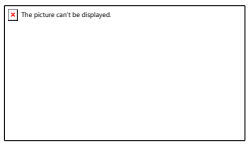
4.1Hasil Laboratororium.

4.1.1 Sample # 1

a. Informasi Sample

Pada Tabel berikut dijelaskan tanggal, lokasi dan dokumentasi pengambilan sample # 1.

Table 1 Identitas Sample

No	Tanggal Pengambilan Sample	Lokasi	Dokumentasi Pengambilan sample	Dokumentasi Sample
1	19-Juni-2026	Are Demolish		
	Catatan : Di RSUP. Dr. Sitanala, material ini banyak digunakan untuk atap, khususnya pada atap selasar			

b. Analisis Laboratorium.

Analisis SEM

Berdasarkan hasil pengamatan menggunakan Scanning Electron Microscope (SEM) pada perbesaran 1.250x dengan skala pengamatan 50 µm, terlihat adanya struktur material berbentuk serat memanjang dengan permukaan tidak rata, bertekstur kasar, dan menunjukkan pola serabut yang saling berikatan. Morfologi tersebut mengindikasikan adanya material bersifat fibrous yang perlu menjadi perhatian dalam konteks identifikasi material yang diduga mengandung asbestos.

Pengamatan dilakukan pada kondisi acceleration voltage 10 kV dengan waktu akuisisi selama 61 detik. Hasil pencitraan menunjukkan bahwa serat memiliki bentuk memanjang, relatif padat, dan sebagian tampak mengalami fragmentasi atau pengelupasan pada permukaannya. Kondisi ini penting untuk dievaluasi karena material berserat yang rapuh atau mengalami kerusakan berpotensi melepaskan partikel halus ke lingkungan apabila terganggu secara mekanis, seperti saat renovasi, pembongkaran, pemotongan, atau aktivitas pemeliharaan bangunan.

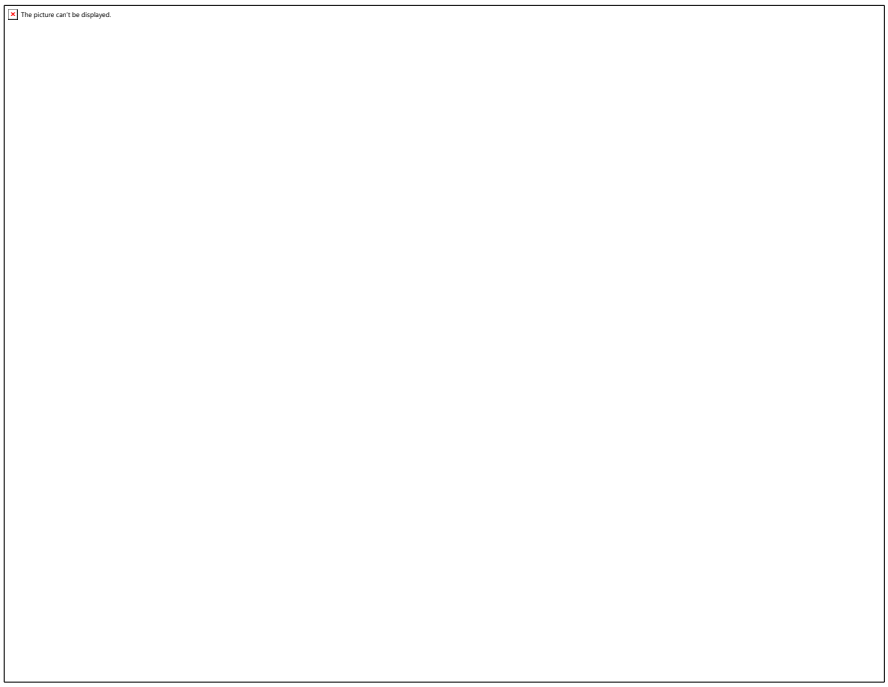


Figure 4 Hasil SEM Sample # 1 RSUP Dr. Sitanala

Secara visual, karakteristik serat pada hasil SEM memperlihatkan indikasi material yang berpotensi termasuk dalam kelompok Asbestos Containing Material (ACM) atau material berserat lain yang memerlukan verifikasi lebih lanjut. Oleh karena itu, hasil ini perlu dikaitkan dengan data analisis laboratorium tambahan, seperti identifikasi komposisi unsur atau metode konfirmasi lainnya, untuk memastikan jenis material dan status kandungan asbestos secara definitif. Komposisi unsur telah dilakukan dengan komposisi sebagai berikut.

Table 2 Komposisi Unsur Elemen Sample # 1

Element	Line	At. %	Wt. %	Net Counts	At. % Error	Wt. % Error
C	K	30.8	20.8	14 350	0.3	0.2
O	K	53.3	47.9	35 146	0.4	0.3
Mg	K	1.7	2.3	4 318	0.0	0.1
Al	K	0.8	1.2	2 291	0.0	0.1
Si	K	3.7	5.8	11 464	0.1	0.1
Ca	K	9.7	22.0	15 382	0.1	0.3

Berdasarkan hasil analisis komposisi unsur pada sampel, diketahui bahwa unsur dominan yang terdeteksi adalah oksigen (O), karbon (C), dan kalsium (Ca). Unsur oksigen memiliki nilai tertinggi, yaitu 53,3 At.% dan 47,9 Wt.%, diikuti oleh karbon sebesar 30,8 At.% dan 20,8 Wt.%, serta kalsium sebesar 9,7 At.% dan 22,0 Wt.%. Dominasi unsur oksigen, karbon, dan kalsium menunjukkan bahwa sampel memiliki karakteristik material anorganik yang kemungkinan berasosiasi dengan matriks berbasis mineral, karbonat, atau material semen/kalsium.

Hasil Scanning Electron Microscope (SEM)

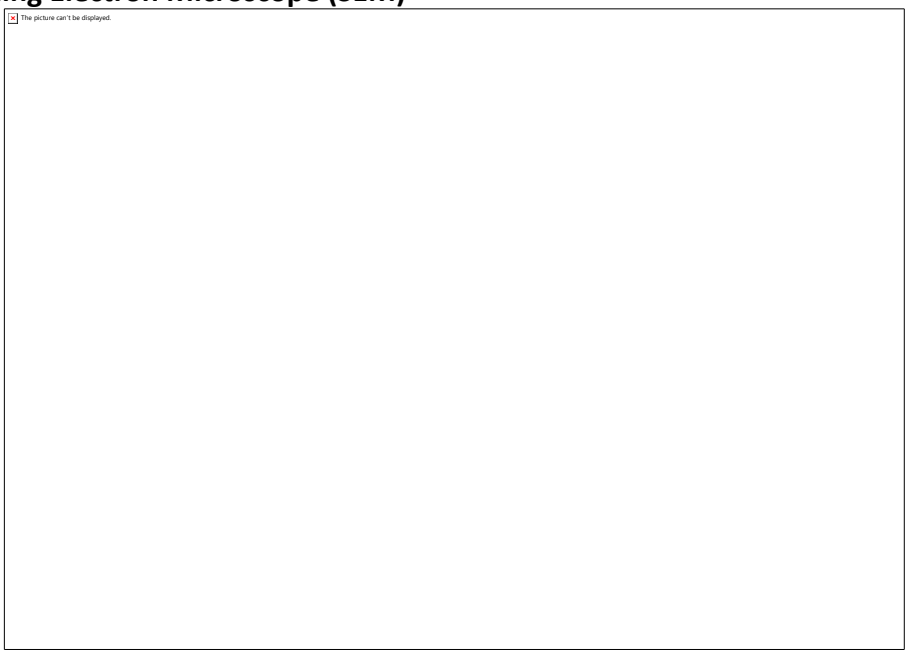


Figure 5 Scanning Electron Microscope (SEM) perbesaran 3500 x *Sample # 1 RSUP Dr. Sitanala*

Berdasarkan hasil pengamatan menggunakan Scanning Electron Microscope (SEM) pada perbesaran 3.500x dengan skala pengamatan 10 µm, terlihat bahwa sampel memiliki morfologi berupa struktur serat memanjang yang saling berikatan dan membentuk kumpulan serabut. Serat yang teramati tampak berukuran halus, memanjang, tidak beraturan, serta menunjukkan pola percabangan atau pemisahan serat pada beberapa bagian.

Permukaan serat terlihat tidak homogen, dengan tekstur kasar dan adanya partikel-partikel kecil yang melekat pada permukaan maupun di antara celah serat. Kondisi ini menunjukkan bahwa material memiliki karakteristik fibrous atau berserat, yang secara visual relevan untuk diperhatikan dalam kegiatan identifikasi material yang diduga mengandung asbestos

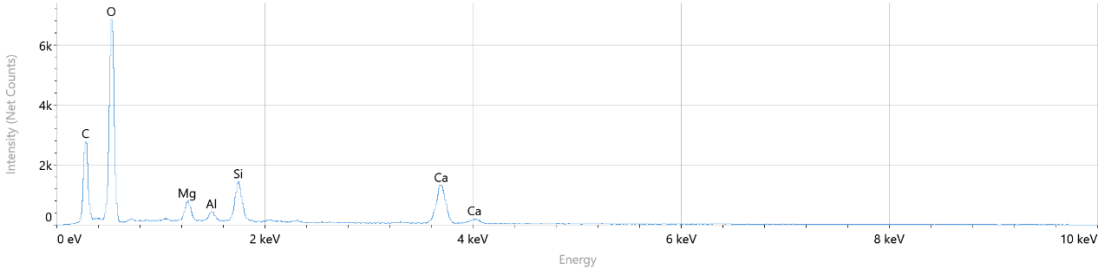


Figure 6 Komposisi Sample # 1 RSUP Dr. Sitanala

Selain unsur utama tersebut, terdeteksi pula unsur silikon (Si) sebesar 3,7 At.% dan 5,8 Wt.%, magnesium (Mg) sebesar 1,7 At.% dan 2,3 Wt.%, serta aluminium (Al) sebesar 0,8 At.% dan 1,2 Wt.%. Keberadaan unsur silikon, magnesium, dan aluminium mengindikasikan adanya komponen mineral silikat pada sampel. Dalam konteks audit asbestos, unsur magnesium dan silikon menjadi parameter yang perlu diperhatikan karena beberapa jenis mineral berserat, termasuk kelompok asbestos tertentu, memiliki komposisi berbasis silikat.

Analisis Quant Map

Berdasarkan hasil analisis Quant Map/EDS Mapping pada sampel, terlihat bahwa unsur-unsur utama yang terdeteksi meliputi C, O, Mg, Al, Si, dan Ca. Pemetaan unsur menunjukkan distribusi unsur yang tidak sepenuhnya merata, dengan konsentrasi tertentu mengikuti bentuk morfologi serat yang tampak memanjang pada citra SEM. Kondisi ini menunjukkan bahwa sampel memiliki karakter material berserat dengan komposisi unsur penyusun yang bervariasi.

