Nusantara Infrastructure

HEALTH, SAFETY & ENVIRONMENT PERFORMANCE IN NI'S BUSINESS UNITS AND PROJECTS FOR 2022

AUDIT REPORT

December 2022

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All projects under the jurisdiction of PT Nusantara Infrastructure Tbk. and its direct and indirect subsidiary companies must be audited internally by the Group's HSE Department, established in August 2018, for compliance with the Group's HSE protocols set forth in the NI Environmental Manual and Annexes. These HSE protocols are based on the Government of Indonesia's health, safety and environmental (HSE) laws and regulations and the HSE guidelines provided by the World Bank, IFC, Asian Development Bank and IIF.

All projects follow the Group's Social and Environmental Management System (SEMS) that details the policy, operating procedures, institutional arrangements and workflow that will be followed to identify social and environmental risks that may arise from the projects and therefore ensure the avoidance, minimization or mitigation of those risks.

The objective of Nusantara Infrastructure (NI) annual **Audit Reports on the Health, Safety & Environmental Performance including the Social Performance** of its projects is to record health, safety, social and environmental impacts resulting from the project activities. These impacts are measured and recorded according to the Social and Environmental Management System (SEMS) that is implemented throughout the NI Group, its business units, subsidiaries and all projects.

As a developer and operator of toll roads, water treatment plants and renewable energy plants, the major negative environmental impact comes from the greenhouse gas (GHG) emissions generated by the users of our toll roads in Jakarta, Banten and Makassar. These account for more than 90 percent of NI's total GHG emissions.

On the positive side, as a service provider of bulk clean water to households and industry and generator of renewable energy from a mini-hydro run-of-the-river plant in North Sumatra and a sustainable biomass plant in West Kalimantan, NI's overall carbon footprint is very small. When the avoided GHG emissions from the two renewable energy plants are factored in, there is a positive amount of carbon that can be offset against the negative amount of carbon produced by the operations of toll roads, water treatment plants and renewable energy plants.

In 2022, the operation of EIs two renewable energy plants resulted in 131,779 t CO2E avoided GHG emissions, with Lau Gunung contributing 53,824 t and RPSL 77,955 t. In other words, to produce the same amount of electrical power from generating stations using fossil fuels, would consume 131,779 t CO2E. In 2022, the company's offices, projects and operations produced a total of 120,020 t CO2E and qualifies as carbon positive to the amount of 11,759 t CO2E. This situation is likely to continue for the next four years or thereabouts when carbon neutrality will only be achieved by increasing our renewable energy output or instigating a tree-planting program to offset GHG emissions

Chapter 1 Introduction

1.1 Background

All projects under the jurisdiction of PT Nusantara Infrastructure Tbk. and its direct and indirect subsidiary companies must be audited internally by the Group's HSE Department, established in August 2018, for compliance with the Group's HSE protocols set forth in the NI Environmental Manual and Annexes[1]. These HSE protocols are based on the Government of Indonesia's health, safety and environmental (HSE) laws and regulations and the HSE guidelines provided by the World Bank, IFC, Asian Development Bank and IIF.

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SEMS is to be followed during the entire project cycle from project inception, through appraisal, tendering, award, construction, operation, maintenance and decommissioning.

It is mandatory for all NI's projects to establish a SEMS based on the company's Social and Environmental Policy (S&P) and Performance Requirements as defined in the company's Environmental, Health and Safety Guidelines Manual and accompanying Annexes, together with the SEMS Guideline[2], all of which are available in NI's HSE Intranet and Website. www.nusantarainfrastructure.com

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This report is the **Health, Safety & Environmental Performance Audit Report of NI, its Business Units and Projects for 2022.**

[1] Health, Safety and Environmental Manual Guidelines
[2] SEMS Guideline

1.2 NI Organizational Structure

NI has three main or Strategic Business Units (SBUs) referred to as subsidiaries, each representing a particular sphere of infrastructure interest. First, PT Margautama Nusantara (MUN) that handles the toll roads sector. MUN has two subsidiaries and two associated companies, PT Bintaro Serpong Damai (BSD), PT Makassar Metro Network (MMN), PT Jakarta Lingkar Baratsatu (JLB) and PT Jalan Toll Seksi Empat (JTSE).

Second, PT Potum Mundi Infranusantara (POTUM) that handles the clean bulk water sector. POTUM has three subsidiaries and one associated company, PT Tirta Bangun Nusantara (TBN), PT Sarana Catur Tirta Kelola (SCTK), PT Dain Celicani Cemerlang (DCC) and PT Tirta Kencana Cahaya Mandiri (TKCM).

The third business unit PT Energi Infranusantara (EI) invests in the clean renewable energy sector. EI has two subsidiaries, PT Impola Meka Energi (IME) and PT Rezeki Perkasa Sejahtera Lestari (RPSL).

Each Business Unit and subsidiary has its own HSE team that is responsible for ensuring the companies and their projects comply with NI's HSE protocols under the jurisdiction and guidance of the NI HSE management, the structure of which is shown in Figure 1.1.

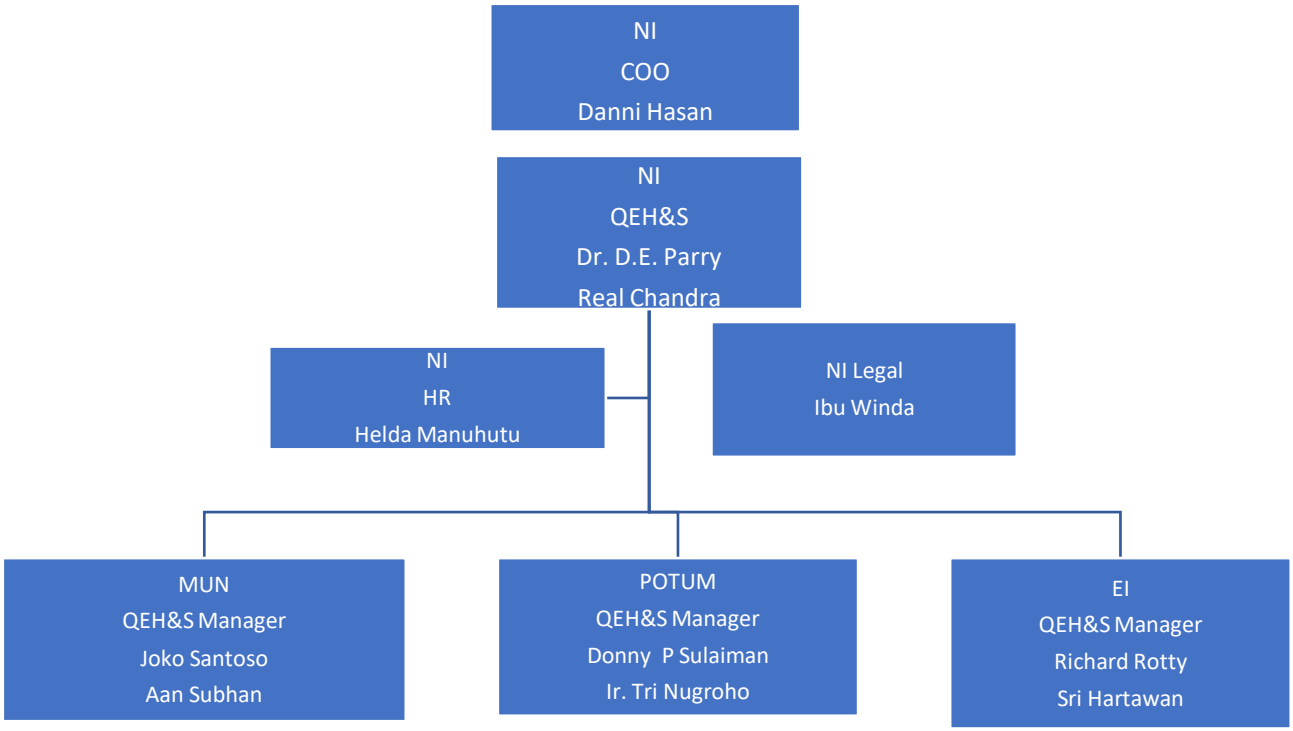


Figure 1.1 NI HSE Management Structure

This department was established in 2018 in response to the 21st century's advocacy of sustainable development coupled with the perils of climate change, which has focused the attention of governments, the international development agencies and funding institutions on social and environmental issues including workers' welfare and safety. Strong social and environmental standards are demanded by governments including the Government of Indonesia and funding agencies as a pre-requisite for funding. With the expansion of NI's business activities and their increasing complexity over the past decade, in early 2018 NI decided to consolidate and strengthen HSE throughout the Group by establishing an HSE Department at the Group level, as shown in Figure 1 above. The Department has overall responsibility for HSE protocols throughout the Group's business units and projects, and has put in place a management and reporting structure that goes from Group and business unit level, down to project level.

Health, Safety and Environment issues have been an integral part of all NI's business activities since the establishment of the company in 2006, but have been thrust into the limelight since 2020 because of the pandemic. These issues were generally under the jurisdiction of the business units and their individual projects but the unprecedented conditions in 2020-2021 meant that the parent company, NI took overall control of HSE prioritizing employee welfare above all else.

The Company established a Covid-19 Task Force in March 2020 to provide daily and weekly advice via the Company's WhatsApp Group (WAG) to all staff regarding developments and Government directives regarding Covid-19. In addition, the Company also provided additional support in the form of vitamins, lunch meals, rapid tests, and PCR swabs to encourage the prevention and handling of Covid-19 for the Company's employees.

These protocols and support were maintained throughout 2021 reflecting the management's commitment to not only prioritizing commercial interests, but also prioritizing the health and safety of human capital as assets and catalysts for the Company's business sustainability. This priority of staff welfare continued throughout 2021 as the pandemic ebbed and flowed throughout the archipelago during the year.

This year, 2022, saw a quite dramatic and favourable change in the dynamics of the pandemic with the emergence of the Omicron variant, a milder less virulent strain of Covid-19 and the widespread decline of the more deadly Delta variant. In addition, the government's highly successful mass vaccination and booster program has meant that over 75 percent or 204 million people received the first dose, 175 million the second and 70 million a booster shot, putting Indonesia fifth in the world in terms of Covid vaccinations. In the second half of 2022, the daily death rate from Covid was between 8 and 15 persons and while protective protocols like mask wearing and social distancing are still in place, the government has declared the disease as an endemic type of influenza to be treated with annual vaccinations and boosters. This strategy has been adopted by most countries. By the end of December 2022, the total number of deaths from

Covid in Indonesia was around 161,500 from a total population of 276 million, equivalent to 0.06 percent of the population. This compares with 231,000 deaths in the UK with population of 67.3 million, equivalent to 0.31 percent of the population.

1.3 Social and Environmental Audits

The NI Group's HSE Department undertakes Social and Environmental Performance Audits on all the Company's operational projects, on those projects under construction and those in the project development pipeline to ensure implementation of the "mitigation measures" identified to reduce adverse impacts and enhance positive impacts from specific project activities. The audits anticipate likely environmental and social impacts, both negative and positive and also consider any unexpected or unforeseen environmental impacts that may arise during the construction and operational phases of a project.

Social and Environmental Audits of operational projects and those under construction were generally audited at six -monthly intervals via site visits. However, since the outbreak of the Covid-19 pandemic in Indonesia in March 2020, it has not been possible for the HSE team to carry out site visits so auditing had to be done remotely during the remainder of 2020 and throughout 2021 and 2022, relying on reports submitted by e-mail or during on-line Zoom or Teams meetings with the various HSE business unit sub-committees. The environmental and social audits conducted by the HSE business units and project teams during 2022 are discussed in Chapter 2.

This HSE Audit Report for PT Nusantara Infrastructure Tbk. for the year 2022 presents the HSE audit data according to the three main business units, namely PT Margautama Nusantara (MUN), PT Potum Mundi Infranusantara (POTUM) and PT Energi Infranusantara (EI) which represent the Company's interests in developing and operating toll roads, water treatment plants and renewable energy plants, respectively. Chapter 2 covers MUN's activities, Chapter 3 looks at POTUM's projects and Chapter 4 deals with EI's renewable energy projects. Chapter 5 considers the overall greenhouse gas (GHG) emissions emitted by the Company and its various projects, details the methods used to calculate these emissions and proposes tree-planting programs to offset these emissions. An Executive Summary provides a synopsis of the HSE audit findings for 2022 that is aimed at board members and senior managers within the Company, shareholders and other stakeholders.

Chapter 2 MUN Environmental and Social Audits 2022

2.1 Introduction

PT Margautama Nusantara or MUN as the developer and operator of toll roads, accounts for some 75 percent of NI's revenue and, through its activities, has the greatest impact on the physical environment both positively and negatively. On the positive side, toll roads increase connectivity and reduce both congestion and air pollution, whilst on the negative side, the greenhouse gas (GHG) emissions from toll road users accounts for >90 percent of NI's total GHG emissions for any one year.

Since the Company is not developing any greenfield toll roads in 2022, there are no social or physical environmental impacts to consider. The only new toll road construction is occurring in Makassar City centre, with the elevated access road from the port to JTSE and on BSD with the flood mitigation at KM 8, weaving mitigation at Serpong Junction and widening of ROW 30. All these projects have been audited by the relevant HSE teams and found to comply fully with NI, local government and national government HSE protocols. Details of these projects are discussed below.

The S&E Performance of all MUN's projects in 2022 was measured against the S&E Principles followed by IFC, World Bank, ADB, IIF and NI that are summarized in Table 2.1. overleaf with individual projects discussed below.