Distribusi unsur karbon (C) dan oksigen (O) tampak dominan pada area pengamatan, yang mengindikasikan keberadaan matriks material berbasis karbonat, oksida, atau senyawa anorganik lainnya. Sementara itu, keberadaan unsur silikon (Si), magnesium (Mg), aluminium (Al), dan kalsium (Ca) menunjukkan adanya komponen mineral pada sampel. Unsur Si dan Mg menjadi perhatian karena keduanya umum ditemukan pada kelompok mineral silikat, termasuk beberapa jenis material berserat yang berpotensi terkait dengan asbestos.

Berdasarkan hasil analisis Quant Map/EDS Mapping pada sampel, terlihat bahwa unsur-unsur utama yang terdeteksi meliputi C, O, Mg, Al, Si, dan Ca. Pemetaan unsur menunjukkan distribusi unsur yang tidak sepenuhnya merata, dengan konsentrasi tertentu mengikuti bentuk morfologi serat yang tampak memanjang pada citra SEM. Kondisi ini menunjukkan bahwa sampel memiliki karakter material berserat dengan komposisi unsur penyusun yang bervariasi.

Distribusi unsur karbon (C) dan oksigen (O) tampak dominan pada area pengamatan, yang mengindikasikan keberadaan matriks material berbasis karbonat, oksida, atau senyawa anorganik lainnya. Sementara itu, keberadaan unsur silikon (Si), magnesium (Mg), aluminium (Al), dan kalsium (Ca) menunjukkan adanya komponen mineral pada sampel. Unsur Si dan Mg menjadi perhatian karena keduanya umum ditemukan pada kelompok mineral silikat, termasuk beberapa jenis material berserat yang berpotensi terkait dengan asbestos.

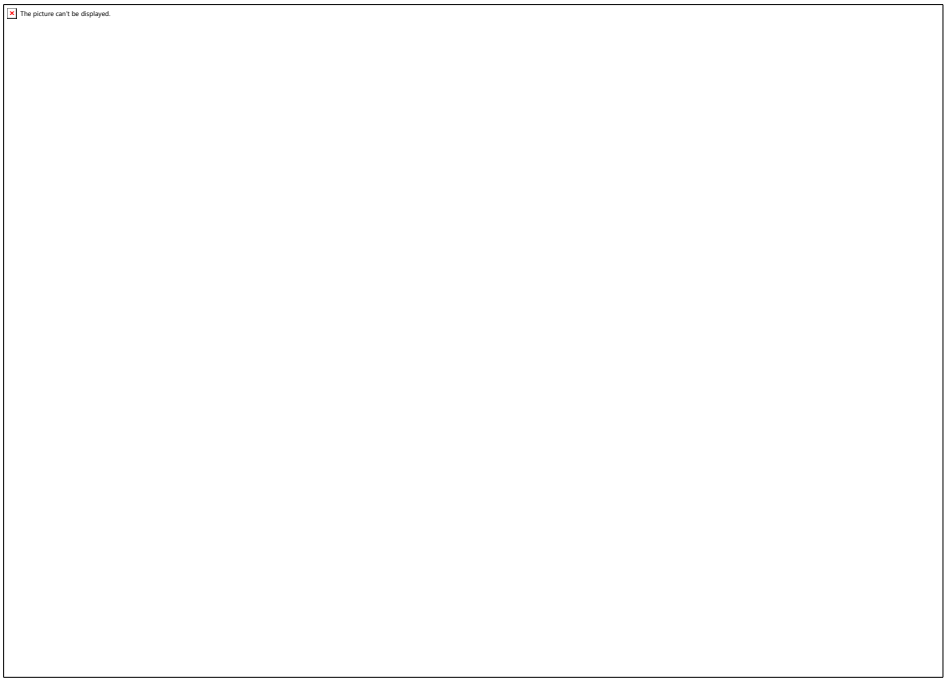


Figure 7 Hasil Quant Maps Sample # 1 RSUP Dr. Sitanala

Secara visual, hasil pemetaan memperlihatkan bahwa unsur-unsur tersebut tersebar pada bagian serat maupun material latar di sekitarnya. Hal ini mengindikasikan bahwa sampel tidak tersusun dari satu unsur tunggal, melainkan merupakan material komposit atau mineral dengan kandungan unsur anorganik yang kompleks. Pemetaan ini mendukung hasil pengamatan morfologi SEM yang menunjukkan adanya struktur serat memanjang dengan permukaan kasar dan tidak homogen

Analisis Count Map

Berdasarkan hasil analisis Count Map pada sampel, teridentifikasi adanya sebaran unsur C, O, Mg, Al, Si, dan Ca pada area pengamatan. Pemetaan unsur menunjukkan bahwa distribusi elemen mengikuti morfologi material yang berbentuk serat memanjang, dengan permukaan yang tampak tidak homogen dan bertekstur kasar. Hal ini menunjukkan bahwa struktur serat tersebut tersusun atas beberapa unsur mineral dan bukan merupakan material tunggal.



Figure 8 Hasil Count Maps Sample # 1 RSUP Dr. Sitanala

Unsur karbon (C) dan oksigen (O) tampak sebagai unsur yang dominan pada area pengamatan, baik pada bagian serat maupun matriks di sekitarnya. Keberadaan unsur tersebut dapat berkaitan dengan komponen karbonat, oksida, atau material pengikat pada sampel. Selain itu, terdeteksi pula unsur silikon (Si), magnesium (Mg), aluminium (Al), dan kalsium (Ca) yang mengindikasikan adanya kandungan mineral silikat dan komponen anorganik lainnya.

Distribusi unsur Si dan Mg menjadi perhatian dalam konteks identifikasi material berserat, karena kedua unsur tersebut umum dijumpai pada beberapa jenis mineral silikat. Sementara itu, keberadaan Ca dan Al dapat menunjukkan adanya campuran material berbasis semen, mineral pengisi, atau matriks bangunan yang melekat pada struktur serat.

Secara umum, hasil Count Map mendukung hasil pengamatan SEM yang menunjukkan adanya material berbentuk serat dengan komposisi unsur yang komplek

Elemental Mapping SEM-EDS

Berdasarkan hasil elemental mapping SEM-EDS, teridentifikasi distribusi unsur C, O, Mg, Al, Si, dan Ca pada area pengamatan sampel. Pemetaan unsur dilakukan pada bidang pengamatan dengan skala 50 µm, sehingga sebaran masing-masing unsur dapat diamati terhadap morfologi material yang tampak berbentuk serat atau matriks berserat.

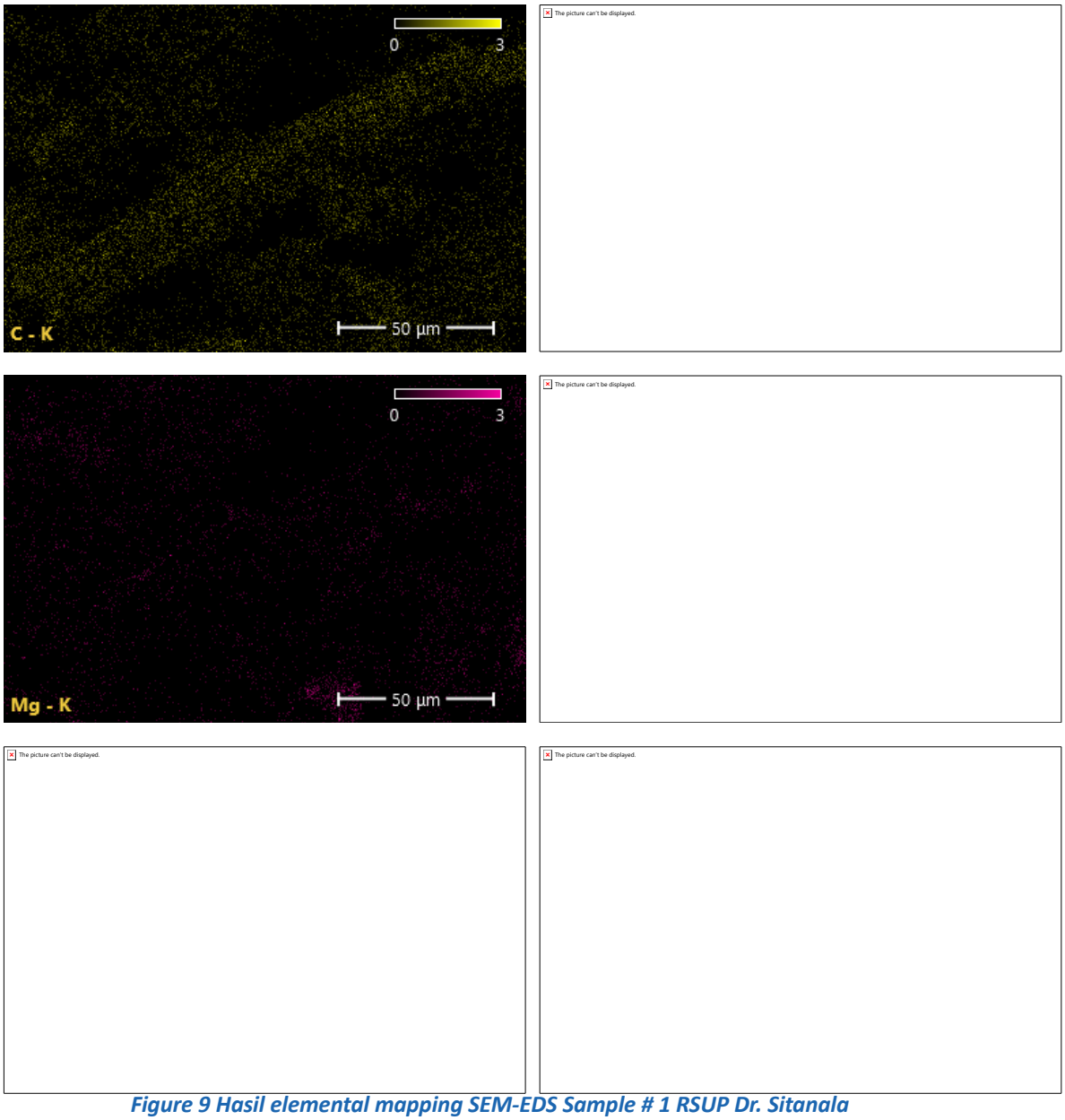


Figure 9 Hasil elemental mapping SEM-EDS Sample # 1 RSUP Dr. Sitanala

Hasil pemetaan menunjukkan bahwa unsur karbon (C) dan oksigen (O) memiliki sebaran yang relatif dominan dan mengikuti pola material utama pada area pengamatan. Distribusi kedua unsur tersebut mengindikasikan adanya komponen karbonat, oksida, atau matriks material anorganik yang menyusun bagian utama sampel. Unsur kalsium (Ca) juga terlihat tersebar cukup luas, yang dapat menunjukkan keberadaan material berbasis kalsium, seperti matriks semen, filler mineral, atau komponen karbonat yang melekat pada struktur sampel.

Selain unsur dominan tersebut, terdeteksi pula unsur magnesium (Mg), aluminium (Al), dan silikon (Si) dengan intensitas sebaran yang lebih rendah dan cenderung tersebar tidak merata. Keberadaan Si dan Mg menjadi parameter penting dalam interpretasi material berserat, karena kedua unsur tersebut umum dijumpai pada mineral silikat, termasuk beberapa jenis mineral yang berpotensi berkaitan dengan asbestos. Namun, intensitas dan pola sebarannya perlu dikorelasikan lebih lanjut dengan data kuantitatif serta morfologi serat.

Secara umum, hasil elemental mapping menunjukkan bahwa sampel memiliki komposisi mineral yang kompleks, dengan dominasi unsur C, O, dan Ca, serta keberadaan unsur minor berupa Mg, Al, dan Si. Pola sebaran unsur yang mengikuti bentuk material berserat mendukung hasil pengamatan SEM bahwa sampel memiliki karakteristik fibrous atau berserat.

Analisis XRD

Berdasarkan hasil analisis X-Ray Diffraction (XRD) pada Sample 1 RSUP Dr. Sitanala, pola difraksi menunjukkan adanya beberapa puncak intensitas pada rentang sudut 2θ sekitar 10°–85°. Pola tersebut memperlihatkan bahwa sampel memiliki struktur material yang bersifat kristalin, ditandai dengan munculnya puncak-puncak difraksi yang tajam pada beberapa posisi sudut tertentu.

Puncak paling dominan terlihat pada kisaran 2θ ±29°–30°, dengan intensitas yang jauh lebih tinggi dibandingkan puncak lainnya. Puncak utama ini menunjukkan adanya fase mineral dominan dalam sampel. Selain itu, terdapat beberapa puncak lain dengan intensitas sedang hingga rendah pada kisaran 2θ ±23°–26°, 36°–48°, serta beberapa puncak minor pada rentang 50°–70°. Keberadaan banyak puncak pada berbagai posisi menunjukkan bahwa sampel kemungkinan tersusun atas lebih dari satu fase mineral atau merupakan material campuran.

Dalam konteks audit asbestos, hasil XRD ini memberikan informasi penting mengenai karakter mineralogi sampel. Adanya puncak-puncak difraksi yang tajam menunjukkan bahwa material tidak sepenuhnya amorf, melainkan mengandung komponen mineral kristalin.



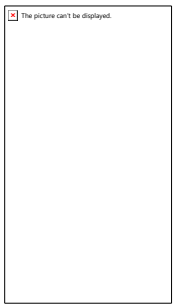
Figure 10 Hasil Analisa XRD Sample # 1 RSUP Dr. Sitanala

4.1.2Sample # 2

a. Informasi Sample

Pada Tabel berikut dijelaskan tanggal, lokasi dan dokumentasi pengambilan sample.

Table 3 Identitas Sample

No	Tanggal Pengambilan Sample	Lokasi	Dokumentasi Pengambilan sample	Dokumentasi Sample
1	19-Juni-2026	Are Demolish		

b. Analisis Laboratorium.

Analisis SEM

Berdasarkan hasil pengamatan menggunakan Scanning Electron Microscope (SEM) pada perbesaran 1.000x dengan skala pengamatan 50 µm, sampel menunjukkan morfologi berupa material berserat dan berbentuk memanjang. Beberapa struktur tampak menyerupai serat atau batang memanjang yang tersusun sejajar, dengan permukaan kasar, tidak homogen, serta sebagian tertutup oleh partikel halus atau matriks material di sekitarnya.

Pada citra SEM terlihat adanya fragmen serat yang relatif tebal dan memanjang, disertai bentuk pecahan atau patahan pada beberapa bagian. Permukaan material tampak tidak rata dan menunjukkan tekstur berlapis, yang mengindikasikan adanya proses degradasi, pelapukan, atau fragmentasi material. Kondisi ini penting untuk diperhatikan karena material berserat yang mengalami kerusakan atau pelapukan berpotensi menghasilkan partikel halus apabila terganggu oleh aktivitas mekanis seperti pemotongan, pengeboran, pembersihan, renovasi, atau pembongkaran.

Pengamatan dilakukan pada kondisi acceleration voltage 10 kV dengan waktu akuisisi 61 detik. Hasil pencitraan memperlihatkan bahwa sampel memiliki karakteristik fibrous material yang relevan untuk dievaluasi lebih lanjut dalam konteks identifikasi material yang diduga mengandung asbestos. Keberadaan struktur serat memanjang menjadi indikasi awal bahwa sampel perlu dianalisis secara lebih komprehensif melalui data komposisi unsur dan metode konfirmasi laboratorium.



Figure 11 Hasil SEM Sample # 2 RSUP Dr. Sitanala

Berdasarkan hasil analisis komposisi unsur menggunakan SEM-EDS, sampel didominasi oleh unsur karbon (C) dan oksigen (O). Unsur karbon terdeteksi sebesar 54,7 At.% dan 45,0 Wt.%, sedangkan oksigen terdeteksi sebesar 39,7 At.% dan 43,6 Wt.%. Kedua unsur ini juga memiliki nilai net counts yang tinggi, yaitu masing-masing 17.978 counts untuk karbon dan 19.924 counts untuk oksigen, sehingga menunjukkan bahwa keduanya merupakan komponen utama penyusun material pada area yang dianalisis.

Table 4 Komposisi Unsur Elemen Sample # 2

Element	Line	At. %	Wt. %	Net Counts	At. % Error	Wt. % Error
C	K	54.7	45.0	17 978	0.4	0.4
O	K	39.7	43.6	19 924	0.4	0.4
Mg	K	0.2	0.4	426	0.0	0.0
Al	K	1.3	2.5	2 825	0.0	0.1
Si	K	3.5	6.8	7 502	0.1	0.1
Ca	K	0.6	1.7	652	0.0	0.1



Figure 12 Komposisi Sample # 2 RSUP Dr. Sitanala

Selain unsur dominan tersebut, terdeteksi pula unsur silikon (Si) sebesar 3,5 At.% dan 6,8 Wt.%, aluminium (Al) sebesar 1,3 At.% dan 2,5 Wt.%, kalsium (Ca) sebesar 0,6 At.% dan 1,7 Wt.%, serta magnesium (Mg) sebesar 0,2 At.% dan 0,4 Wt.%. Keberadaan unsur Si, Al, Mg, dan Ca mengindikasikan adanya kandungan mineral anorganik, kemungkinan berupa komponen silikat, oksida, karbonat, atau matriks material bangunan.

Hasil Scanning Electron Microscope (SEM)

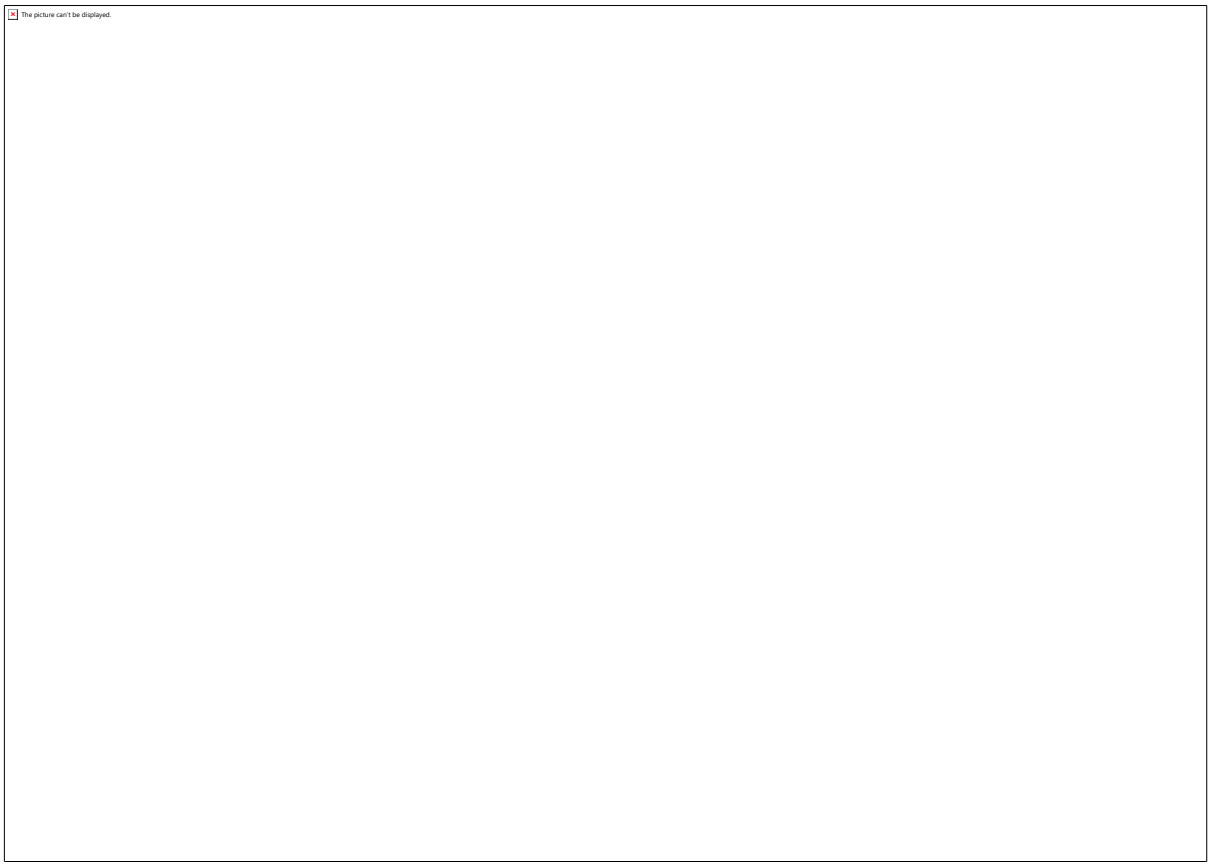


Figure 13 **Scanning Electron Microscope (SEM) perbesaran 1000 x** ***Sample # 2 RSUP Dr. Sitanala***

Berdasarkan hasil pengamatan menggunakan Scanning Electron Microscope (SEM) pada perbesaran 1.000x dengan skala pengamatan 50 µm, sampel menunjukkan morfologi berupa struktur serat memanjang yang tersusun relatif sejajar dan rapat. Serat yang terlihat memiliki bentuk menyerupai batang atau bundel memanjang, dengan ukuran yang bervariasi serta orientasi yang dominan mengikuti arah longitudinal material.

Permukaan serat tampak relatif padat namun tidak sepenuhnya halus. Pada beberapa bagian terlihat adanya tekstur kasar, retakan memanjang, fragmen halus, serta partikel yang melekat pada permukaan serat. Kondisi tersebut mengindikasikan bahwa material telah mengalami pelapukan, abrasi, atau fragmentasi pada sebagian permukaannya. Beberapa ujung serat juga tampak terputus atau terbuka, yang menunjukkan adanya kemungkinan degradasi fisik pada struktur material

Analisis Quant Map

Hasil pemetaan unsur menunjukkan adanya distribusi unsur C, O, Mg, Al, Si, dan Ca pada area pengamatan. Unsur-unsur tersebut tersebar pada bagian permukaan serat maupun matriks material di sekitarnya. Keberadaan unsur karbon (C) dan oksigen (O) mengindikasikan adanya komponen karbonat, oksida, atau material pengikat pada sampel. Sementara itu, unsur silikon (Si), magnesium (Mg), aluminium (Al), dan kalsium (Ca) menunjukkan adanya kandungan mineral anorganik yang dapat berasosiasi dengan material bangunan berbasis semen, silikat, atau mineral pengisi.