2.2 A.P. Pettarani Elevated Toll Road, Makassar

The construction of the first elevated toll road outside Java Island started at the end of April 2018 without any land acquisition (**the first in toll construction in Indonesia**), with the completion of the toll structural work on September 30, 2020, PT Makassar Metro Network (MMN), the indirect subsidiary of MUN responsible for toll road development in Makassar, together with the local government initiated the construction of the A.P. Pettarani Elevated Toll Road to ease traffic congestion in the city, as well as build connectivity in Eastern Indonesia.

The A.P. Pettarani Elevated Toll Road (known as Section or SEKSI III), is an extension of Sections I and II Toll Roads without the addition of new toll gates. Thus, toll payment transactions will still be carried out at existing toll gates with tariff adjustments. The linkages to the other Makassar toll roads are shown in Figure 2.1. This Elevated Toll Road has become one of the new icons of the Makassar City and has facilitated mobility, distribution of goods and logistics, as well as optimizing the function of the toll road network in Makassar City which integrates the economic nodes, airports, ports, industrial estates and offices.

Table 2.1 S&E Principles followed by IFC, World Bank, ADB, IIF and NI

PS 1 Assessment and Management of S&E Risks and Impact

- Identify and assess social and environmental impacts and risks in the project's area of influence
- Avoid if possible and minimize adverse impacts on affected communities
- Promote improved S&E performance through the use of management systems
- Ensure affected communities are properly engaged
- Provide grievance mechanisms

PS 2 Labour and Working Conditions

- Respect Collective Agreements
- Workers' Right to Organize and Bargain Collectively
- Comparable terms and conditions required for all workers including migrant workers
- Risk assessment and regular monitoring of juvenile workers
- Provide a safe and healthy work environment
- No use of child or forced labour in supply chain

PS 3 Resource Efficiency and Pollution Prevention

- Avoid or minimize adverse impacts on human health and the environment from project-related activities
- Promote reduction of emissions that contribute to climate change
- Resource efficiency requirements (CP, energy efficiency and water conservation)
- Examine water impacts beyond project boundary

PS 4 Community Health, Safety and Security

- Avoid or minimize risks and impacts to the H&S of the local community
- Ensure that safeguarding of personnel and property avoids or minimizes risks to community safety and security
- Clients' use of natural resources will not impede the communities continued use of these resources (ecosystems and ecosystem services related)

PS 5 Land Acquisition and Involuntary Resettlement

- Avoid or minimize resettlement through alternative project design
- Mitigate impacts from land acquisition or use of affected persons' land with fair compensation
- Restore and preferably improve livelihoods of affected people
- Improve living conditions among displaced persons

PS 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources

- Protect and conserve biodiversity
- Establishes a hierarchy of sensitivity – modified, natural, critical
- Emphasis on ecosystems services
- Demonstrate that siting project on degraded land is not feasible
- Obtain certification for primary production
- Shift supply chains away from converting sensitive habitats
- Protect against invasion alien species

PS 7 Indigenous Peoples

- Ensure full respect for the dignity, human rights, aspirations, cultures and customary livelihoods of Indigenous Peoples
- Avoid adverse impacts ojn Indigenous Peoples
- Respect and preserve culture, knowledge and practices
- Free, Prior and Informed (FPIC) in special circumstances

PS 8 Cultural Heritage

- Protect cultural heritage from adverse impacts and support its preservation
- Identify critical cultural heritage
- Requires FPIC when Indigenous Peoples' cultural practices or knowledge will be commercialized

The project has strengthened the role of Makassar City as a growth center as well as a service and distribution center for the Eastern Region of Indonesia. The A.P. Pettarani Elevated Toll Road Makassar connects the southern part of Makassar City with Soekarno-Hatta Port, Makassar New Port, Sultan Hasanudin Airport, and the southern coast of South Sulawesi.

Figure 2.1 Layout of Seksi I-II, III (A.P. Pettarani) & IV toll roads in Makassar

Since the A.P. Pettarani is an urban elevated tool road that is built above an existing national urban road there was no land acquisition required, no voluntary or involuntary resettlement of local people and no requirement for any resettlement plans or restoration of local livelihoods as required under **PS5 – Land acquisition and Involuntary Resettlement**.

Similarly, as an urban elevated toll road above existing roads infrastructure, A.P. Pettarani has no biodiversity or management of natural resource issues as specified in **PS6- Biodiversity Conservation and Sustainable Management of Living Natural Resources.** This rationale also applies to both **PS7 – Indigenous Peoples** and **PS8-Cultural Heritage.**

During the toll roads operation on 2022, the risk analysis carried out by the HSE team in 2020 and 2021 has proven to be robust with zero accidents or deaths recorded and only the minimum disruption to customers caused by occasional electronic equipment malfunctioning at toll plazas.

Complaints from the local population living in the vicinity of MMN's toll roads in Makassar during the year were minimal and often related to issues outside the jurisdiction of MMN or even related to the presence of a toll road, nonetheless, all complaints are registered and answered by the relevant HSE teams.

2.3 Seksi I-II and Seksi-IV (JTSE)

These three sections of MMN's toll roads in Makassar have been have been operational since 2004 and have implemented environmental management planning (*RKL - Rencana Pengelolaan Lingkungan)* and environmental monitoring planning (*RPL - Rencana Pemantauan Lingkungan)* activities as specified in the relevant ANDAL (*Analisis Dampak Lingkungan* – Analysis of Environmental Impacts) studies, continuously, reporting these activities to the local environmental agency every six months (January – June – Semester I and July -December - Semester II) as required by law. The first 2022 semester RKL/RPL reports for the four toll roads in Makassar can be viewed at the following link:

(https://drive.google.com/drive/folders/1PxOXF9by3NqZk-qXfl_UjyMW0HDiv-M_?usp=share_link)

The environmental priority objective is to reduce traffic noise and maintain air quality by planting and maintaining trees in nearby open land and along the left and
right
sides of the highway. Trees that have thick crowns and shady leaves planted close together are most effective for absorbing air pollutants and noise. Species planted by MMN along Seksi I-II and IV include white teak *(Tectona grandis)*, Japanese bamboo *(Dracaena surculose)*, Trembesi or the Rain Tree *(Samanea saman)*, mahogany *(Swietania spp.)*, Tamarind *(Tamarindus indica)*, Jack fruit *(Artocarpus heterophyllus)* and oil palm *(Elaeis guineensis)*. By the end of 2022, 2,588 trees have been planted and maintained,

From the health and safety perspective, all MMN's Makassar toll roads maintained the high standards of safety achieved in 2021 with no deaths recorded and only minor accidents with no serious injuries reported in 2022.

2.4 Operational Performance on MMN's Toll Roads

Since there is no direct toll gate to A.P. Pettarani and the Kalukubodoa toll gate caters for traffic from any direction, analysis of traffic numbers from Kalukubodoa, AIPI and Urip is required in order to determine the A.P. Pettarani numbers. This analysis for the period May 2021 to January 2023 is shown in Table 2.2. In order to test this analysis a formal traffic survey for A.P. Pettarani will be carried out in 2023 to provide accurate numbers and trend.

Table 2.2 Traffic numbers for A.P. Pettarani Elevated Toll Road, Makassar

	Month	Pettarani Elevated 83%	Others (AIPI & Urip) 17%	Kaluku Bodoa Traffic
24	May-21	8,708	1,771	10,479
30	Jun-21	10,203	2,075	12,279
31	Jul-21	8,132	1,654	9,786
31	Aug-21	7,655	1,557	9,211
30	Sep-21	9,332	1,898	11,230
31	Oct-21	10,495	2,134	12,629
30	Nov-21	11,267	2,291	13,558
31	Dec-21	11,839	2,408	14,247
31	Jan-22	7,685	1,563	9,248
28	Feb-22	12,419	2,526	14,944
31	Mar-22	9,195	1,870	11,065
30	Apr-22	12,833	2,610	15,443
31	May-22	11,087	2,255	13,341
30	Jun-22	12,873	2,618	15,491
31	Jul-22	11,728	2,385	14,113
31	Aug-22	12,524	2,547	15,071
30	Sep-22	12,144	2,470	14,613
31	Oct-22	11,935	2,427	14,362
30	Nov-22	12,931	2,630	15,561
31	Dec-22	12,188	2,479	14,667
12	Jan-23	12,311	2,504	14,815

Daily traffic volume in vehicles per day (vpd) for A.P Pettarani from the entrance on Seksi II for the period March 19 until December 31 2021, was 14,247. This number increased to just over 15,691 in November 2022 but dropped to 14,667 by the end of the year. These numbers suggest that vehicle numbers in 2023 will be between 15,000 and 16,000 vpd. The very strategic location of the A.P. Pettarani Elevated Toll Road within the severely congested centre of Makassar City means that local motorists may use the toll road two or even three times a day. This is in contrast to JTSE and Seksi I and II within the Makassar network which, by and large, enable motorists to exit the city quickly. Daily multiple use of the elevated toll road could double vehicle number projections.

In order to encourage motorists to use A.P. Pettarani as the toll road of choice for intra-city daily travel more than once a day, in October 2022, MMN launched a customer loyalty reward program called 'Tolvaganza', offering prizes such as motor cycles, iPhones, free Umroh and e-money via

an app that can be down-loaded from Apple Store and Google Play Store. To date, 10,563 toll users are members. If the scheme continues to grow and be successful, it will be replicated in MUN's other toll roads in Jakarta, Banten and West Java.

In 2021 Seksi I – II averaged 44,629 vpd. In 2022, this figure increased by 15.2 percent to 51,441 vpd of which 14 percent or 7,862 vehicles were trucks with more than two axles (Golongan II – V). Traffic volumes for 2023 are likely to increase by at least 12 percent to around 58,000 vpd as travel patterns return to the pre-Covid levels of 2019.

In 2021, JTSE averaged 30,329 vpd and was projected to increase by 15.9 percent to 35,653 vpd in 2022. In fact, daily traffic volume 2022 rose to 37,794 vpd, equivalent to a 24.5 percent increase, further evidence that pre-Covid travel patterns are bring re-established. Next year, 2023 could see traffic volume on JTSE exceeding 43,000 vpd, an increase of 13 percent.

2.5 MUN's Jakarta and Banten Toll Roads

MUN operates one toll road concession in Jakarta, *PT Jakarta Lingkar Baratsatu* (JLB) also known as JORR W-2, a 9.7 km toll road connecting Kebon Jeruk, West Jakarta, with Perjaringan (Soekarno-Hatta International Airport in Cengkareng, Banten Province. The toll road has a strategic location as it is directly connected with three other toll roads, namely the Jakarta-Tangerang Toll Road, the North JORR W-2 Toll Road in Kebon Jeruk and the Soekarno-Hatta Airort (Prof Sedyatmo) Toll Road in Penjaringan.

The second toll road concession, *PT Bintaro Serpong Damai (BSD)*, is a 7.5 km toll road from Pondok Aren to BSD in South Tangerang, Banten Province. It commenced operations in February 1999 and since then it has become the main route from BSD and Bintaro to Jakarta

2.6 PT Jakarta Lingkar Baratsatu (JLB)

JLB is an associated entity of MUN and increased its share ownership to 35 percent on August 29th 2018. As a minority shareholder, HSE activities are not within the jurisdiction of MUN. Nonetheless, NI's HSE Department undertook due diligence of the HSE status of the toll road at the time of share acquisition and has continued to monitor the HSE performance of the toll road since then. Regular site visits were made between 2013 and 2018 by Dr. Parry, NI's Independent Commissioner 2013-2018 as part of NI's Audit Committee responsibilities.

The NI HSE team made no official site visits during 2020, 2021 and 2022 due to Covid-19 travel restrictions although Dr. Parry travelled along JLB two or three times in the 2021 – 2022 period observing the status of the toll road in terms of safety and operational efficiency. The surface was well maintained and any sections that were being repaired were clearly indicated and traffic was safely and efficiently directed past the repair works.

All RKL and RPL reports are submitted to the local environmental agency in West Jakarta and should be accessible through that agency.

Traffic volumes for 2021 were 63,631 vpd and rose in 2022 to 77,452 vpd, an increase of 21.7 percent. At this rate, traffic volumes should reach the pre-Covid-19 levels of 100,000 + vpd by 2024.

2.7 PT Bintaro Serpong Damai (BSD) Toll Road

PT Nusantara Infrastructure Tbk became shareholders in the BSD toll road in 2008 with the majority shareholding under PT Margautama Nusantara at 89 percent. The toll road runs from Pondok Aren in South Jakarta, 7.5 km to Serpong in South Tangerang and is the main artery for residents of Serpong and Bintaro commuting to Jakarta. Toll road operations began on February 2nd 1999. HSE audits were initially made by NI's audit Committee led by Dr. Parry, NI's Independent Commissioner from 2013-2018. The first of these visits occurred on August 14th 2014, and is recorded in the official minutes of the Audit Committee, which are included as Annex A of this report to demonstrate that HSE auditing was being carried out by NI before the official establishment of the NI HSE Department in 2018. With the establishment of the NI HSE Department in August 2018, formal HSE audits of the BSD toll road were undertaken, the first being on September 9th 2019.

All site visits were cancelled in 2020, 2021 and 2022 due to the Covid restrictions and protocols although Dr. Parry made several trips along the toll road in 2022 to observe progress on the flood mitigation and down-ramp modification construction activities. – *waiting for input from Pak Vembrie*

Traffic volume has increased by 25.4% in 2022 from an average of 77,421 vpd in 2021, to 91,111 vpd in 2022. The last five months of 2022 (August – December) saw traffic volume exceed 100,000 vpd every month, the highest traffic volumes ever recorded since NI's BSD toll road operations began in 2008.

2.8 MUN's New Toll Road Construction Projects

2.8.1 BSD Construction Projects

There are currently three construction projects on-going along the BSD toll road. They are:

1. The design and construction of flood mitigation measures at KM 8
2. Weaving at the Serpong ramp junction and the Pamulang exit ramp
3. Widening of Pamulang exit arterial road

By the end of December 2022, construction work on these projects were 45.77%, 54.54% and 25.72% complete with a May 2023 target completion date for flood mitigation and March 2023 completion date for the other two projects. In addition, the Government of South Tangerang City is normalizing the Cibenda River at the downstream side by increasing the height of the river protection wall.

Plate 2.1 Polder sheet piling being installed

One of the flood mitigation measures involves constructing a polder to temporarily retain the floodwater. The photograph, Plate 2,1, shows the sheet piling being installed.

The weaving project on the down ramp at KM 10 is primarily to improve the safety of toll road operations, providing motorists with more space to enter the main flow of traffic when exiting the down ramp. Similarly with the widening of the ROW 30 which will include the installation of a U-turn ditch in addition to the construction of 108 m of rigid pavement.

2.8.2 MMN Construction Projects

MMN currently is working on one new construction project namely, the Makassar New Port Toll Access Road construction Phase I and II *(Jalan Akses Tol Makassar New Port Tahap I & II)*. The two phases consist of +/- 3.25 km of elevated (including one bridge) and at grade toll road. Phase I starts close to the old port near the Gerbang Cambaya Gate on Tol Seksi I, heading for 2.6 km before heading north for 500 m towards the Makassar New Port.

Plate 2.2 Down ramp B final construction

Phase I is currently under construction and on schedule, having started in August 2022, to be completed by the contractor, PT. Wijaya Karya (WIKA) within 14 months or by September 2023. The 513 m long two-lane down ramp B joins the arterial road heading to the new port. Plate 2.2 shows the final stages of construction with only the asphalt concrete wearing layer and side barriers to be completed.

On-site HSE is managed by the consultants, Indo Koei and Nippon Koei whose on-site supervisor holds daily safety briefings with site workers and to date, (year-end 2022) reports zero

accidents and zero near misses. The MMN HSE team headed by Pak Yusuf, liaise regularly with the HSE consultants to check the situation.

2.9 MUN's New Projects in the Pipeline

2.9.1 JORR Expressway

A 21.4 km elevated (2nd level and 3rd level), 2 x 2 lanes toll road above existing JORR toll road between Cikunir, Jatiasih and Ulujami. The consortium consists of MUN, Adhi Karya and Acset.

MUN, Adhi Karya and Acset and WIKA submitted Feasibility Study and Basic Design carried out by Nippon Koei to the government (Bina Marga, MPWPH) in June 2019 and waiting for decision from the government. On July 30th 2021, the BPJT of the MMPWPH announced that the NI consortium had passed the prequalification stage and would be invited to bid at the forthcoming auction, time and place to be announced. This is still the position as of December 31st 2022 but BPJT has set the tariff at Rp. 23,000 rather than Rp. 28,000 as in NI's proposal. An appeal process will be launched in January for BPJT to accept a tariff of Rp. 27,000.

2.10 Measuring MUN's Projects' Environmental Impact

2.10.1 Introduction

It is a fact that the building of toll roads and their operation has greater negative impacts on the environment that building and operating water treatment plants and renewable energy power plants with the notable exception of large hydro-electric schemes that involve high dams and large storage reservoirs. Since MUN's toll road projects are all urban, the impacts of construction and land acquisition are minimal and of relatively short duration. The major negative environmental impact comes from the GHG emissions generated by the users of the toll roads and it is these emissions which are linked to the traffic volumes recorded on the toll roads, that are calculated by NI's HSE Department and plans put in place to off-set these emissions by establishing tree-planting programs. Details of these calculations for MUN's toll roads for the past three years are included in NI's Greenhouse Gas (GHG) Emissions Report for 2022 that is available on the NI website www.nusantarainfrastructure.com

2.10.2 Impact from MUN offices and staff commuting

A template for recording GHG emissions from MUN's subsidiary offices is shown in Table 2.3. It is concerned primarily with power usage and GHG emissions from staff commuting. Once the employee numbers, commuting distance and transport mode are known, the GHG emissions can be calculated using the standard CO2E figures per passenger kilometre for each transport mode provided in Table 2.4.

Table 2.3 GHG emissions from MUN subsidiary offices

Office	Area m2	Electricity usage kWh	No. Employees	Car Commuters	Motorcycle commuters	Public transport commuters
JLB Jakarta						
BSD Jakarta						
MMN Makassar		107,189.91				

Table 2.4 gCO_2E per passenger km for various transport modes

Transport mode	gCO_2e/passenger km
Petrol car <2,000 cc	135.45
Diesel car >2,000 cc	205.08
Diesel bus	45.45
Taxi	164.76
Motor cycle	41.57

2.10.3 MUN's Toll Road Users' Emissions

Traffic numbers, toll road length in kilometres and gCO2E per passenger km for the various transport modes determines the amount of GHG emissions in CO2 equivalent for the users of MUN's toll roads. In 2022 the users of MUN's toll roads in Jakarta, Banten and Makassar generated 119,015 t of carbon dioxide equivalent (CO_2E).

Chapter 3 POTUM Environmental and Social Audits 2022

3.1 Introduction

PT POTUM MUNDI INFRANUSANTARA (POTUM) was established in 2011 as a subsidiary of the Company (NI) to operate in the clean water treatment sector. The company currently manages and operates three water treatment plants: one in Tangerang, one in Serang and the third in Medan, North Sumatra. In 2012, POTUM successfully acquired 51% of the shares of both PT Tirta Bangun Nusantara (TBN) and PT Dain Celicani Cemerlang (DCC). Both of these companies were involved in the concessions of clean water treatment installation projects in Cikokol, Tangerang, Banten Province and Medan, North Sumatra Province, respectively.

In 2013, POTUM acquired 65% shares of PT Sarana Catur Tirta Kelola (SCTK), a concessionaire of clean water treatment and distribution in Serang, Banten. By 2018 Potum had increased its ownership of TBN to 99.99% and the Company, NI controls 99.99% of POTUM's shares.

At the end of 2022, POTUM was operating the following three water treatment plants (WTPs):

- PT Sarana Catur Tirta Kelola (SCTK), Serang, Banten
- PT Tirta Kencana Cahay Mandiri (TKCM), Cikokol, Tangerang, Banten
- PT Dain Celicani Cemerlang (DCC), Medan, North Sumatra.

All three WTPs follow strict HSE protocols compliant with Government of Indonesia regulations for WTP operation, international 'best practice' and NI's HSE guidelines.

3.2 PT Tirta Kencana Cahaya Mandiri (TKCM), Tangerang

Mr. Hubert Broux, the founder and initiator of PT Tirta Kencana Cahay Mandiri (TKCM), established a joint venture company to provide Refurbished, Uprate, Operate & Transfer (RUOT) services to PDAM Kabupaten Tangerang through his company, PT Enviro Nusantara (PTEN). On June 11th 2004 an agreement was signed for a period of 15 years between TKCM and *Persolaan Daerah Air Minum Tirta Kerja Baharga (PDAM TKB)* for the former to upgrade the Cikokol Water Treatment Plant under the RUOT framework and bring the plant's capacity up to 950 l/s; this was increased to 1,275 l/s by an amended agreement signed on September 20th 2011. PDAM invited TKCM to assist because prior to 2004, the plant's condition was very bad, the performance was very poor and there were numerous complaints from customers.

TKCM refurbished and uprated the WTP between November 2004 and June 2008, spending some Rp. 62.4 billion in the process and increasing the plant's capacity from 950 l/s to 1,275 l/s. So successful has the refurbishment and up-rating been, that the Cikokol Water Treatment Plant is considered to be the best in Indonesia, producing potable water in accordance with Minister of Health Decree Nr. 492/MENKES/SK/IV/2010.

Nusantara Infrastructure (NI) accepted an invitation from TKCM to enter into a joint venture to develop a leading water business company in Indonesia through the establishment of a Special Purpose Company (SPC) called PT Tirta Bangun Mandiri (TBN) in June 2012 and acquired 51% of the shares. By 2018 POTUM had increased its ownership of TBN to 99.99%.

TBN focuses on consultation, operation and distribution of clean water and waste management. TBN engages in clean water and waste water management in industrial areas, housing complexes, ports, oil and gas facilities, mining and integrated commercia estates (superblocks). A new 300 l/s water treatment plant was built within the TKCM Cikokol site by the end of 2019, bringing the total capacity of the plant to 1,527 l/s.

Site visits to audit the performance of the Cikokol plant were made as part of NI's Audit Committee remit on September 24th 2013, and then in November 2019 by NI's HSE team. A further visit was made on May 18th 2022 by Dr. Parry the Chief of NI's HSE Department.

In 2022, potable bulk clean drinking water was still being produced by the Cikokol plant but only being marketed as clean bulk water because of the distribution network contamination issues which were being addressed by PDAM but had not been resolved by the end of the year.

All complaints from customers were logged in the complaints Register and handled by TKCM's Grievance Mechanism team. Most concerned the quality and quantity of water being received but such issues are beyond the jurisdiction or capability of TKCM to resolve since they are caused by contamination and low water pressures issues in the PDAM-controlled distribution pipe network.

3.3 PT Sarana Catur Tirta Kelola (SCTK), Serang

3.3.1 Background

Operating in Cijeruk Village, Serang District, Banten, PT Sarana Catur Tirtakelola (SCTK) is a water company that specializes in water treatment plant operations and water distribution systems. On December 23rd 2013, PT POTUM acquired 65% shareholding in SCTK, with the remaining 35% owned by PT Lumbung Sumber Rejeki (LSR) which is the original / founding shareholder of the company.

On December 24th 2013, PDAM Kabupaten Serang granted SCTK an amendment to their Concession Agreement for water supply to industrial and business customers in Serang Timur, extending the concession period for a further 25 years until 2038 during which time, SCTK is expected to increase its WTP capacity from the current 60 liter/second (lps) to at least 375 lps.

During this stage, SCTK was already supplying and distributing water with a capacity of 60 lps to 103 industrial and commercial customers in the Cikande Industrial Estate in Serang Timur at a price of Rp. 8,500 per m^3, while the need and expectation is at least 5 to 6 times this or 375 lps and, moreover, the quality of water needed to be improved. There were a further 114 potential industrial and commercial customers in the industrial estate that do or will require a clean water supply in the near future. These include industries such as a steel foundry, oil and gas, agro-industrials, food products, starches and sweeteners, sea food products, animal feed, etc.

Therefore, PDAM Serang required SCTK to up-grade and up-rate its capacity and the quality of water supply to a rapid growing number of industries locating in the Serang Timur industrial area. In order to accomodate the above Agreement, SCTK would need to build and develop a water intake on Ciujung River, install a transmission row water pipe, construct a new water treatment plant with a minimum capacity of 250 lps capacity, up grade/up rate the existing water treatment plant to a minimum capacity of 125 lps, install transmission distribution pipes, the main distribution pipe and install secondary/tertiary distribution pipes and contigencies. The new intake with a capacity of 400 lps was designed and built by December 2015.

The construction of a new water treatment plant was completed between January 2016 and February 2017 when the new plant began operation to supply water to the expanded customer base in the Cikande Moderne Industrial Estate. The two 200 lps rated pumps are each supplying around 161 lps giving a total output of around 320 lps.

3.3.2 SCTK Audits

Three visits to the SCTK water treatment plant in East Serang were made between 2015 and 2017 by the NI Audit Committee. The first on April 4th 2015, the second on December 14th 2015 and the third on July 7th 2017 (site visit reports are archived with the Audit Committee). These visits by the Audit Committee were intended to review the WTP's overall technical and commercial operations and monitor progress on the construction of the Phase 2 expansion of the WTP to provide a further 150 lps capacity.

During those visits, issues relating to HSE, while noted were not prioritized. With the establishment of the HSE Department in NI and the universal requirement for rigorous HSE compliance in companies, a full HSE audit by the NI HSE Department was conducted in November 2018. This followed an independent HSE audit of the SCTK plant conducted in July 2018 by ESC (EnviroSolutions and Consultancy) based in Singapore and Jakarta on behalf of IIF (Indonesia Infrastructure Finance) who were looking at that time to invest in NI. The results of that audit were passed onto the newly established NI HSE Department and the concerns raised regarding HSE issues noted for action.

The first official HSE audit of the plant by the HSE Department was carried out on November 7th 2018 by Dr. D.E. Parry (Chief of NI HSE Department), Ir. Tri Nugroho (POTUM Technical Director with responsibility for HSE matters) and Pak Kemal Dinata, (POTUM representative on HSE Sub-Committee). Dr. Parry provided details of what the HSE priorities were to the SCTK management

team including the results of the ESC audit. Pak Tri and Pak Kemal were then taken by motorcycle to view the water intake and conduct an HSE audit paying particular attention to the ingress of debris from the river, the clearing of debris and the dangers posed to personnel working 8m below the top of the river bank where the intake is located. The team also examined the pipeline route from the intake to the plant looking at ease of accessibility and safety issues along the route.

At the same time, Dr. Parry conducted an HSE audit of the WTP Phase 2 plant concentrating on the handling of hazardous materials, especially chlorine-based disinfectants, the handling and disposal of sludge generated by the plant, the electricity supply, fire-fighting equipment and signage indicating hazards, obstacles and emergency protocols.