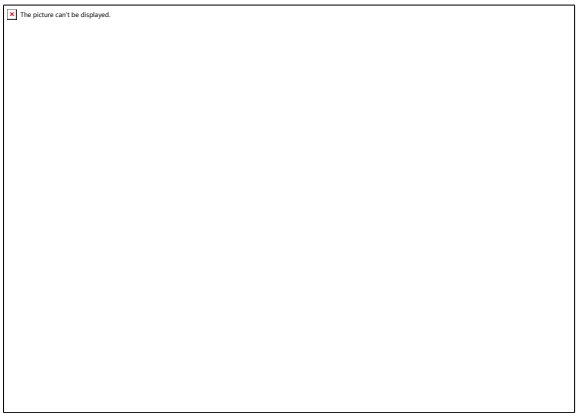


Figure 14 Hasil Quant Maps Sample # 2 RSUP Dr. Sitanala

Secara visual, pola sebaran unsur tampak mengikuti bentuk material memanjang yang terlihat pada citra SEM. Hal ini menunjukkan bahwa struktur serat atau fragmen memanjang tersebut bukan hanya bagian dari citra morfologi, tetapi juga memiliki komposisi unsur yang terdeteksi melalui analisis EDS. Permukaan material terlihat kasar, tidak homogen, dan sebagian tertutup oleh partikel halus, yang mengindikasikan adanya kemungkinan pelapukan, degradasi, atau fragmentasi pada permukaan sampel.

Analisis Count Map

Berdasarkan hasil pengamatan SEM-EDS Mapping pada perbesaran 1.000x dengan skala 50 µm, sampel menunjukkan morfologi berupa struktur memanjang menyerupai serat atau fragmen mineral yang tersusun tidak beraturan. Beberapa bagian tampak berbentuk batang memanjang dengan permukaan kasar, retakan, serta adanya partikel halus yang menempel pada permukaan material

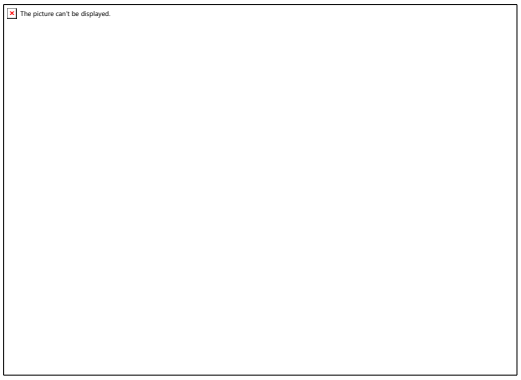


Figure 15 Hasil Count Maps Sample # 2 RSUP Dr. Sitanal

Hasil pemetaan unsur menunjukkan keberadaan unsur C, O, Mg, Al, Si, dan Ca pada area pengamatan. Sebaran unsur tersebut tampak mengikuti bentuk morfologi material, baik pada bagian serat memanjang maupun pada matriks di sekitarnya. Keberadaan unsur karbon (C) dan oksigen (O) mengindikasikan adanya komponen karbonat, oksida, atau material pengikat pada sampel. Sementara itu, unsur silikon (Si), magnesium (Mg), aluminium (Al), dan kalsium (Ca) menunjukkan adanya kandungan mineral anorganik yang berasosiasi dengan material berbasis silikat, semen, atau mineral pengisi.

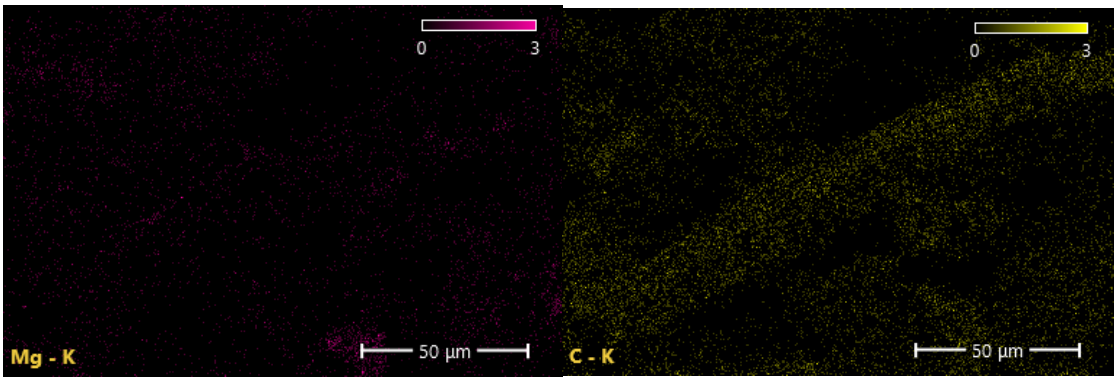
Secara visual, material memperlihatkan karakteristik fibrous atau berserat, dengan beberapa bagian yang tampak mengalami fragmentasi dan pelapukan. Kondisi ini penting untuk diperhatikan karena material berserat yang rapuh atau rusak berpotensi melepaskan partikel halus apabila terganggu oleh aktivitas mekanis, seperti pemotongan, pengeboran, renovasi, atau pembongkaran.

Elemental Mapping SEM-EDS

Berdasarkan hasil elemental mapping SEM-EDS, teridentifikasi sebaran unsur C, O, Mg, Al, Si, dan Ca pada area pengamatan sampel dengan skala 50 µm. Pemetaan unsur menunjukkan bahwa setiap elemen memiliki pola distribusi yang berbeda, baik pada bagian struktur berserat maupun pada matriks material di sekitarnya.

Unsur karbon (C) dan oksigen (O) tampak memiliki sebaran yang cukup dominan pada area pengamatan. Distribusi kedua unsur ini mengikuti bentuk morfologi material dan mengindikasikan adanya komponen karbonat, oksida, atau material pengikat pada sampel. Unsur kalsium (Ca) juga terlihat tersebar cukup luas, terutama pada bagian matriks, yang dapat menunjukkan adanya kandungan material berbasis kalsium seperti semen, filler mineral, atau senyawa karbonat.

Sementara itu, unsur magnesium (Mg), aluminium (Al), dan silikon (Si) terdeteksi dengan intensitas yang lebih rendah dan distribusi yang tidak sepenuhnya merata.



Analisis XRD

Berdasarkan hasil analisis X-Ray Diffraction (XRD) pada Sample 2 RSUP Dr. Sitanala, pola difraksi menunjukkan karakteristik yang berbeda dibandingkan material kristalin murni. Pada grafik terlihat adanya puncak lebar atau broad peak pada rentang awal sudut 2θ, dengan intensitas tertinggi berada pada area sekitar 2θ ±20°–25°. Bentuk puncak yang melebar menunjukkan bahwa sampel memiliki kandungan material yang cenderung amorf, semi-kristalin, atau tersusun dari campuran matriks yang tidak sepenuhnya memiliki keteraturan kristal yang kuat.

Pola XRD tidak menunjukkan banyak puncak tajam dengan intensitas tinggi. Hal ini mengindikasikan bahwa fase kristalin pada sampel relatif terbatas atau tertutup oleh kontribusi matriks amorf. Setelah puncak utama yang lebar, intensitas grafik tampak menurun secara bertahap dan hanya menunjukkan beberapa puncak minor dengan intensitas rendah pada rentang sudut yang lebih tinggi. Kondisi ini menunjukkan bahwa sampel kemungkinan merupakan material campuran yang terdiri atas komponen amorf, mineral halus, material pengikat, atau matriks bangunan yang telah mengalami perubahan fisik

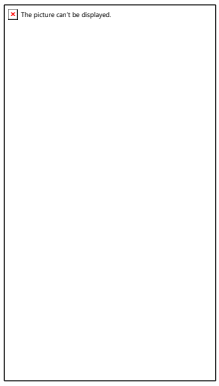


Figure 17 Hasil Analisa XRD Sample # 2 RSUP Dr. Sitanala

1.3.3 Sample # 3

a. Informasi Sample

Pada Tabel berikut dijelaskan tanggal, lokasi dan dokumentasi pengambilan sample.

No	Tanggal Pengambilan Sample	Lokasi	Dokumentasi Pengambilan sample	Dokumentasi Sample
1	19-Juni-2026	Are Demolish		

Berdasarkan hasil pengamatan menggunakan **Scanning Electron Microscope (SEM)** pada perbesaran **3.000x** dengan skala pengamatan **20 µm**, sampel menunjukkan morfologi permukaan yang tidak homogen, kasar, dan didominasi oleh matriks material yang tampak padat. Pada area pengamatan terlihat adanya partikel halus, fragmen tidak beraturan, serta tekstur permukaan yang menunjukkan indikasi pelapukan atau degradasi material.

Berbeda dengan sampel yang menunjukkan struktur serat memanjang secara jelas, citra ini lebih memperlihatkan permukaan material yang kompak dengan beberapa garis atau struktur tipis memanjang pada bagian tertentu. Struktur tersebut dapat berupa retakan, sisa serat halus, atau fragmen material yang melekat pada matriks utama. Kondisi ini menunjukkan bahwa sampel memiliki karakter permukaan yang kompleks dan memerlukan korelasi lebih lanjut dengan hasil analisis unsur untuk memahami komposisi penyusunnya.

Pengamatan dilakukan pada kondisi **acceleration voltage 10 kV** dengan waktu akuisisi selama **35 detik**. Jumlah total hitungan yang terdeteksi sebesar **47.428 counts** dengan rata-rata **1.366 cps**, yang menunjukkan bahwa area pengamatan memiliki respons sinyal yang cukup untuk mendukung analisis morfologi dan komposisi unsur melalui SEM-EDS.