3.3.3 Hazardous materials

The primary hazardous material used at the plant is liquid sodium hypochlorite (NaClO) that is used to disinfect the water supply. The liquid was stored in polyethylene/fiberglass reinforced plastic (FRP) 500 l tanks located on a concrete base with open sides and a roof adjacent and below the flocculation, filtration and dosing tanks. Signage on the tanks was minimal and such signs as they are, appeared on one side of the storage area only. The ambient temperature of the storage area at 25 – 30^0C was over 10^0C above the ideal storage temperature (15^0C) and will hasten the decomposition of the NaClO, weaken its strength and encourage the build-up of oxygen gas.

A delivery of liquid sodium hypochlorite from the local supplier was observed during the visit and raised some serious concerns regarding the safety of the supplier's personnel. None had any form of personal protective clothing, in contrast to the SCTK staff member in charge of receiving the delivery and were at serious risk of injury from contact with the caustic liquid during transfer.

It was noted that there was no store for personal protective equipment near the liquid NaClO tanks and there was no alarm system in place in the event of a leak or spillage.

Poor PPE of vendors

Correct PPE for SCTK staff

Inadequate labelling of chemicals

In addition, the was no Material Data Safety Sheet (MSDS) for Sodium Hypochlorite or for Polyaluminium Chloride (PAC), the chemical in liquid form used as a coagulant at the plant and stored in Polyethylene/FRP tanks alongside the sodium hypochlorite.

To rectify this situation, the HSE Team drew up a list of 'priority actions' that the management of SCTK had to undertake immediately. These included contacting the local supplier of sodium hypochlorite and insisting that personnel delivering the product to the SCTK plant must, at the very minimum, be issued with protective gloves, hard hats, goggles, rubber boots and overalls otherwise they will not be allowed on the site since this would contravene NI's HSE protocols and SCTK would be liable in case of an accident and/or injury occurring.

Further priority actions included increasing and improving signage in and around the chemical storage area relating to sodium hypochlorite including a clear, concise summary of what to do in case of an incident such as a spillage, leak or fire occurring. All such signage must have strong visual impact, be easily read and prominently displayed, and be made from tough, weatherproof material. A simple alarm system with a siren should be installed close to the chemical storage area and activated by the person who first discovers an emergency such as a leak or spill from the tanks.

A storage cupboard to house two full sets of Personal Protective Equipment (PPE) including chemical goggles, full-face shield, full-face respirator, gloves (butyl or neoprene), chemically resistant overalls, and chemically resistant boots, needs to be built close to the chemical storage area.

3.3.4 General conclusions

The SCTK plant is a new state-of-the-art water treatment plant that has only been in operation for a year. The plant is well-designed, well-built and well-run but HSE has not been integrated fully into the design, build and operation. Many issues, most minor but one or two major ones

need to be addressed in order to bring the plant up to international 'best practice' standard and to comply with NI's HSE protocols. Fortunately, the 'benchmark' for NI is provided by TKCM's Cikokol water treatment plant at Tangerang. Since that site visit by the NI HSE team all the recommendations made have been implemented and HSE within the plant is considered to be on a par with that at the TKCM water treatment plant.

The expectations for SCTK business development in 2022 were not fulfilled due to the impact of the new Omicron covid variant and the war in Ukraine which had a negative impact on commodity and energy prices worldwide. Under these conditions in the water industry, it is the bulk commercial users that cut back on their water supplies as the business slows down. In contrast, supplies of water to residential areas tends to increase as a result of the pandemic as people stay at home more consuming more water. This situation means that POTUM's main source of revenue, the commercial users, is severely impacted while the low tariff paid for residential use fails to make up the difference even with the increased consumption.

The plans for SCTK in 2023 include further plant development through 'intensification' and 'extensification' involving the installation of new piping to allow looping and enhanced connectivity. Meanwhile, the greatly improved covid environment should enable the commercial bulk water users in the Moderne industrial estate to return to full capacity.

3.4 PT Dain Celicani Cemerlang (DCC), Medan

DCC holds exclusive rights for water treatment including to build, operate and manage the Water Treatment Plant (WTP) in the Medan Industrial Estate (*Kawasan Industri Medan* - KIM) with TBN's supervision. The WTP's source of raw water is the Deli River and will subsequently provide clean water to 153 factories in KIM. The 20-year cooperation agreement is under a Build Operate and Transfer (BOT) scheme.

Construction of the plant began in 2012 and it came into production on January 20th 2014 supplying 100 l/s of bulk water to KIM for sale to commercial customers in the industrial estate. Originally the plant was licensed to extract 1,000 l/s but this amount was never used so DG Water Resources (Jakarta) reduced the total extractable water to 500 l/s.

It is a conventional water treatment plant (WTP or *Instalsai Pengolahan Air Bersih*) that takes the water from an intake on the Deli River and delivers it to the plant via a 4.8 km long 450 mm diameter HDPE transmission pipeline that is buried at 1.5m depth alongside the industrial estate and public roads. The intake on the Deli River has 2 submersible pumps of 100 l/s capacity. The processes for treatment of the raw water include coagulation and flocculation using PAC or poly aluminium chloride, disinfection using sodium hypochlorite in granular form, sedimentation and filtration.

The plant has a capacity of 200 l/s but currently delivers 100 l/s due to the commercial conditions existing at the present time. The plant has sufficient area to be able to produce 500 l/s should the commercial, contractual and political conditions change for the better.

An environmental audit was carried out by NI's HSE Department between January 23rd and 24th, 2019. The results of the audit are included as Annex B to this report. The plant is professionally run and managed and although no major HSE issues were identified, a number of small things were apparent that needed to be rectified to comply with NI's HSE guidelines. Foremost among those was the signage and labelling of the chemicals used in the water treatment process and the lack of any Toxicity Characteristic Leaching Procedure (TCLP) analysis of the 'sludge' generated by the plant. Dr. Parry agreed to provide DCC with full details of the TCLP analyses required and the timing of the sampling. It was noted that waste water generated by the plant is recycled and used for backwashing the filters, a highly commendable and environmentally sound practice.

All recommendations made by the HSE audit team were addressed and fully complied with by the end of March 2019.

3.5 Measuring POTUM's Projects' Environmental Impact

The environmental impact of constructing and operating water treatment plants can be divided into three components. The first component involves the construction of the plant and the environmental footprint of the construction materials used such as cement, steel, plastic, glass and wood. The second component is the environmental impact, both physical and social, that the actual construction of the plant causes to the local surroundings and communities. The third component addresses the environmental impacts of operating the plant, especially in terms of GHG emissions generated.

At the macro-level the operation of a bulk clean water treatment plant has a very positive environmental impact on those communities in receipt of the clean bulk water and on the local physical environment by easing the pressure on local ground water resources in those areas that are connected to the piped distribution network. These positive aspects generally far out-weigh the negative impacts of using construction materials with a high carbon footprint and the generation of waste materials such as sludge that are treated according to government-approved HSE protocols.

3.6 POTUM's new projects in the pipeline

3.6.1 Develop SPAM in the service zone of Manado City with PDAM Manado

An MOU was signed between POTUM, AWK and PDAM Kota Manado in November 2021 to expand and upgrade the existing regional water supply system (SPAM) for Manado producing 1,422 lps to serve a population of 568,997 persons for the period 2024-2036. The current capacity is 800 lps. Consultants appointed by POTUM to carry out pre-feasibility studies began in early 2022 and was completed by May 2022. The Feasibility Study is currently assessing the use of non-chemical water treatment using membrane technology and reverse osmosis. Although more expensive than the conventional dosing of bulk water with chemicals, the environmentally friendly technology is being increasingly used as governments and water legislators continue to insist on potable water being produced by WTPs and Sustainable Development Goals (SDGs) being met.

3.6.2 Upgrade and expand existing PDAM Bitung WTP under BOT

MOU signed between POTUM, AWK and PDAM Kota Bitung on October 18th 2021 to increase current capacity at 200 l/s, to 400 l/s. Consultants appointed by POTUM to carry out pre-feasibility which were completed in February 2022/ The Feasibility Study is evaluating the use of membrane technology and reverse osmosis in lieu of chemical water treatment, as is the case with the larger Manado SPAM, discussed above.

3.6.3 DCC3 WTP acquisition Semarang, Central Java

DCC and KIW *(Kawasan Industri Wijaya Kusuma)* is in the process of acquiring a 50 lps WTP in Semarang to supply clean bulk water to KIW. POTUM expects to conclude the acquisition by the end of June 2023.

Chapter 4 EI Environmental and Social Audits 2022

4.1 Introduction

The Company established PT Energi Infranusantara (EI) in 2012 as a business entity engaging in the renewable energy management sector and owns 99.99% of the shares. In 2013, EI acquired 56.23% shares of PT Inpola Meka Energi (IME), a hydro-power development company and independent power producer (IPP). Through the acquisition, EI automatically became the owners of the 15 MW Lau Gunung hydro-power plant (PLTA) in Tanah Pinem, Dairi Regency, North Sumatra that has been operating commercially since December 16th 2020.

In 2018 EI acquired 80% ownership of *PT Rezeki Perkasa Sejahtera Lestari (RPSL)*, a 15 MW PLTBm (Biomass Power Plant) located in Mempawah, Pontianak, West Kalimantan.

4.2 Lau Gunung 15 MW Mini-Hydro Plant, North Sumatra

Located in Tanah Pinem, Dairi Regency, North Sumatra, the 15 MW Lau Gunung hydro-power plant (PLTA) provides renewable electricity to the people of North Sumatra through a commitment entered into by IME with PT PLN (Persero) the national producer and distributor of electricity throughout Indonesia.

The first HSE audit of the Lau Gunung site in 2019 was carried out by the international Tunneling Consultant between November 16th and 17th 2019. The audit was based on a HSE Questionnaire that was prepared by Dr. D.E. Parry, Chief of NI's HSE Department. The result of the audit indicated a very poor HSE culture at PT Sulindo, the contractor, and prompted IME to hire a Health and Safety and Quality Assurance Supervisor for the Lau Gunung site who would be on-site for the duration of the project construction and beyond to project operation. The supervisor, Pak Risman, arrived on site in late November and immediately began a thorough check of the site's health, safety and environmental issues using the latest November HSE audit as a guide. The results of the audit questionnaire are included as Annex C of this report.

A site visit to evaluate the status of Lau Gunung's construction and HSE issues following the results of the HSE Questionnaire was carried out by Dr. Parry and Mr. Charly Espanola, a Director on NI's BOD, on February 11th and 12th 2020. As a result of the tunnel construction difficulties identified by the international tunneling consultant Mr. Terry Crouch and the poor performance of the tunnel contractor, NI set up a Lau Gunung Oversight Committee chaired by Dr. D.E. Parry to supervise the consultants and contractors and make recommendations for improving

performance to meet the commercial operation delivery (COD) date. All Oversight Committee meetings were minuted and an example of these minutes is included in Annex D.

IME submitted the first official environmental management and environmental monitoring report, *Laporan Pelaksaan Upaya Pengelolaan Lingkungan Hidup (UKL) dan Upaya Pemantauan Lingkungan Hidup (UPL)* for Semester I 2020 (Januari – Juni) to the environmental agency at Sidikalang in September 2020, some three months before commercial operations began. Reporting has continued through 2021 and 2022, with the Semester I report being submitted in …….. and Semester II scheduled for submission in February 2023.

In all cases, the impact of the project on water quality and air quality is minimal and measurements of suspended solids and chemical parameters for the water and the air are all well below the threshold levels given by the government.

The project has an active CSR program that includes a 15 ha plot of land that could support a tree-planting program and social support for local communities through NI's Nusantara Care Program.

4.3 RPSL 15 MW Biomass Plant, Pontianak, West Kalimantan

On August 16th 2018 NI purchased 80% of the shares of *PT Rezeki Perkasa Sejahtera Lestari (RPSL),* an Independent Power Producer (IPP) operating the biomass electricity plant *(Pembangkit Listrik Tenaga Biomasa - PLTBm)* located at Siantan, Mempawah, West Kalimantan Province some 15 km northwest of Pontianak, the capital of the province. The site is sited by the left bank of the Kapuas River together with a line of other industrial ventures. The nominal potential capacity of the plant is 15MW, with 13.5 MW sold to PLN. The power is fed directly into the grid network *(Gardu Induk),* locally called the *Katulistiwa* Network. The remaining 1.5 MW of power produced is used to run the plant. Besides being the first biomass power plant in West Kalimantan, Siantan PLTBm is also one of the company's business strategies in developing its portfolio in the field of new energy and renewables.

A site visit to the plant was made to the plant on July 18th 2018 by Dr. D.E. Parry, then the NI Independent Commissioner and Prof. Dr. Scott Younger, NI Technical Director, to assess the operation of the plant and comment on its viability and competence. Dr. Parry also took the opportunity to assess the HSE status of the plant and its operation.

The PLTBm, which began operations on April 23rd 2018, uses gasification technology, namely a boiler with a water tube and burns fuel (feedstock) derived from a variety of sustainable sources including oil palm kernels *(cangkang)*, rice husks *(sekam padi)* sawdust *(serbuk gerjagi)*, waste wood *(limbah kayu)*, wood chips *(serpilih kayu)*, tree choppings *(kayu dari Hutan Rakyat)*, coconut husks, oil palm fibre *(serabut),* sugarcane stalks *(ampas tebu),* maize husks *(tongkol jagung)* and wood pellets *(pelet kayu)*. Feedstock totalling some 300 – 400 tonnes is delivered daily to the plant by trucks. In addition, some 12,000-15,000 tonnes of waste kernel *(cangkang)* is supplied

each month in 3,000 ton lots by small vessels tying up at the shoreside jetty/pontoon arrangement.