Secara umum, hasil citra SEM menunjukkan bahwa sampel memiliki permukaan kasar, tidak merata, dan tersusun atas fragmen mineral atau matriks anorganik

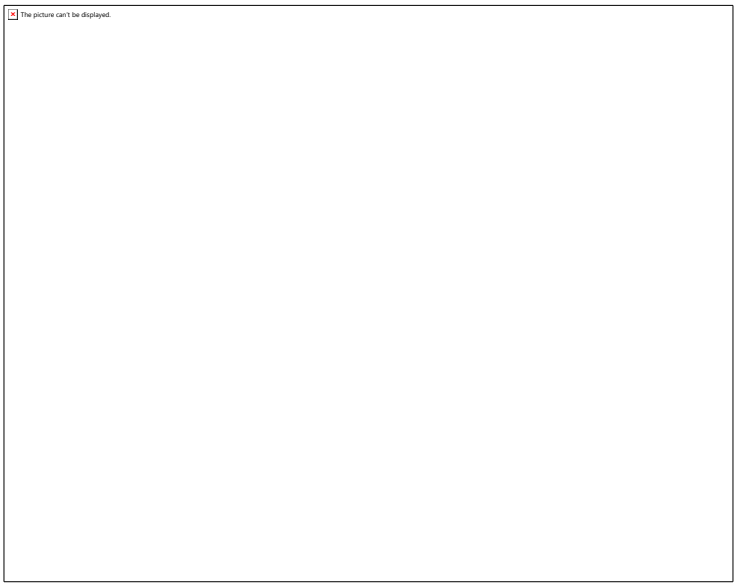


Figure 18 Hasil SEM Sample # 3 RSUP Dr. Sitanala

Berdasarkan hasil analisis komposisi unsur menggunakan SEM-EDS, sampel didominasi oleh unsur oksigen (O) dengan nilai sebesar 42,3 At.% dan 46,0 Wt.%. Unsur oksigen juga memiliki nilai net counts tertinggi, yaitu 14.445 counts, sehingga dapat diinterpretasikan sebagai unsur utama yang terdeteksi secara signifikan pada area pengamatan.

Selain oksigen, unsur lain yang terdeteksi cukup dominan adalah nitrogen (N) sebesar 27,6 At.% dan 26,2 Wt.%, serta karbon (C) sebesar 27,0 At.% dan 22,0 Wt.%. Keberadaan karbon dan nitrogen dapat mengindikasikan adanya komponen organik, material pengikat, kontaminan permukaan, atau kontribusi dari matriks material yang menempel pada sampel. Sementara itu, oksigen menunjukkan adanya komponen oksida atau mineral anorganik pada material.
Unsur minor yang terdeteksi meliputi silikon (Si) sebesar 1,7 At.% dan 3,3 Wt.%, aluminium (Al) sebesar 1,3 At.% dan 2,3 Wt.%, serta magnesium (Mg) sebesar 0,1 At.% dan 0,2 Wt.%. Keberadaan Si, Al, dan Mg menunjukkan adanya kandungan mineral anorganik dalam jumlah relatif kecil. Dalam konteks identifikasi material berserat, unsur Si dan Mg tetap perlu diperhatikan karena keduanya dapat berasosiasi dengan mineral silikat, meskipun pada hasil ini kadarnya relatif rendah.

Komposisi Unsur Elemen Sample # 3





Komposisi Sample # 3 RSUP Dr. Sitanala

Hasil Scanning Electron Microscope (SEM)

Citra SEM pada perbesaran 3.500x dengan skala 10 µm menunjukkan permukaan sampel yang tidak homogen, kasar, dan didominasi oleh matriks padat dengan partikel halus yang tersebar. Pada bagian tengah terlihat struktur memanjang menyerupai fragmen serat atau lapisan tipis yang terikat pada matriks utama. Beberapa area menunjukkan tekstur pecah, retakan, serta aglomerasi partikel yang mengindikasikan adanya degradasi atau pelapukan material.
Secara visual, sampel tidak menampilkan serat panjang yang dominan seperti pada citra fibrous yang jelas, tetapi terdapat indikasi fragmen tipis memanjang dan struktur berserat lokal.

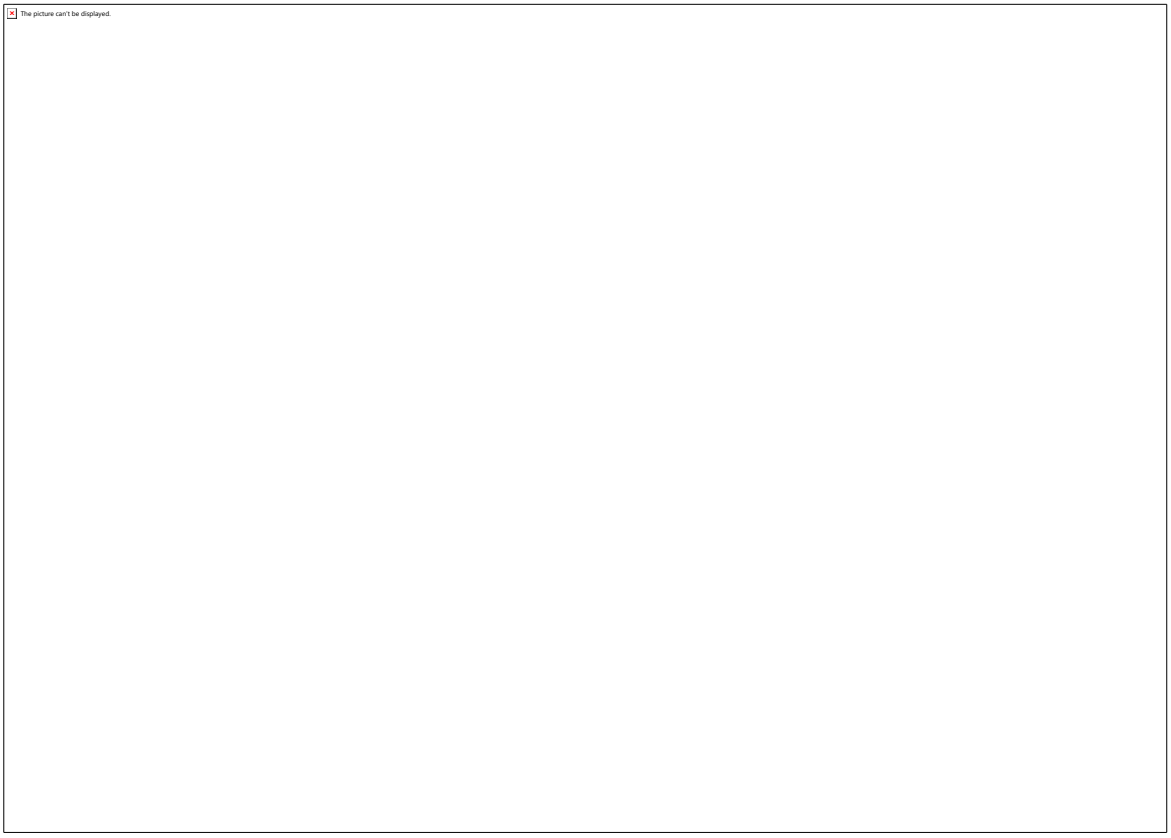


Figure 20 Scanning Electron Microscope (SEM) perbesaran 3500 x *Sample # 3 RSUP Dr. Sitanala*

Analisis Quant Map

Citra menunjukkan hasil pemetaan unsur pada permukaan sampel dengan perbesaran 3.000x dan skala 20 µm. Morfologi sampel tampak berupa permukaan padat, kasar, tidak homogen, serta memiliki fragmen/retakan halus yang membentuk pola memanjang pada beberapa bagian. Overlay warna pada citra menunjukkan adanya sebaran unsur C, N, O, Mg, Al, dan Si pada area pengamatan.

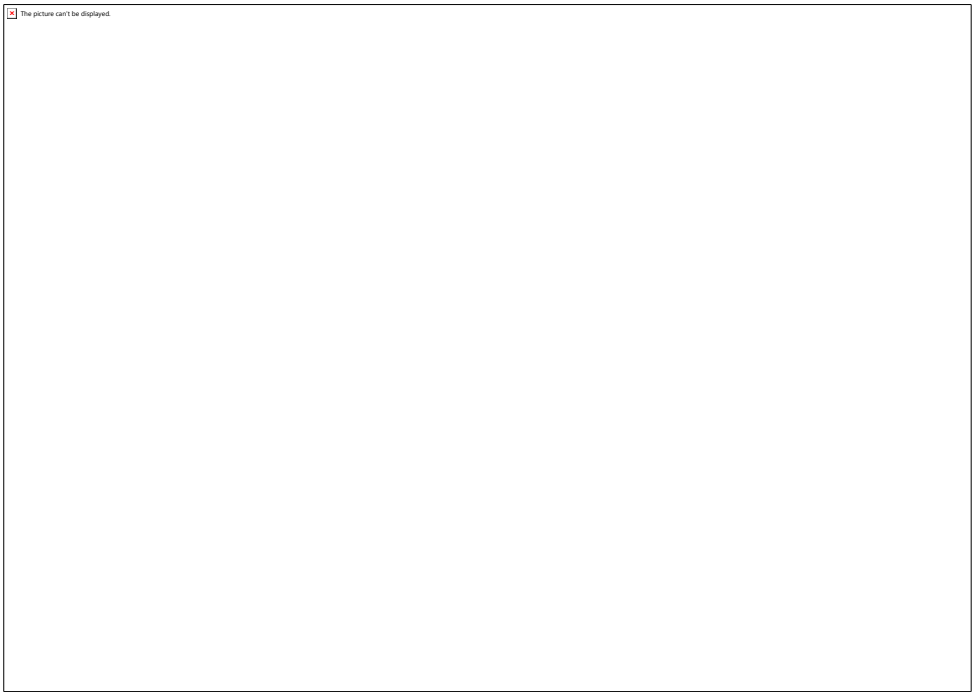


Figure 21 Hasil Quant Maps Sample # 3 RSUP Dr. Sitanala

Analisis Count Map

Berdasarkan hasil pengamatan SEM-EDS Mapping pada perbesaran 3.000x dengan skala pengamatan 20 µm, sampel menunjukkan morfologi permukaan yang kasar, tidak homogen, dan tersusun atas matriks padat dengan sebaran partikel halus. Pada beberapa bagian terlihat struktur memanjang tipis, retakan, serta fragmen tidak beraturan yang melekat pada permukaan material.

Hasil pemetaan unsur menunjukkan adanya distribusi unsur C, N, O, Mg, Al, dan Si pada area pengamatan. Sebaran unsur tersebut tampak mengikuti pola morfologi permukaan sampel, terutama pada bagian matriks kasar dan area yang menunjukkan bentuk memanjang. Keberadaan unsur karbon (C), nitrogen (N), dan oksigen (O) dapat mengindikasikan adanya komponen matriks, senyawa organik, oksida, atau material pengikat pada sampel.



Figure 22 Hasil Count Maps Sample # 3 RSUP Dr. Sitanala

Elemental Mapping SEM-EDS

Berdasarkan hasil elemental mapping SEM-EDS pada area pengamatan dengan skala 20 µm, teridentifikasi sebaran unsur C, N, O, Mg, Al, dan Si pada sampel. Pemetaan unsur menunjukkan bahwa masing-masing elemen memiliki pola distribusi yang berbeda pada permukaan material, baik pada area matriks utama maupun pada bagian yang menunjukkan tekstur tidak homogen.

Unsur oksigen (O) tampak memiliki sebaran yang cukup dominan dan relatif merata pada area pengamatan. Hal ini mengindikasikan adanya komponen oksida, mineral anorganik, atau material pengikat yang menjadi bagian dari struktur sampel. Unsur nitrogen (N) juga terlihat tersebar cukup luas, yang dapat berkaitan dengan komponen matriks, kontaminan permukaan, atau material organik tertentu yang melekat pada sampel.

Unsur karbon (C) terdeteksi dengan sebaran yang relatif merata, namun tidak menunjukkan konsentrasi yang sangat dominan pada area tertentu. Keberadaan karbon dapat berasal dari material pengikat, komponen organik, karbonat, atau pengaruh preparasi sampel.

Sementara itu, unsur magnesium (Mg) terlihat dalam jumlah yang lebih sedikit dan tersebar secara sporadis pada area pengamatan.

Unsur aluminium (Al) dan silikon (Si) juga terdeteksi dengan intensitas relatif rendah dan pola sebaran tidak merata. Dalam konteks identifikasi material terduga asbestos, keberadaan Si dan Mg perlu diperhatikan karena kedua unsur tersebut dapat berasosiasi dengan kelompok mineral silikat. Namun demikian, intensitas Mg yang rendah dan pola distribusi unsur yang tidak dominan menunjukkan bahwa interpretasi terhadap potensi asbestos perlu dilakukan secara hati-hati.

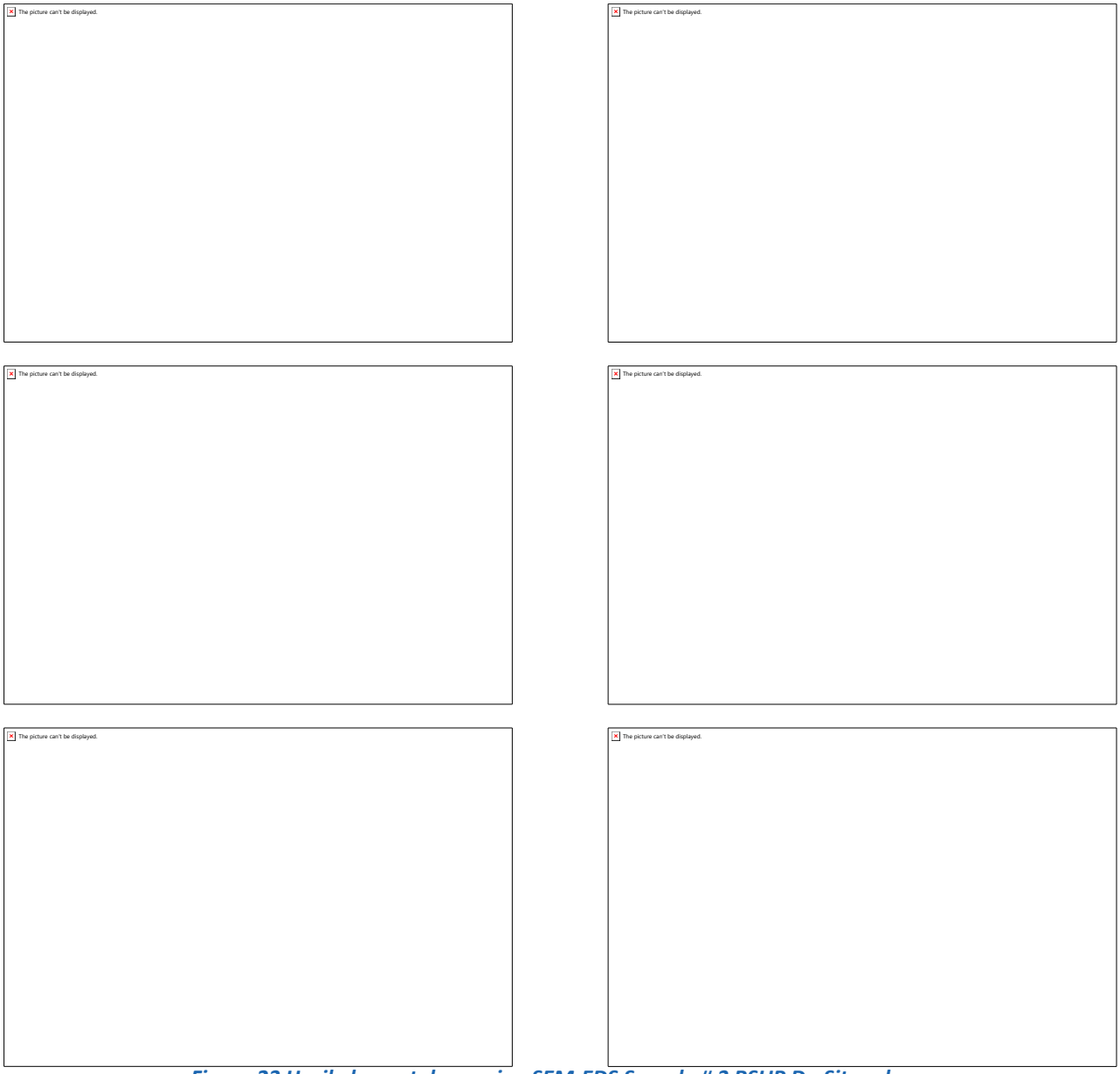


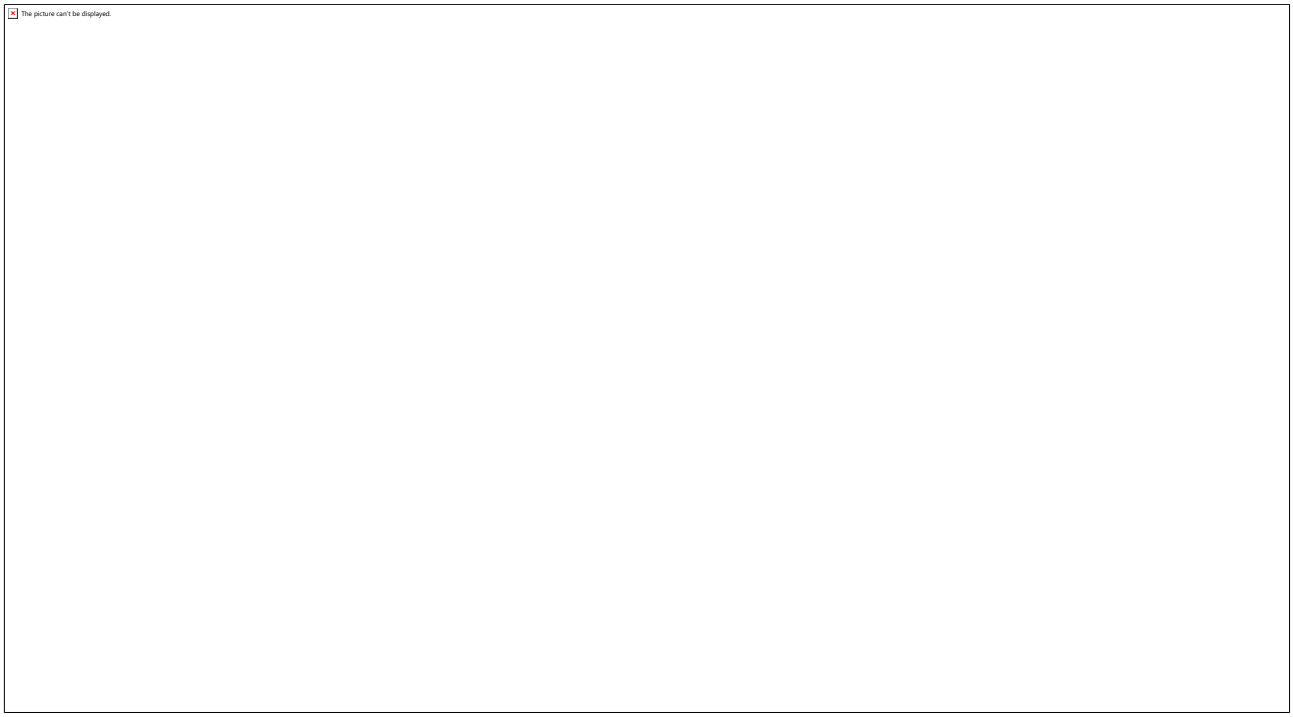
Figure 23 Hasil elemental mapping SEM-EDS Sample # 3 RSUP Dr. Sitanala

Analisis XRD

Berdasarkan hasil analisis X-Ray Diffraction (XRD) pada Sample 3 RSUP Dr. Sitanala, pola difraksi menunjukkan adanya kombinasi antara puncak lebar dan beberapa puncak tajam pada rentang sudut pengamatan. Kondisi ini mengindikasikan bahwa sampel tersusun atas material campuran yang memiliki komponen amorf/semi-kristalin sekaligus fase mineral kristalin.

Pada bagian awal pola difraksi terlihat adanya puncak lebar dengan intensitas sedang, yang menunjukkan keberadaan matriks amorf atau material dengan keteraturan kristal yang rendah. Puncak lebar ini dapat berkaitan dengan material pengikat, komponen organik/anorganik, atau matriks bangunan yang tidak sepenuhnya memiliki struktur kristalin yang teratur.

Selain puncak lebar tersebut, terdapat beberapa puncak tajam dengan intensitas tinggi pada posisi sudut tertentu. Puncak paling dominan terlihat pada rentang sekitar 2θ ±29°–31°, yang menunjukkan adanya fase mineral kristalin yang cukup signifikan dalam sampel. Selain itu, beberapa puncak lain dengan intensitas sedang hingga rendah juga tampak pada rentang sudut yang lebih tinggi, yang mengindikasikan bahwa sampel kemungkinan terdiri atas lebih dari satu fase mineral.



Hasil Analisa XRD Sample # 3 RSUP Dr. Sitanala

berdasarkan uraian hasil pengamatan SEM, SEM-EDS, mapping, dan dokumentasi yang telah disampaikan pada Tabel Berikut.

No Sampel		Lokasi / Area	Karakteristik Visual Lapangan	Hasil Pengamatan SEM	Unsur Terdeteksi Dominan	Interpretasi	Kesimpulan
1	**Sample #1**	Area Demolish / area atap selasar	Material berupa lembaran/fragmen bangunan yang diduga berasal dari material atap lama	Tampak struktur serat memanjang, halus, berikatan, membentuk kumpulan serabut dengan permukaan homogen	C, O, Mg, Al, Si, Ca	Morfologi menunjukkan karakter **fibrous material**. Keberadaan Si dan Mg perlu diperhatikan karena dapat berasosiasi dengan mineral silikat	**Terindikasi sebagai material terduga** dan perlu dengan metode pendukung seperti PLM, XRD, atau TEM
2	**Sample #2**	Area bangunan/kompone material lama	Material menunjukkan bentuk fragmen memanjang dan berlapis	Terlihat struktur memanjang menyerupai batang/bundel serat, tersusun relatif sejajar, dengan permukaan kasar, retakan, dan partikel halus yang melekat	C, O, Mg, Al, Si, Ca	Struktur berserat cukup dan menunjukkan adanya material mineral kompleks. Unsur Si dan Mg indikasi material berbasis silikat	**Terindikasi kuat sebagai material terduga ACM**, terutama bila berasal dari atap, panel, atau material bangunan lama
3	**Sample #3**	Area permukaan material bangunan	Material tampak lebih padat/kompak dengan permukaan kasar dan tidak homogen	Tidak menunjukkan panjang dominan, namun terdapat tipis memanjang, mikro, partikel halus, struktur lokal menyerupai serat	C, N, O, Al, Si	Komposisi menunjukkan material campuran antara komponen organik/permukaan dan mineral anorganik. Indikasi fibrous lebih lemah Sampel 1 dan 2	**Belum dapat dipastikan sebagai ACM**, namun tetap perlu diperlakukan sebagai material terduga sampai ada hasil konfirmasi laboratorium

5.REKOMENDASI PENGENDALIAN.