A continuous feedstock supply (24/7 for +350 days/year) is essential for a biomass plant. Stronger 'guarantees' in the current feedstock supply agreements (FSA) should be explored and consideration given to the plant owning 20-30% of the feedstock supply.

The actual fabric of the plant consists of the following main elements for its 24/7 operation:

- Weighbridge inside entrance
- Stockpiles for different types of biomass waste
- Equipment to reduce large feedstock to feed in size (wood chipper) and linked to conveyor feed belts
- One steam turbine linked to transformer with grid connection and monitored controls
- 4 boiler units – monitored
- 3 feed pumps, with 2 in operation at any one time; pumps rotated on 2-weekly basis
- Water cooling system with 3 floating pump intakes with 10 lps capcacity taken from the river (surface water). This goes into water treatment plant (WTP). The system is one involving recirculation and top up from the river for losses in cooling function. No discharge is required.

Steel frame sheds on deep piled foundations and reinforced concrete foundations and dividing walls

In 2019, the second year of operation for Siantan PLTBm and the first year in full operational mode from January to December, the performance exceeded management targets. After a few months the power plant was operated more efficiently as the cost of fuel tended to fall. The total energy sold to PT PLN *(Pesero)*, was greater than the annual production in the of 10 MW in the Power Purchase Agreement (PPA) due to high energy demand in West Kalimantan.

In the later part of 2022, the price of oil palm kernels rose significantly, forcing RPSL to reduce the proportion of palm kernels in the feedstock mix to < 15%, replacing it with oil palm fresh fruit bunch (ffb) and a higher proportion of wood sourced from nearby sustainable forests *(Hutan Rakyat)*.

RPSL plans to increase plant operating efficiency in 2023 by promoting an automation program prioritizing the use of one compressor for the feedstock and installing gas and dust collectors to minimize the loss of heat and dust to the air thereby increasing operating efficiency. At the present time, electricity produced by RPSL costs <Rp. 850/kWh generated.

HSE is managed by a dedicated HSE team that reports regularly to the NI HSE Department via Zoom and/or Teams applications and submits its RKL/RPL 6-monthly semester reports to the Pontianak environmental agency for review and approval. All health, safety and environmental

parameters including air and water pollution attributable to the plant's operation are well below the threshold levels set by the government.

Issues of a social or economic nature such as complaints raised by local people living in the vicinity of the plant are registered and acted upon by the HSE team. To date, complaints are few and often concern matters that are not related to the plant's operation and are beyond RPSL's ability and jurisdiction to alleviate.

4.4 Measuring EI's Projects' Environmental Impact

Of all NI's business units, EI is demonstrably the one with the strongest 'green' credentials since its mission is to develop energy from renewable sources. At the present time, those sources include hydro and biomass, but solar and wind energy are being considered where conditions are technically and commercially feasible.

As a producer of renewable energy through its 15 MW mini-hydro powerplant, Lau Gunung in North Sumatra, and its biomass plant 15 MW biomass power plant in Pontianak, West Kalimantan, EI's carbon footprint is very low, limited to the relatively small GHG emissions due to on-site operations such as the use of diesel-powered back-up generators.

The assessment of GHG emissions from the full 'lifecycle' of hydropower involves two main sources: first, direct and indirect emissions associated with the construction of the plants; second, emissions from decaying biomass from land flooded by hydro reservoirs. Since the Lau Gunung 15 MW mini-hydro power plant is a run-of-the river scheme that involves no storage, there are no GHG emissions from flooded biomass. The only GHG emissions that can be attributed to the plant are those from its construction and day-to-day operations which are minimal, consisting mainly of emissions from staff commuting to site.

Because of repeated delays, the construction period was spread over four years but there were long periods when there was no construction. The main environmental impacts caused by construction and the ensuing delays were felt socially and economically through disruption to local employment at the site delays in the supply of electrical power to nearby communities. Once constructed and operational, there is no monthly electricity bill to pay since the hydro plant produces its own electricity from the !5 MW output.

When the GHG emissions during construction are factored in, research has shown that for hydropower plants in cold climates, a typical GHG emissions factor is 15g CO_2 equivalent/kWh, which is 30 – 60 times less than the factors of usual fossil fuel generation[3] but this is generally for

[3] Greenhouse gas emissions from hydropower: The state of research in 1996, Gagon, L. and Van de Vate, J.F. Energy Policy, Volume 25, Issue 1, January 1997, pp. 7-13

large hydro schemes of >500 MW. A small run-of-the river scheme like Lau Gunung, is likely to have a much lower emissions factor.

With biomass power production, the metrics are very different to hydropower. The burning of biomass, like the burning of fossil fuels, releases carbon dioxide ($CO_{2)}$ to the atmosphere; however, the plants that are the source of biomass for energy capture almost as much CO_2 through photosynthesis while growing as is released when the biomass in burned, which can make biomass a carbon-neutral energy source. However, the combustion of biomass is not a particularly efficient method of producing power because of the low calorific value of biomass compared with coal, oil or gas. Put simply, it takes much more biomass to produce a kWh of electricity than fossil fuels, with biomass emitting 230g of CO_2/kWh on a life cycle basis, four times less than the 1,011g of CO_2/kWh produced from coal combustion. (U.S. Energy Information Administration, 2021).

The RPSL biomass plant which uses gasification technology, namely a boiler with a water tube, is capable of burning multiple types of biomass including crushed oil palm kernels *(cangkang)*, rice husks *(sekam padi)* sawdust *(serbuk gerjagi)*, waste wood *(limbah kayu)*, wood chips *(serpilih kayu)*, tree choppings *(kayu dari Hutan Rakyat)*, coconut husks, oil palm fibre *(serabut),* sugarcane stalks *(ampas tebu),* maize husks *(tongkol jagung)* and wood pellets *(pelet kayu)*. For the past year the biomass has come from two main sources: oil palm kernels and sustainably produced round wood logs from the local Community Forest *(Hutan Rakyat)*.

The GHG emissions from the plant's chimney stack are analysed every six months and the results sent to the local government environmental agency. To date, all pollutants are below the government's permitted threshold limits.

Calculating the GHG emissions from operational projects has two main elements: the first involves the calculation of GHGs from staff commuting to site and electrical power usage on site, and the second, the calculation of GHG emissions from materials used on the project and emissions from the actual operation of the project.

The GHG emissions from the operation of the RPSL biomass plant will come from the trucks that deliver the feedstock to the plant on a daily basis and from the combustion of the biomass which will release CO_2 into the atmosphere via the boiler smokestack. These emissions are measured and reported to the local environmental monitoring agency every six months.

But since the company operates renewable energy plants that run on hydropower and biomass, there is a positive amount of carbon that can be offset against the negative amount of carbon produced by the operations of toll roads, water treatment plants and renewable energy plants. The operation of EIs two renewable energy plants results in 131,779 t CO2E avoided GHG emissions each year with Lau Gunung contributing 53,824 t and RPSL 77,955 t. In other words, to produce the same amount of electrical power from generating stations using fossil fuels, would consume 131,779 t CO2E. In 2022, the company's offices, projects and operations produced a total of 120,020 t CO2E and qualifies as carbon positive to the amount of 11,759 t

CO2E. This situation is likely to continue for the next four years or thereabouts when carbon neutrality will only be achieved by increasing our renewable energy output or instigating a tree-planting program to offset GHG emissions

Chapter 5 NI's Greenhouse Gas (GHG) Emissions 2022

5.1 Introduction

The scientific evidence is unequivocal that mankind's excessive use of fossil fuels to power the world economy has driven up the levels of CO_2 and other GHGs in the atmosphere and caused average global air temperatures to rise beyond the level expected from natural variation. Unless drastic action is taken in the next decade to dramatically reduce fossil fuel consumption and achieve net zero carbon emissions by 2050, at the latest, the temperature increase will exceed 1.5^0C and possibly reach 3-5^0C by the end of the century, a temperature range last experienced on the Earth in the mid-Pliocene epoch some 3.3 - 3 million years ago, and one that would make parts of the planet uninhabitable.

Any use and release of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) is required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

The requirement for more effort on behalf of companies to reduce their GHG emissions is intensifying internationally and locally among governments and financial institutions that lend money for development projects. The year 2021 represented an important watershed in the fight to bring down GHG emissions worldwide by <1.5^0C of the pre-industrial level, as agreed at the Paris climate conference in 2015. In August 2021 the IPCC published its 6^{th} Assessment Report on climate change. In addition, in November 2021, the city of Glasgow in Scotland, UK hosted the COP26 meeting. Unfortunately, the meeting was meant to get the 196 world governments to pledge sufficient cuts in GHG emissions to make this <1.5^0C target possible, namely 7% per year for the next 20-years; it failed to achieve this largely through the intervention of China and India. The result of this failure will be to accelerate the desire of other governments, industries, corporations, financing agencies and individuals to cut GHG emissions and decarbonize the environment.

In 2022, the urgency to take action on climate change is greater than ever and was a major theme at the G-20 summit held in Bali in November 2022. Indonesia has set an unconditional target to reduce emissions by **29**% and a conditional target assisted by international financial aid to reduce emissions by **41%** with Business as Usual (BaU) by 2030. At the Sustainable Finance for Climate Transition Roundtable, a side event at the G-20 summit, Indonesia Finance Minister, Sri Mulyani, said that Indonesia's forestry might be able to exceed the emission reduction target by the government in the nationally determined contributions (NDC).

Running in parallel with the G-20 Summit was the COP 27 UN Climate Summit being held in Sharm El-Sheik, Egypt which, once again, was unable to secure fresh commitments to cut GHG emissions from the biggest economies. Th only agreement reached among the 200 countries participating was for providing poor countries for the first time with financial assistance known as loss and damage. The fund will be set up by rich governments for the rescue and rebuilding of vulnerable areas stricken by climate disaster. However, there is no agreement yet on how much money should be paid in, by whom and on what basis, a formula for doing nothing.

The Summit was widely judged a failure on efforts to cut carbon dioxide, after oil-producing countries and high emitters weakened and removed key commitments on greenhouse gases and phasing out fossil fuels.

It is against this international climate change backdrop that NI has pledged to reduce its greenhouse gas emissions as a key part of its **Go Green** Infrastructure initiative.

5.2 Background

The calculation of the GHG emissions from all NI's projects is required under current Indonesian environmental regulations but it is an issue that is fraught with complexity, opacity and inaccuracy. There are numerous computer models and spreadsheets claiming to calculate a company's or a project's GHG emissions in tons of CO_2 equivalent per year. What all these models have in common, apart from providing a false impression of accuracy, is the need for an extensive team of researchers to mine a company or project's data relating to personnel, materials purchase, fossil fuel consumed over time and utilities like electricity purchased. This is a luxury that very few companies, especially small and mid-sized outfits, can afford. Nonetheless, an effort must be made to provide a reasonable approximation GHG emissions to be calculated over a year that is applicable to NI's operations nationwide.

The calculation was begun in 2021 and started with NI's head office on the 38th Floor of Equity Tower in the Sudirman Central Business District (SCBD) and was expanded to cover some of NI's operational projects. The rationale, methodology and results of the 2021 survey are discussed in the 2021 NI GHG Emissions Report. The survey was expanded in 2022 to cover more of NI's

projects but still falls short of covering them all. Nonetheless, the relatively small GHG footprint from

GHG emissions fall into three basic categories:

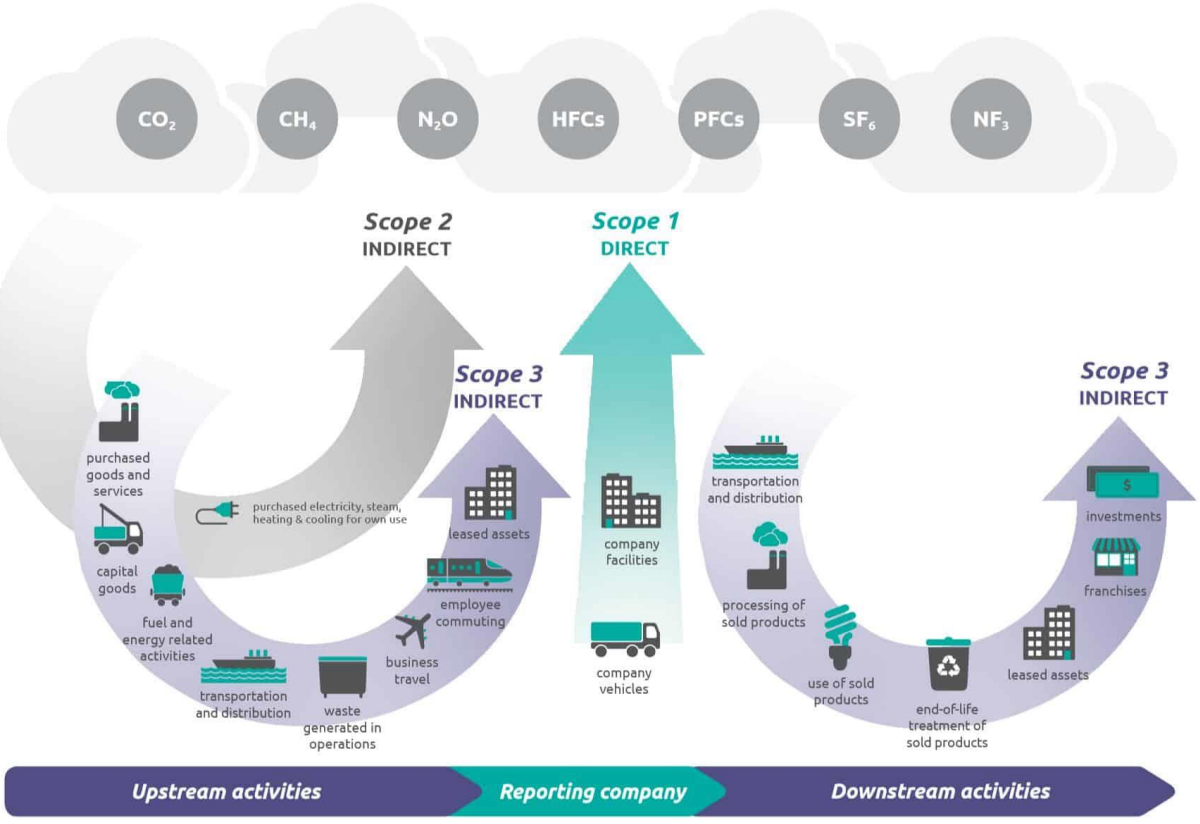
1 **Direct Emissions** from the activities of an organization or under their control. Including fuel combustion on site such as gas boilers, fleet vehicles and air-conditioning leaks.