Rekomendasi pengendalian disusun berdasarkan hasil identifikasi lapangan, dokumentasi material terduga **Asbestos Containing Material (ACM)**, hasil pengamatan morfologi menggunakan SEM, serta interpretasi komposisi unsur melalui SEM-EDS dan elemental mapping. Pengendalian diperlukan untuk mencegah potensi pelepasan serat asbestos ke udara, khususnya pada material yang berada dalam kondisi rusak, rapuh, lapuk, terbuka, atau berpotensi terganggu oleh aktivitas pemeliharaan, renovasi, pembongkaran, pembersihan, pemotongan, maupun pengeboran.

Material yang belum terkonfirmasi secara definitif tetapi menunjukkan karakteristik berserat dan mengandung unsur mineral yang relevan perlu diperlakukan sebagai **suspect ACM** sampai terdapat hasil konfirmasi laboratorium lebih lanjut. Pendekatan kehati-hatian ini penting untuk melindungi pekerja, pasien, pengunjung, serta lingkungan sekitar rumah sakit dari potensi paparan serat halus yang dapat terlepas apabila material mengalami gangguan mekanis

5.1 Prinsip Pengendalian Risiko.

Prinsip pengendalian risiko asbestos dilakukan dengan mengutamakan pencegahan pelepasan serat dari sumbernya. Pengendalian tidak hanya difokuskan pada keberadaan material, tetapi juga pada kondisi fisik material, lokasi pemasangan, tingkat aksesibilitas, serta potensi material terganggu oleh aktivitas operasional rumah sakit.

Secara umum, prinsip pengendalian risiko yang direkomendasikan meliputi identifikasi dan inventarisasi seluruh material terduga ACM, pembatasan akses pada area berisiko, pelabelan atau penandaan lokasi, pemantauan kondisi material secara berkala, serta penerapan prosedur kerja aman sebelum dilakukan kegiatan pemeliharaan, renovasi, atau pembongkaran. Material yang masih utuh, stabil, dan tidak mudah terganggu dapat dikelola melalui pemantauan berkala dan pencegahan gangguan fisik. Sebaliknya, material yang rusak, rapuh, terbuka, atau berada pada area dengan aktivitas tinggi perlu mendapatkan pengendalian lebih lanjut.

Pengendalian juga perlu mengikuti hierarki pengendalian risiko, yaitu dimulai dari eliminasi atau pengangkatan material apabila diperlukan dan aman dilakukan, pengendalian teknis seperti enkapsulasi atau enclosure, pengendalian administratif berupa prosedur kerja aman dan pembatasan akses, serta penggunaan alat pelindung diri sebagai lapisan perlindungan terakhir. Setiap pekerjaan yang berpotensi mengganggu material terduga ACM harus dilakukan oleh personel yang kompeten, menggunakan metode kerja basah atau pengendalian debu, serta dilengkapi dengan pengemasan dan pengelolaan limbah sesuai ketentuan yang berlaku

5.2 Prioritas Pengendalian.

Prioritas pengendalian ditetapkan berdasarkan tingkat risiko material, yaitu dengan mempertimbangkan kondisi fisik material, potensi pelepasan serat, tingkat kerusakan, lokasi material, frekuensi aktivitas di sekitar area, dan jumlah orang yang berpotensi terpapar. Area dengan material yang rusak, rapuh, mudah hancur, atau berada pada lokasi yang sering dilalui harus menjadi prioritas utama dalam pengendalian.

Prioritas pertama adalah material terduga ACM yang berada dalam kondisi rusak, lapuk, terbuka, atau telah mengalami fragmentasi. Material pada kategori ini perlu segera diamankan melalui pembatasan akses, pemasangan tanda peringatan, pencegahan gangguan fisik, serta evaluasi kebutuhan tindakan lanjutan seperti enkapsulasi, enclosure, atau pengangkatan oleh pihak yang kompeten. Apabila material harus dibongkar, maka pekerjaan harus dilakukan dengan prosedur khusus asbestos, termasuk penggunaan APD, pengendalian debu, pengemasan tertutup, dan pengelolaan limbah sebagai limbah berbahaya sesuai ketentuan.

Prioritas kedua adalah material terduga ACM yang masih dalam kondisi relatif utuh tetapi berada pada area dengan potensi gangguan tinggi, seperti area pemeliharaan, jalur utilitas, atap, plafon, selasar, gudang, atau area yang berpotensi mengalami renovasi. Material pada kategori ini perlu diberi label, didokumentasikan dalam daftar inventaris ACM, dan dimasukkan ke dalam rencana pengawasan berkala. Setiap rencana pekerjaan di area tersebut harus didahului dengan penilaian risiko dan izin kerja khusus.
Prioritas ketiga adalah material terduga ACM yang berada dalam kondisi baik, tertutup, tidak mudah terganggu, dan berada pada area dengan akses terbatas. Untuk kategori ini, tindakan pengendalian dapat berupa pemantauan berkala, dokumentasi lokasi, pelabelan terbatas, serta edukasi kepada petugas pemeliharaan agar tidak melakukan pekerjaan yang dapat merusak material tanpa prosedur pengendalian yang memadai.
Dengan penerapan prioritas tersebut, pengelolaan asbestos di RSUP Dr. Sitanala Tangerang dapat dilakukan secara lebih terarah, proporsional, dan efektif. Rekomendasi ini diharapkan menjadi dasar bagi pihak rumah sakit dalam menyusun rencana pengelolaan material terduga ACM, menetapkan area pengawasan, mengendalikan pekerjaan pemeliharaan atau renovasi, serta memastikan bahwa setiap tindak lanjut dilakukan dengan memperhatikan keselamatan kerja, kesehatan lingkungan, dan perlindungan terhadap seluruh pengguna fasilitas rumah sakit.

6.RENCANA TINDAK LANJUT.

Rencana tindak lanjut disusun sebagai langkah sistematis untuk memastikan hasil audit asbestos dapat ditindaklanjuti secara efektif, terukur, dan terdokumentasi. Tindak lanjut ini diarahkan untuk mengendalikan potensi risiko paparan serat asbestos dari material yang teridentifikasi atau diduga sebagai **Asbestos Containing Material (ACM)**, terutama pada area yang memiliki indikasi material berserat, kondisi material yang lapuk atau rusak, serta lokasi yang berpotensi terganggu oleh aktivitas operasional, pemeliharaan, renovasi, maupun pembongkaran.

Pelaksanaan rencana tindak lanjut perlu dilakukan dengan pendekatan bertahap, dimulai dari pendataan dan validasi lokasi material terduga ACM, penetapan prioritas pengendalian, pengamanan area berisiko, penyusunan prosedur kerja aman, hingga pelaksanaan inspeksi

berkala. Rencana ini juga menjadi dasar bagi pihak RSUP Dr. Sitanala Tangerang dalam menyusun program pengelolaan asbestos yang berkelanjutan dan sesuai dengan prinsip keselamatan dan kesehatan kerja serta perlindungan lingkungan.

6.1 Action Plan.

Action plan merupakan rencana aksi yang berisi langkah-langkah pengendalian yang perlu dilakukan setelah pelaksanaan audit asbestos. Rencana aksi ini disusun berdasarkan tingkat risiko, kondisi material, lokasi temuan, serta potensi paparan terhadap pekerja, pasien, pengunjung, dan lingkungan sekitar.

Langkah awal yang perlu dilakukan adalah menyusun inventaris material terduga ACM berdasarkan hasil audit, termasuk informasi lokasi, jenis material, kondisi fisik, dokumentasi foto, hasil analisis laboratorium, serta status risiko. Inventaris ini perlu diperbarui secara berkala dan menjadi acuan bagi setiap kegiatan pemeliharaan, renovasi, atau pembongkaran di lingkungan rumah sakit.

Selanjutnya, area atau material yang terindikasi sebagai suspect ACM perlu diberi penandaan atau label peringatan secara proporsional, terutama pada lokasi yang berpotensi diakses oleh petugas pemeliharaan atau pihak ketiga. Penandaan ini bertujuan untuk mencegah gangguan tidak sengaja terhadap material yang berpotensi melepaskan serat apabila rusak, dipotong, dibor, dibongkar, atau dibersihkan secara tidak tepat.

Untuk material yang berada dalam kondisi rusak, rapuh, terbuka, atau mengalami pelapukan, perlu dilakukan tindakan pengamanan sementara seperti pembatasan akses, pemasangan tanda peringatan, pencegahan kontak langsung, dan pengendalian aktivitas di sekitar area. Apabila diperlukan, dapat dilakukan tindakan teknis seperti enkapsulasi, enclosure, atau pengangkatan material oleh pihak yang kompeten dan memiliki prosedur kerja asbestos yang sesuai.

Setiap pekerjaan yang berpotensi mengganggu material terduga ACM harus dilaksanakan melalui mekanisme izin kerja khusus, penilaian risiko sebelum pekerjaan, penggunaan alat pelindung diri, pengendalian debu, metode kerja basah apabila memungkinkan, serta pengelolaan limbah secara aman. Pekerjaan pembongkaran atau pemindahan material terduga ACM tidak disarankan dilakukan secara umum tanpa perencanaan teknis, personel kompeten, dan prosedur pengendalian yang memadai.

Selain pengendalian teknis, diperlukan juga sosialisasi kepada petugas terkait, khususnya unit pemeliharaan, sanitasi, K3RS, IPSRS, petugas kebersihan, dan kontraktor. Sosialisasi ini mencakup pengenalan material terduga ACM, larangan melakukan pekerjaan yang dapat merusak material tanpa prosedur, tata cara pelaporan apabila ditemukan material rusak, serta langkah keselamatan dasar saat berada di area berisiko.

Secara ringkas, action plan yang direkomendasikan meliputi pendataan material terduga ACM, pelabelan area, pembatasan akses pada lokasi berisiko, pengamanan material rusak, penyusunan prosedur kerja aman, pelatihan atau sosialisasi petugas, pengelolaan limbah apabila dilakukan pembongkaran, serta pelaksanaan pemantauan dan evaluasi secara berkala

6.2 Program Inspeksi Berkala.

Program inspeksi berkala diperlukan untuk memastikan bahwa material terduga ACM tetap berada dalam kondisi aman dan tidak mengalami perubahan yang dapat meningkatkan risiko paparan. Inspeksi berkala juga berfungsi untuk memantau kondisi fisik material, mengevaluasi efektivitas pengendalian, serta mendeteksi sejak dini adanya kerusakan, pelapukan, retakan, atau gangguan mekanis pada material.