2 **Indirect Emissions** from electricity purchased and used by the organization. Emissions are created during the production of the energy and eventually used by the organization.

3 **All Other Indirect Emissions** from activities of the organization, occurring from sources that they do not own or control. These are usually the greatest share of the carbon footprint, covering emissions associated with business travel, procurement, waste and water.

The various sources of GHG emissions are shown diagrammatically in Figure 5.1

Figure 5.1 Sources of GHG emissions



As a developer and operator of toll roads, water treatment plants and renewable energy plants including mini-hydro and biomass facilities, NI maintains a number of offices to manage its various businesses and related projects. The Company's carbon footprint, is defined by the total amount of greenhouse gases (GHG), especially carbon dioxide (CO_2) that is generated by all these activities. But since the company operates renewable energy plants that run on hydropower and biomass, there is a positive amount of carbon that can be offset against the negative amount of carbon produced by the operations of toll roads, water treatment plants and renewable energy plants.

The operation of EI's two renewable energy plants results in 131,779 t CO2E avoided GHG emissions each year with Lau Gunung contributing 53,824 t and RPSL 77,955 t. In other words, to produce the same amount of electrical power from generating stations using fossil fuels, would consume 131,779 t CO2E. In 2022, the company's offices, projects and operations produced a total of 120,020 t CO2E and qualifies as carbon positive to the amount of 11,759 t CO2E. This situation is likely to continue for the next four years or thereabouts when carbon neutrality will only be achieved by increasing our renewable energy output or instigating a tree-planting program to offset GHG emissions. A summary of NI's GHG emissions from Head Office and the operations of its three Strategic Business Units (SBUs), MUN, POTUM and EI, is shown in Table 5.1.

Table 5.1 Summary of NI's GHG Emissions 2019 – 2022

Employee commuting CO_2Et	**2019**	**2020***	**2021**	**2022**
Car	980	595	371	684
Motorcycle	172	103	65	120
Public transport	191	45	72	133
Office electricity usage kWh/yr	224,189	171,714	128,109	156,914
NI's toll road users CO_2Et	130,000	101,000	94,022	119,015

* Estimate based on traffic volumes

ANNEX A

BSD TOLL ROAD AUDIT 2014 MINUTES

P.T. NUSANTARA INFRASTRUCTURE Tbk AUDIT COMMITTEE

SITE VISIT REPORT TO BSD TOLL ROAD

Thursday, August 21st 2014

Team members:

Dr. D.E. Parry (DEP - Chairman Audit Committee)
Hartopo Soetoyo (HS - Member)
Tufrida Hasyim (TH - Independent member)
Tavip Santoso (TS)
Dahlia Evawani (DE Hon. Dec., Corporate Sec.)
Yusrizal (Y - Internal Audit team)

Itinerary:
TS, DE and Y DEP left the NI office at 0900 hours in an 'Alphard' Silver Bird rental car to meet the rest of the Audit Team at the office of PT BSD in Serpong at 0930 hours. The team was met by Pak Purwoto, BSD Managing Director, Ir. Dani Hendrawan, Operational Manager, S.S. Yuliati Asriningsih, Deputy Managing Director, Ir. Teguh Haryono, Head of Engineering and Maintenance and Ir. Aan Subhan, Head of Procurement. A 'Power Point' presentation on the impact of the opening of JORR W2 on BSD *(Dampak Terkoneksinya Jalan Tol W2 dengan Yol Jakarta-Serpong)* was given by Pak Purwoto, Pak Hendrawan and Ibu Yuliati; copies of this presentation were provided to members of the Audit Committee and a print out of the presentation is included as an Appendix to this site visit report.

Following the presentation and a question and answer session, the team was taken by Pak Purwoto in a BSD mini-bus on a tour of the toll road, first to the north towards Pondok Aren to look at the area that is subject to deep (>60 cm) flooding during periods of heavy rainfall, The team returned independently to the NI Office by JLB transport at 1730 hours.

Background to BSD

The BSD toll road connecting Pondok Aren with Bumi Serpong Damai (BSD) is 7.25 km in length and was opened in 1999. From Pondok Aren a Jasa Marga section of toll road connects Pondok Aren with Pondok Ranji to the east and continues to the beginning of the JORR 1 toll road at Pondok Pinang. PT Nusantara Infrastructure Tbk became shareholders in the BSD toll road in 2008 with the majority share holding under PT Margautama Nusantara at 89 percent.

Traffic Volumes 1999 – 2014

The volume of traffic using the BSD toll road has increased steadily over the 15 years that the toll road has been open from a modest 4,659 vehicles per day (vpd) in 1999, to 85,039 vpd in 2013. The first six years of operations saw traffic volumes increase by an average of 40 percent per year up to 2005 when 34,133 vpd were recorded. This growth was closely linked to the nearby expansion in housing and office space that was occurring in the adjacent satellite towns of Bumi Serpong Damai and Bintaro Jaya. Vehicles numbers continued to increase substantially between 2006 and 2008 by an average of 18.3 percent per year but slowed down to 5 percent in 2009, probably as a result of the impact of the world-wide financial crisis that started in 2008, the year that PT Nusantara acquired the majority share holding in the BSD toll road. Traffic numbers picked up again in 2010 and 2011 by 9 and 14 percent, respectively.

In 2012, the year PT BSD completed the third lane of the toll road in both directions, daily traffic numbers averaged 79,233 vpd and surpassed 85,000 vpd in 2013, a year on year increase of 7 percent.

Although traffic volumes were expected to rise by 5 – 7% in 2014 in line with the expansion of BSD City, Bintaro Jaya and the increase in car ownership among the middle and upper income groups that live in those cities the opening of the JORR W1 section between Ciledug and Meruya Utama in late December 2013 appears to have had a negative impact on traffic numbers; for the first seven months of 2014 average daily traffic was reduced to 68,974 vpd, a decrease of 19% on the 2013 traffic. This decrease is particularly severe in vehicle categories Golongan I, II and III, saloon cars, small and medium-sized trucks, many of which choose more convenient alternative routes offered by the opening of JORR W1 and, most recently JORR W2. Despite this reduction in traffic and revenue, the prospects for the BSD toll road remain attractive given the future plans for expansion in the region.

Macro-environmental Assessment BSD

The planned growth in middle class housing, office space and retail facilities the area, especially the expansion of BSD City by another 6,000 ha including the development of integrated commercial and education centres containing Unilever, Freeport and the University of Atmajaya and further expansion in Bintaro Jaya and Alam Sutra, bodes well for the future of the BSD toll road which is an important conduit for access to all three areas. Of particular importance in terms of additional traffic and revenue, will be the completion of the Serpong – Balaraja toll road that will link BSD with the Jakarta – Merak toll road at Balarja, passing through Legok and Tiga Raksa Selatan on the way as shown in Figure 1. The increase in commercial vehicles, especially trucks travelling from Java to Merak port, will be especially acute since the vehicles will be able to bypass Jakarta altogether.

A further important toll road link from Serpong to the airport at Soekarno-Hatta via Kunciran is planned to be operational by 2016. The completion of this toll road will provide travellers coming from the east and south of Jakarta with a second toll road alternative to the international airport that avoids the notoriously congested Inner City Toll Road. The first alternative, the JORR W2 link between Ulujami and Ciledug, was opened in late July 2014 but its impact has yet to be re3croded in the BSD traffic figures.

BSD Operation and Management

PT BSD operates an open system *(sistem terbuka)* for toll revenue collection whereby each vehicle pays a tariff according to the class of vehicle *(golongan)* on entering the toll road. All transactions at the toll booths, both tariff collection and vehicle classification and recording, have been fully automated and computerized. Cash collection is handled by Bank Mandiri and the operation is insured.

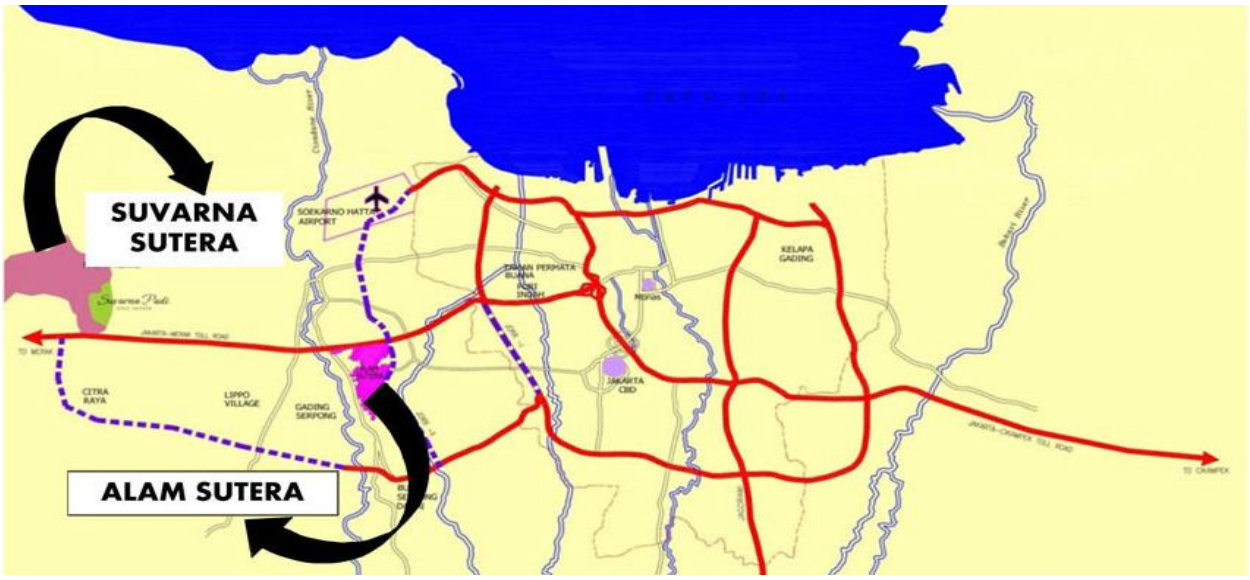


Figure 2 Planned Serpong – Balaraja and Serpong – Soekarna Hatta Toll Roads

Condition of Physical Assets

Overall, the condition of the physical assets of PT BSD such as the toll booths and plazas, the operations office and its vehicles and the physical infrastructure of the toll road (flyovers, bridges, pavement, hard shoulders, fencing, signage and lighting) is good. The toll gates and plaza at Pondok Aren has recently been refurbished.

Flooding

The major problem for the operators is the frequency of flooding on one section of the toll road near the bridge over the Sungai Cibenda. Although PT BSD has installed pumps to cope with the flood water and improved the roadside drainage, flooding still occurs after very heavy rain although the water is generally shallow enough to permit cars to pass but the flooding does cause tail-backs. Particularly severe flooding occurred along this section in February to a depth of more than a metre which resulted in the toll road being closed for half a day.

Inspection of this one kilomtre section of toll road by the Audit Committee team indicated the main cause of the flooding to be the under-capacity of the River Cibenda that crosses the toll road. While the twin culverts under the toll road appear to be large enough (2 x 4 x 1.5 m), the stream banks on the east side have slumped badly restricting the width of the channel, and on the north side a retaining wall impedes the flow of the stream. Once water overtops the river banks and reaches the toll road it is directed towards a lock-pit and the nearby Anke river by roadside drainage channels which are too small for the volume of water. Once in the lock-pit, the water is pumped into the Anke River via a 12 inch diameter PVC pipe. The fact that the road floods for a number of hours during heavy rain suggests that the drainage channels, the pump and the PVC pipe are too small to cope with the volume of water. A second pipe was installed but does not reach the river.

A hydraulic and flooding study of the area was carried out for NI by ITB in 2013 that made a number of short-term, medium-term and long-term recommendations to resolve the flooding problem which included building a 600 m long concrete barrier on either side of the flooded section of the toll road to retain the floodwater and increase the pumping capacity; the creation of artificial ponds to store the

floodwater prior to pumping, increasing the existing pumping capacity and finally, opening a channel from the Sungai Cibenda to the nearby and larger Sungai Angke.

It is strongly recommended that this phased approach is implemented by NI and the results monitored before consideration is given to the very expensive option of raising that particular 1 km section of toll road by a metre or more. Although flooding is a nuisance and does result in tailbacks and potential revenue loss as motorists choose to avoid the section, the reality is that the toll road is closed for no more than one day on average per year due to flooding.