Inspeksi berkala sebaiknya dilakukan pada seluruh lokasi yang telah teridentifikasi sebagai suspect ACM, terutama area atap, plafon, selasar, ruang utilitas, gudang, bangunan lama, area pemeliharaan, dan lokasi lain yang berpotensi menggunakan material berbasis asbestos. Pemeriksaan dilakukan melalui observasi visual, dokumentasi foto, pencatatan kondisi material, dan evaluasi perubahan kondisi dibandingkan inspeksi sebelumnya.

Frekuensi inspeksi dapat disesuaikan dengan tingkat risiko. Material dengan risiko tinggi, seperti material rusak, rapuh, terbuka, atau berada pada area dengan aktivitas tinggi, perlu diperiksa lebih sering. Material dengan risiko sedang dapat diperiksa secara periodik sesuai kebutuhan operasional, sedangkan material dengan risiko rendah yang berada dalam kondisi baik dan tidak mudah terganggu dapat dimasukkan dalam program pemantauan rutin.

Dalam setiap inspeksi, parameter yang perlu diperhatikan meliputi kondisi permukaan material, adanya retakan atau pecahan, tanda pelapukan, perubahan warna atau tekstur, adanya debu atau serpihan di sekitar material, potensi gangguan dari aktivitas manusia, serta perubahan fungsi ruangan atau rencana pekerjaan konstruksi. Apabila ditemukan kerusakan atau potensi gangguan, maka area tersebut perlu segera dievaluasi dan ditindaklanjuti sesuai tingkat risikonya.

Hasil inspeksi berkala harus didokumentasikan dalam formulir inspeksi yang memuat tanggal pemeriksaan, nama petugas, lokasi, jenis material, kondisi material, dokumentasi foto, tingkat risiko, serta rekomendasi tindak lanjut. Dokumentasi ini penting untuk menjaga ketertelusuran data dan menjadi dasar pengambilan keputusan apabila diperlukan tindakan pengendalian lanjutan.

Program inspeksi berkala juga perlu diintegrasikan dengan sistem manajemen fasilitas rumah sakit, khususnya pada kegiatan pemeliharaan bangunan, renovasi, pembongkaran, dan pekerjaan kontraktor. Sebelum pekerjaan dimulai, daftar lokasi suspect ACM perlu diperiksa terlebih dahulu untuk memastikan tidak ada material yang terganggu tanpa prosedur pengendalian.

Dengan adanya action plan dan program inspeksi berkala, pengelolaan asbestos di RSUP Dr. Sitanala Tangerang dapat dilakukan secara lebih terarah, terdokumentasi, dan berkelanjutan. Rencana tindak lanjut ini diharapkan dapat mendukung upaya pencegahan paparan asbestos, meningkatkan keselamatan kerja, serta memastikan bahwa setiap kegiatan operasional maupun pengembangan fasilitas rumah sakit tetap memperhatikan aspek kesehatan dan perlindungan lingkungan.

7.KESIMPULAN.

Berdasarkan hasil pengamatan lapangan, analisis morfologi menggunakan Scanning Electron Microscope (SEM), analisis komposisi unsur melalui SEM-EDS/Elemental Mapping, serta analisis mineralogi menggunakan X-Ray Diffraction (XRD), diperoleh gambaran bahwa ketiga sampel memiliki karakteristik material yang berbeda, baik dari sisi bentuk fisik, struktur serat, komposisi unsur, maupun pola kristalinitasnya.

Secara umum, hasil SEM menunjukkan bahwa Sample 1 dan Sample 2 memiliki indikasi morfologi berserat yang lebih jelas dibandingkan Sample 3. Sample 1 memperlihatkan struktur serat halus yang saling berikatan dan membentuk kumpulan serabut, sedangkan Sample 2 menunjukkan struktur memanjang menyerupai bundel atau batang serat yang relatif sejajar. Sementara itu, Sample 3 lebih dominan menunjukkan permukaan material yang padat, kasar, tidak homogen, dan hanya memiliki indikasi fragmen tipis memanjang pada beberapa area.

Hasil SEM-EDS dan elemental mapping menunjukkan adanya unsur-unsur utama seperti C, O, Mg, Al, Si, Ca, serta pada beberapa sampel juga terdeteksi N. Keberadaan unsur Si dan Mg menjadi perhatian dalam konteks identifikasi material berserat karena keduanya dapat berasosiasi dengan mineral silikat. Namun, keberadaan unsur tersebut tidak secara otomatis menyatakan bahwa material positif mengandung asbestos, karena unsur yang sama juga dapat ditemukan pada mineral non-asbestos, material semen, filler mineral, oksida, karbonat, atau matriks bangunan lainnya.

Analisis XRD memberikan informasi tambahan mengenai karakter mineralogi sampel. Sample 1 menunjukkan pola difraksi kristalin dengan puncak dominan pada kisaran 2θ ±29°–30°, yang mengindikasikan adanya fase mineral utama yang cukup kuat. Sample 2 menunjukkan pola difraksi dengan puncak lebar atau broad peak, yang mengarah pada karakter material amorf hingga semi-kristalin, dengan fase kristalin yang tidak dominan. Sementara itu, Sample 3 menunjukkan kombinasi antara puncak lebar dan puncak tajam, yang menandakan bahwa sampel memiliki campuran matriks amorf/semi-kristalin dan fase mineral kristalin.

Berdasarkan korelasi ketiga metode analisis tersebut, dapat disimpulkan bahwa Sample 1 dan Sample 2 memiliki indikasi lebih kuat sebagai material terduga Asbestos Containing Material (ACM) karena menunjukkan karakter morfologi berserat yang jelas serta adanya unsur mineral yang relevan, terutama Si dan Mg. Namun, hasil XRD belum cukup untuk menetapkan status positif asbestos secara definitif tanpa pencocokan fase mineral terhadap database referensi dan/atau konfirmasi melalui metode tambahan seperti PLM, XRD fase matching, atau TEM.

Sample 3 menunjukkan karakter material mineral campuran dengan fase kristalin yang cukup jelas, tetapi indikasi morfologi seratnya lebih lemah dibandingkan Sample 1 dan Sample 2. Oleh karena itu, Sample 3 belum dapat dinyatakan sebagai ACM berdasarkan data yang tersedia, namun tetap perlu diperlakukan sebagai material terduga sampai ada hasil konfirmasi lanjutan.

Kesimpulan Umum

Dari ketiga sampel yang dianalisis, **Sample 1 dan Sample 2 merupakan sampel dengan indikasi paling kuat sebagai material terduga mengandung asbestos**, terutama berdasarkan morfologi SEM yang menunjukkan struktur berserat dan hasil SEM-EDS yang memperlihatkan keberadaan unsur mineral seperti Si dan Mg. **Sample 1** memperlihatkan karakter kristalin yang lebih jelas berdasarkan hasil XRD, sedangkan **Sample 2** lebih menunjukkan karakter amorf/semi-kristalin namun tetap memiliki morfologi fibrous yang perlu mendapat perhatian.

Sample 3 menunjukkan karakter material campuran dengan fase mineral kristalin dan matriks amorf/semi-kristalin, namun bentuk serat tidak terlihat dominan. Oleh karena itu, Sample 3 memiliki tingkat indikasi ACM yang lebih rendah dibandingkan Sample 1 dan Sample 2, tetapi tetap perlu dikelola secara hati-hati karena masih menunjukkan komponen mineral dan struktur permukaan yang kompleks.

Secara keseluruhan, hasil analisis menunjukkan bahwa material yang diperiksa memiliki potensi sebagai material bangunan lama yang mengandung komponen mineral berserat. Namun, status **positif asbestos** belum dapat dinyatakan secara definitif hanya berdasarkan SEM, SEM-EDS, dan pembacaan visual XRD. Penetapan akhir sebagai **Asbestos Containing Material (ACM)** perlu dilakukan melalui konfirmasi lanjutan, antara lain pencocokan fase XRD terhadap database referensi mineral dan/atau analisis menggunakan **Polarized Light Microscopy (PLM)** atau **Transmission Electron Microscopy (TEM)**.

Sampai diperoleh hasil konfirmasi akhir, seluruh material yang memiliki karakteristik fibrous, khususnya yang mewakili Sample 1 dan Sample 2, direkomendasikan untuk diperlakukan sebagai **suspect ACM**. Pengelolaan perlu dilakukan dengan prinsip kehati-hatian, termasuk pendataan lokasi, pelabelan, pembatasan akses, pengendalian pekerjaan pemeliharaan atau renovasi, penggunaan alat pelindung diri, serta pengelolaan limbah sesuai ketentuan apabila

No	Sampel	Hasil SEM	Hasil SEM-EDS / Elemental Mapping	Hasil XRD	Interpretasi Terpadu	Kesimpulan
1	**Sample 1**	Menunjukkan struktur serat halus, memanjang, saling berikatan, dan membentuk kumpulan serabut. Morfologi fibrous terlihat jelas.	Terdeteksi unsur C, O, Mg, Al, Si, dan Ca. Keberadaan Si dan Mg relevan untuk evaluasi mineral silikat.	Pola difraksi kristalin dengan puncak dominan sekitar 2θ ±29°–30° dan beberapa puncak minor.	Sampel menunjukkan karakter material berserat dengan fase mineral kristalin. Indikasi suspect ACM cukup kuat, tetapi perlu pencocokan fase mineral untuk konfirmasi.	**Terindikasi kuat sebagai material terduga ACM.**
2	**Sample 2**	Menunjukkan struktur memanjang menyerupai bundel/batang serat, tersusun relatif sejajar, dengan	Terdeteksi unsur C, O, Mg, Al, Si, dan Ca. Komposisi menunjukkan material mineral/anorganik kompleks.	Pola XRD didominasi puncak lebar, menunjukkan karakter amorf hingga semi-kristalin dengan	Morfologi fibrous cukup jelas, tetapi pola XRD tidak menunjukkan puncak kristalin dominan yang mudah	**Terindikasi sebagai material terduga ACM,.**

		permukaan kasar dan berfragmen.		fase kristalin terbatas.	diidentifikasi secara visual.	
3	**Sample 3**	Permukaan lebih padat, kasar, tidak homogen, dengan retakan mikro dan beberapa fragmen tipis memanjang. Serat tidak dominan.	Terdeteksi unsur C, N, O, Mg, Al, dan Si. Unsur mineral terdeteksi, tetapi Mg relatif rendah pada beberapa hasil.	Pola XRD menunjukkan kombinasi puncak lebar dan puncak tajam, menandakan campuran amorf/semi-kristalin dan mineral kristalin.	Material menunjukkan karakter mineral campuran, tetapi indikasi fibrous lebih lemah dibanding Sample 1 dan 2.	**Belum dapat ditetapkan sebagai ACM.**

LAMPIRAN I : DOKUMENTASI AREA TERSUSPECT ACM