Toll Revenues

In 2013 toll revenues averaged approximately Rp. 428,000,000 per day compared with Rp. 397,000,000 per day in 2012, and increase in revenue of 7.8 percent. Gross profit in 2013 was Rp. 96.9 billion and operating profit Rp. 89.5 billion.

The daily revenue from the toll road for the first eight months of 2014 at Rp. 485 million, is higher than the average daily revenue of Rp. 439 million for 2013 despite the decrease in traffic volume mainly because of the tariff increase that occurred early in 2014.

Dr.D.E. Parry, 18.09.14.
Chairman Audit Committee

ANNEX B
DCC MEDAN HSE AUDIT 2019

SITE VISIT REPORT TO PT DAIN CELIANI CEMERLANG (DCC) WATER TREATMENT PLANT, MEDAN, NORTH SUMATRA

WEDNESDAY – THURSDAY JANUARY 23RD & 24TH 2019

PARTICIPANTS: D.E.Parry; Tri Nugroho; Yudha

ITINERARY: Departed GA184 at 09.00 hours and arrived Medan 11.25 hours. 15:00 – 17:30 hours at DCC plant; Thursday 08:00 hours to DCC plant until 14:30 hours then return to Jakarta on GA191 leaving Medan at 17.00 hours, arriving Jakarta at 19.25 hours.

DCC STAFF INTERVIEWED:

Ir. Ahmad Syarif Harahap, Plant Manager
Ir. Bambang Sugeng M, Assistant Plant Manager
Ir. Sartika Sari QA Supervisor

BACKGROUND

The DCC Water Treatment Plant, located at Jalan Pulau Tidore KIM Tahap 3 in Medan, is a Build Operate Transfer (BOT) plant between PT (Persero) Kawasan Industri Medan (KIM) and PT Dain Celicani Cemerlang (DCC). Construction of the plant began in 2012 and came into production on January 20th 2014 supplying 100l/s of bulk water to KIM for sale to commercial customers in the industrial estate. Originally the plant was licensed to extract 1,000 l/s but this amount was never used so DG Water Resources (Jakarta) reduced the total extractable water to 500 l/s.

It is a conventional water treatment plant (WTP or *Instalsai Pengolahan Air Bersih*) that takes the water from an intake on the Deli River and delivers it to the plant via a 4.8 km long 450 mm diameter HDPE transmission pipeline that is buried at 1.5m depth alongside the industrial estate and public roads. The intake on the Deli River has 2 submersible pumps of 100 l/s capacity.

The processes for treatment of the raw water include coagulation and flocculation using PAC or poly aluminium chloride, disinfection using sodium hypochlorite in granular form, sedimentation and filtration. The main purpose of the visit was to conduct an HSE audit of the plant to ensure compliance NI's HSE Department's HSE Manual and Guidelines which are based on those of the World Bank and the International Finance Corporation (IFC).

WTP TOUR

Ir. Ahmad S. Harahap, the Plant Manager, welcomed the HSE team and introduced the DCC management team. Ir. Tri from POTUM and Dr. Parry explained the purpose of the visit and provided details of what the HSE priorities were to the DCC team. The Pak Ahmad then gave a brief outline of the plant's history, current production and trading conditions including the problems encountered with the 'water make up' and the 'take and pay' contract with KIM. The NI audit team were then taken on a tour of the WTP.

The plant is professionally run and managed and although no major HSE issues were identified, a number of small things were apparent that need to be rectified to comply with NI's HSE guidelines. Foremost among these is the signage and labelling of the chemicals used in the water treatment process and the lack of any Toxicity Characteristic Leaching Procedure (TCLP) analysis of the 'sludge' generated by the plant. Dr. Parry agreed to provide DCC with full details of the TCLP analyses required and the timing of the sampling (see Annex B attached to this report). It was noted that waste water generated by the plant is recycled and used for backwashing the filters, a highly commendable and environmentally sound practice.

HAZARDOUS MATERIALS

Three chemicals are used at the plant during the process that are considered to be potentially hazardous. They are granular sodium hypochlorite (NaClO) that is used to disinfect the water supply; poly aluminium chloride (PAC) in powder form used for flocculation and sodium carbonate (Na_2CO_3) or soda ash granules used to adjust the bulk water pH. The chemicals are stored and carefully stacked in a large, well ventilated and well-lit room but are either poorly labelled or not labelled at all.

A few of the 50 l polyethylene/fiberglass reinforced plastic (FRP)barrels containing the sodium hypochlorite granules have a 'corrosive warning' label on them but there is no clear signage indicating what the barrels contain. Similarly, with the PAC sacks and the soda ash. The 500 l red tanks where the chemical solutes are stored prior to 'dosing' are also missing any signage indicating the name of the chemical or its hazardous nature. THIS SITUATION MUST BE RECTIFIED IMMEDIATELY. The SCTK plant in Serang signage can be used as a guide.




It was noted that there was no store for personal protective equipment near the chemicals although the warning notice on the wall indicated the need for PPE (Personal Protective Equipment). Although the plant has Materials Safety Data Sheets (MSDS) for the chemicals provided by the suppliers, these were not posted on the walls near the chemicals.

ACTION REQUIRED BY DCC - IMMEDIATE

- Address all signage issues for chemicals and post the MSDS forms on the walls of the chemical storage area. Refer to the example from the SCTK water treatment plant at Serang shown on the left. Probably best to laminate the six or so A4 sheets before posting on the wall to protect from the elements.

- There should be a clear, concise summary of what to do in case of an incident such as a spillage, leak or fire occurring. All such signage must have strong visual impact, be easily read and prominently displayed, and be made from tough, weatherproof material.
- A simple alarm system with a siren should be installed close to the chemical storage area and activated by the person who first discovers an emergency such as a leak or spill from the tanks.

- There needs to be cupboard in the chemical storage area at the end farthest away from the chemicals to house at least one full set of Personal Protective Equipment (PPE) including chemical goggles, full-face shield, full-face respirator, gloves (butyl or neoprene), chemically resistant overalls, and chemically resistant boots.

HANDLING AND DISPOSAL OF SLUDGE

The water treatment plant operations especially the sedimentation and flocculation processes produce sludge that is stored temporarily in open sludge tanks before being disposed of by local contractors.

According to environmental law in Indonesia, enshrined in the AMDAL process, sludge generated by water treatment and waste treatment plants must be tested regularly to determine the chemical composition and potential toxicity of the sludge before being disposed of either in an approved sanitary landfill site, or as a soil amendment for farmland. A standard Toxicity Characteristic Leaching Procedure (TCLP) test is required that can be carried out by a number of laboratories in Medan. The tests determine whether the waste is toxic i.e. contains above the permitted levels of heavy metals (such as lead, arsenic, chromium and cadmium), organophosphates, and hydrocarbons, and whether the waste is ignitable, corrosive or reactive. No such tests have been carried out to date on DCC sludge.

ACTION REQUIRED BY DCC - IMMEDIATE

- Sample sludge every 6 months and send to local certified local laboratory to undertake an TCLP test as described in Annex B to this report.

GENERAL CONCLUSIONS

The DCC plant is a small conventional water treatment plant taking water from the Deli River and delivering to the plant via a 4.8 km long 450 mm diameter HDPE transmission pipeline that is buried at 1.5m depth alongside the industrial estate and public roads. The plant has a capacity of 200 l/s but currently delivers 100 l/s due to the commercial conditions existing at the present time. The plant has sufficient area to be able to produce 500 l/s should the commercial, contractual and political conditions change for the better.

The plant is well run and only relatively minor adjustments need to be made to comply with NI's HSE standards and protocols as discussed above. However, overall the site, rather than the plant, looks a little run-down and needs some tidying up especially in the open spaces and along the paths and access road. Some re-painting is required, especially of the DCC sign on the side of the building as shown below.

Dr. D.E. Parry, Chief Health, Safety and Environment Department, NI

January 28th 2019

ANNEX C
LAU GUNUNG HSE STATUS QUESTIONNAIRE 2019

LAU GUNUNG H&S QUESTIONNAIRE

PART 1 GENERAL

ACCESS TO SITE:

LOCATION: LAU GUNUNG VILLAGE, DAIRI DISTRICT, NORTH SUMATRA

ROUTE: MEDAN TO Lau Gunung DISTANCE KM 145 TIME: 5.6 hrs

ROAD CONDITION: ASPHALT/GRAVEL NO. LANES ……

…… TO …… DISTANCE KM …….. TIME ……

ROAD CONDITION: ASPHALT/GRAVEL NO. LANES ……

…… TO LAU GUNUNG DISTANCE KM …… . TIME: ……

ROAD CONDITION: ASPHALT/GRAVEL NO. LANES ……

NEAREST EMERGENCY SERVICES TO LAU GUNUNG: .....

EMERGENCY VEHICLE ACCESS TO SITE: GOOD/FAIR/POOR

IF POOR, REASONS: The road is slippery when raining and landslides frequent during heavy rain; should only drive in daylight hours.

AT SITE:

FIRST IMPRESSIONS:

APPEAR WELL MANAGED/MODERATELY WELL MANAGED/POORLY MANAGED

APPEAR NEAT AND TIDY/MODERATELY TIDY/UNTIDY

APPEAR SAFE/MODERATELY SAFE/UNSAFE/HAZARDOUS

IF UNSAFE OR HAZARDOUS CITE REASONS:

Access roads to tunnel portal areas active landslide zone

PERSONNEL HEALTH & SAFETY ON SITE:

DO SITE STAFF HAVE ADEQUATE AND APPROPRIATE PPE?: YES/NO

IF NO, LIST MISSING PPE: Caps lamps and reflective jackets; no breathing apparatus

ARE THERE DANGEROUS WORKING ZONES AND CONDITIONS ON-SITE? E.G STEEP SLOPES, UNSTABLE GROUND, TUNNELS, CONFINED SPACES ETC YES/NO

IF YES, LIST AREAS: steep slopes not fenced off; no warning signage; very poor ventilation in confined spaces

USE AND STORAGE OF HAZARDOUS MATERIALS

WHAT HAZARDOUS MATERIALS ARE USED AND STORED ON SITE?

EXPLOSIVES/fHYDROCARBONS/ACIDS/ALKALIS

ARE HAZARDOUS MATERIALS STORED PROPERLY? YES/NO

LABELLED CLEARLY AND APPROPRIATELY? YES/NO

ARE WORKERS HANDLING MATERIALS, E.G. EXPLOSIVES CERTIFIED TO DO SO? YES/NO

IS THERE AN EMERGENCY RESPONSE PLAN IN PLACE IN CASE OF ACCIDENTS INVOLVING HAZARDOUS MATERIALS? YES/NO

USE OF HEAVY PLANT ON-SITE

IS HEAVY PLANT USED ON SITE: YES/NO

IF YES, LIST THE PLANT: Excavators, loaders, trucks.

ARE WORKERS CERTIFIED TO USE HEAVY PLANT? YES/NO

WORKER WELFARE

IS THERE OFFICE AND TEMPORARY HOUSING AND CANTEEN FACILITIES ON-SITE? YES/NO

IS THE OFFICE, MESS HALL AND TEMPORARY ACCOMMODATION AIR-CONDITIONED? YES/NO

ARE THERE MEDICAL FACILITIES ON-SITE? YES/NO

IF YES, LIST ……

……

……

IS THERE A TRAINED FIRST-AIDER ON-SITE? YES/NO

HOW MANY SHIFTS ARE WORKED? 2 x 12 hours x 7 days (tunnel only); other civils by PP 8 hour shift x 7 days

WHAT IS THE LENGTH OF THE SHIFTS IN HOURS? 12 hours tunnel and 8 hours other civils work on surface

HOW MANY REST PERIODS DO THE WORKERS HAVE AND WHAT LENGTH OF REST PERIOD?

One (1) hour

WHAT IS THE DISTANCE TO THE NEAREST CLINIC IN KM AND TIME? 8 km 15 minutes

WHAT IS THE DISTANCE TO THE NEAREST HOSPITAL IN KM 30 AND TIME 1.5 hours

IS THERE A 'STANDBY' VEHICLE FOR USE IN EMERGENCIES PERMANENTLY ON-SITE? YES/NO

ARE THE TELEPHONE NUMBERS OF KEY PERSONNEL AND AGENCIES SUCH AS THE EMERGENCY SERVCIES CLEARLY POSTED THROUGHOUT THE WORK SITE IN CASE OF AN INCIDENT? YES/NO

LAU GUNUNG H&S QUESTIONNAIRE

PART 2 SPECIFIC FOR TUNNELLING

EMERGENCY PLANNING

IS THERE AN EMERGENCY REPSONSE PLAN FOR TUNNELLING OPERATIONS? YES/NO

IN THE EVENT OF FIRE, FLOODING, TUNNEL COLLAPSE, PERSONNEL INJURY, HOW IS THE INCIDENT REPORTED AND WHAT PROCEDURES ARE FOLLOWED?

SIREN/KLAXON - H&S OFFICER INFORMS RESCUE TEAM(S) - EMERGENCY SERVICES - CONTRACTORS HEAD OFFICE

ARE EVACUATION PROCEDURES IN PLACE? YES/NO

IS THERE AN EMERGENCY ASSEMBLY POINT? YES/NO

IS BASIC MEDICAL TREATMENT (FIRST AID) AVAILABLE ON-SITE? YES/NO

WHERE IS THE NEAREST CLINIC? Heborig HOSPITAL? Etarina

IS A VEHICLE (4-W-D) PERMANENTLY AVAILABLE ON-SITE FOR EMERGENCIES? YES/NO

ARE EMERGENCY PROCEDURES TESTED ON-SITE YES/NO

IF YES, HOW FREQUENTLY? ……

I**NCIDENTS THAT CONSTITUTE AN EMERGENCY – FIRE, FLOOD, SPILLAGE, EXPLOSION, COLLAPSE**

ARE THERE SPILL KITS ON-SITE? YES/NO

ARE THERE FIRE EXTINGUISHERS ON-SITE? YES/NO

ARE THERE EARLY WARNING SYSTEMS E.G. FIXED GAS MONITORS OR SMOKE DETECTORS ON-SITE? YES/NO

IS THERE A TAG BOARD SYSTEM INPLACE TO CHECK ON WORKERS ENTERING AND LEAVING THE TUNNEL? YES/NO

IS THERE ONE PERSON(S) DESIGNATED AS THE TUNNEL SAFETY OFFICER? YES/NO

IS THE WORKPLACE SITE PLAN CLEARLY DISPLAYED? YES/NO

DOES THE SITE PLAN SHOW WHERE FIRE PROTECTION AND FIRE-FIGHTING EQUIPMENT IS STORED? YES/NO

SHOW THE LOCTION OF EMERGENCY EXITS, ASSEMBLY POINT AND EMERGENCY TELEPHONE NUMBERS? YES/NO

IS APPROPRIATE RESCUE EQUIPMENT (E.G. LIFTING GEAR, BACK-HOE, FRONT-END BUCKET LOADER) IN CASE OF TUNNEL COLLAPSE) AVAILABLE ON-SITE? YES/NO

ARE 'RESCUERS' COMPETENT TO USE THE RESCUE EQUIPMENT? YES/NO

CAN YOU RELY ON LOCAL EMERGENCY SERVICES FOR ASSISTANCE WITHIN A SUITABLE TIMEFRAME? 15 minutes approx. YES/NO

HAS A COPY OF THE EMERGENCY PLAN BEEN PROVIDED TO THE EMERGENCY SERVICES? YES/NO

HAVE THE EMERGENCY SERVICES BEEN INVOLVED IN A TRIAL RESCUE? YES/NO

COMMON HAZARDS AND RISKS ASSOCIATED WITH TUNNELLING WORK

CONFINED SPACES WITH BUILD-UP OF GAS AND FUMES

IS THERE A SUITABLE VENTILATION AND DUST EXTRACTION SYSTEM IN PLACE? YES/NO

ARE ATMOSPHERIC CONDITIONS IN THE TUNNEL MONITORED/MEASURED? YES/NO

IS BREATHING APARATUS (SELF-CONTAINED SELF-RESCUERS SCSRs) AVAILABLE? YES/NO

IS ADEQUATE PPE AVAILABLE FOR TUNNEL WORKERS? YES/NO

IF NO, WHAT ITEMS ARE MISSING? Caps/helmet lamps, reflective clothing

ROCK FALLS

IS THE TUNNEL INSPECTED REGULARLY? YES/NO

IS MECHANICAL SCALING AND BOLTING CARRIED OUT AS APPROPRIATE? YES/NO

IS GROUND SUPPORT WITH OVERHEAD PROECTION (WHERE APPROPRIATE) INSTALLED? YES/NO

IS WORK CARRIED OUT FROM AN ELEVATED PLATFORM? YES/NO

IS AN ELEVATED WORK PLATFORM BASKET USED? YES/NO

ARE AREAS THAT REQUIRE SUPPORT, PROPERLY SUPPORTED? YES/NO

FAILURE OF FLOOR OR ROADWAY

IS A HARD FLOOR PROVIDED WITH ROADWAY SURFACING? YES/NO

IS ADEQUATE DRAINAGE PROVIDED FOR THE HARDFLOOR OR ROADWAY? YES/NO

HIGH WATER AND MUD INFLOW

HAVE OLD DRILL HOLES BEEN GROUTED? YES/NO

HAS PRE-GROUTING BEFORE EXCAVATION BEEN CARRIED OUT? YES/NO

IS GROUT INJECTED AHEAD OF THE WORK FACE? YES/NO

ARE ADEQUATE PUMPS AND DRAINAGE SYSTEMS INSTALLED FOR DEWATERING? YES/NO

IS A LIMIT SET ON MAXIMUM PERMITTED HEIGHT OF WATER AND/OR MUD FLOW DURING WORK E.G. LESS THAN BOOT HEIGHT? YES/NO

GAS INRUSH

CAN EXISTING VENTILATION AND EXTRACTION SYSTEM BE INCREASED IN THE EVENT OF AN INRUSH OF GAS? YES/NO

ARE CHECK VALVES USED WHEN PROBING DRILL HAZARD AREAS? YES/NO

ARE GAS MONITORS INSTALLED? YES/NO

IS SMOKING PROHIBITED IN TUNNEL AREAS? YES/NO

BASED ON EXPERIENCE TO DATE, WHAT IS THE PROBABITY OF FINDING A FLAMMABLE ATMOSPHERE IN THE TUNNEL? HIGHLY LIKELY/LIKELY/UNLIKELY/VERY UNLIKELY

IF LIKELY, IS AUTOMATIC PLANT CUT OFF AND FLAME PROOFING PLANT IN PLACE? YES/NO

FALLS FROM HEIGHT

ARE GUARD RAILS USED ON WORKING PLATFORMS AT HEIGHT? YES/NO

ARE FALL ARREST SYSTEMS IN PLACE? YES/NO

IS ADEQUATE PPE PROVIDED AND USED E.G. HARNESSES AND CARABINERS? YES/NO

IN CASE OF LOSS OF LIGHTING, IS THERE EMERGENCY BACK-UP YES/NO

ARE WORKERS PROVIDED WITH CAP/HELMET LAMPS? YES/NO

MOVING PLANT – ISOLATE AND RESTRICT CONTACT WITH MOVING PLANT

ARE AUDIBLE PLANT REVERSING SYSTEMS USED? YES/NO

ARE SPOTTERS USED FOR VEHICLE MOVEMENTS? YES/NO

IS THERE A SYSTEM TO WARN WORKERS WHEN PLANT IS REVERSING OR SPECIAL LOADS LIKE EXPLOSIVES ARE BEING MOVED? YES/NO

MANUAL TASKS LIKE HANDLING AIR TOOLS, DRILL ROADS, CUTTERS ETC.

WHERE FEASIBLE, IS THE LIGHEST PLANT AND EQUIPMENT SELECTED? YES/NO

ARE LIFTING AIDS AVAILABLE ON-SITE? YES/NO

IS VIBRATION INSULATION ON THE HANDLES OF AIR TOOLS INSTALLED? YES/NO

IS EQUIPMENT WITH AUTOMATIC FEED LIKE DRILLING JUMBOS AVAILABLE? YES/NO

IS TRAINING IN LIFTING AND HANDLING PROCEDURES PROVIDED? YES/NO

HEAT STRESS AND NOISE

IS THE USE OF HIGH HEAT OUTPUT PLANT MINIMISED? YES/NO

CAN VENTILATION BE INCREASED? YES/NO

ARE AIR-CONDITIONED OFFICES, CANTEENS, REST ROOMS AVAILABLE ON-SITE? YES/NO

IS COOL DRINKING WATER AVAILABLE ON-SITE? YES/NO

IS PLANT INSULATED TO REDUCE NOISE LEVELS? YES/NO

ARE PLANT ENGINES SILENCED TO ACHIEVE A NOISE LEVEL NOT EXCEEDING LAeq (Level A-weighted equipment) 85 dbA AT 1m? YES/NO

DUST, HAZARDOUS CHEMICALS

CAN FAN EXTRACTION RATE BE INCREASED? YES/NO

ARE WATER SPRAYS USED ON CUTTING EQUIPMENT OR OVER SPOIL HEAPS? YES/NO

ARE SAFETY DATA SHEETS PROVIDED FOR HAZARDOUS CHEMICALS? YES/NO

ARE CHEMICAL SPILL KITS AVAILABLE? YES/NO

IS APPROPRIATE PPE AVAILABLE IN CASE OF CHEMICAL SPILLAGE OR FIRE? YES/NO

ELECTRICITY

ARE HAZARD REDUCING DEVICES LIKE CUT-OUT, EARTH-LEAKAGE AND ISOLATING DEVICES AVAILABLE ON-STE? Earth wires but no isolation system YES/NO

ARE BACK-UP POWER SUPPLIES TO CRITICAL SYSTEMS LIKE VENTILATION, PUMPING, EMERGENCY LIGHTING AND FIRE-FIGHTING SYSTEMS AVAILABLE? YES/NO

FIRE OR EXPLOSION, FLAMMABLE GASES AND VAPOURS

HAVE ALL IGNITION SOURCES UNDERGROUND BEEN ELIMINATED WHERE PRACTICABLE? YES/NO

HAVE ALL FUEL SOURCES BEEN ISOLATED FROM POTENTIAL IGNITION SOURCES? YES/NO

ARE ATMOSPHERIC CONDITIONS IN THE TUNNEL MONITORED/MEASURED? YES/NO

IS ONLY NECESSARY FUEL STORED UNDERGROUND? YES/NO

ARE FIRE-FIGHTING TRAINING PROCEDURES IMPLEMENTED? YES/NO

IS SMOKING RESTRICTED TO DESIGNATED AREAS? YES/NO

IS A 'HOT WORK' PERMIT SYSTEM USED? YES/NO

WORK PLACE SECURITY AND VISITORS

ARE OFFICES, PARKING AND DELIVERY AREAS LOCATED AWAY FROM HAZARDOUS AREAS? YES/NO

ARE HAZARDOUS AREAS ISOLATED WITH PERIMETER FENCING, BARRICADES, SCREENS, BARRIERS OR HAND-RAILS? YES/NO

ARE HAZARD WARNING LIGHTS INSTALLED WITH SIGNS, MARKERS OR FLAGS? YES/NO

CAN PLANT BE IMMOBILISED AND FUEL DISPENSERS LOCKED? YES/NO

DRILL AND BLAST – USE OF EXPLOSIVES

WHAT RESTRICTIONS ARE IN PLACE WITH REGARD TO THE USE OF EXPLOSIVES?

No restrictions but a licensed charger on-site; no barricades at the portals

IS A COMPETENT CERTIFIED SHOTFIRER HANDLING THE EXPLOSIVES ON-SITE? YES/NO

IS ONLY SUFFICIENT EXPLOSIVE FOR IMMEDIATE USE TRANSPORTED TO THE WORKING FACE? YES/NO

IS ALL ELECTRIC PLANT SWITCHED OFF AND REMOVED FROM AREA BEFORE CHARGING? YES/NO

ARE EXPLOSIVES TRANSPORTED TO SITE IN A SPECIAL-PURPOSE CLEARLY MARKED VEHICLE? YES/NO

ARE EXPLOSIVES STORED IN A CONTROLLED, SAFE AND SECURE ENVIRONMENT? YES/NO

WITH THE THREAT OF A THUNDERSTORM IS CHARGING WITH ELECTRIC DETONATORS STOPPED AND THE WORK FACE EVACUATED? YES/NO

Audit performed by Mr. Terry Couch on November 17th 2019

ANNEX D
LAU GUNUNG OVERSIGHT COMMITTEE MEETING

MINUTES FEBRUARY 11TH 2020

LAU GUNUNG OVERSIGHT COMMITTEE MEETING MINUTES

DATE: Tuesday 11th February 2020

VENUE: Borneo Meeting Room, PT Nusantara Infrastructure, Tbk., 38th Fl. Equity Tower, Sudirman Central Business District (SCBD), Jl. Jend. Sudirman Kav. 52-53 Lot 9, Jakarta 12190

PURPOSE OF MEETING: Review of progress on construction of the tunnel 2020, the equipment, materials, methods and timing for completion by April 2020

ATTENDEES:

Bpk Ramdani Basri	President Director NI Head of Oversight Committee
Bpk Danni Hassan (DH)	Director NI, member Oversight Committee
Bpk Amadeus N. Bejec (ANB)	Financial Director, NI
Bpk Charly G. Espanola (CGE)	Director NI (joined by televideo conference)
Dr. D.E. Parry (DEP)	Chairman Oversight Committee
Bpk Adrianto Januri (AJ)	NI Director (DH) Special Team member
Bpk Ridwan Irawan (RI)	Director NI, Oversight Committee member
Ibu Mirza Imada Z (MIZ)	NI Head of Legal Affairs
Bpk Alverno Soenardo (AS)	President Commissioner IME
Bpk Agus Choliq (AC)	President Director, IME
Bpk Irham Hadiansyah (IH),	Business Development Manager, PPE
Bpk Sri Hartawan Indri (SHI)	IME, CFO
Ir Gumbert Maylolo P (GMP)	IME Lau Gunung Site Manager
Bpk Taufik Anwar (A)	SPT, Director SPT and Owner
Bpk Angga Satriadi (AS)	PP, Site Engineer Manager
Bpk Soo Dong Oh (SDO)	SPT, Tunnel Engineer

The meeting was chaired by Dr. D.E. Parry and opened at 10.15 am.

1. Pak Hartawan (SHI) introduced the IME team and the participants from SPT and PP
2. Pak Agus Choliq (AC) gave a PowerPoint presentation outlining the latest work plan and work schedule for completing the tunnel, including concreting, shotcreting and grouting, by the end of April 2020. Following the presentation, the floor was opened for discussion.
3. As per latest update, the tunnel boring breakthrough is expected to be completed on Saturday, February 15th, 2020. The expected timeline has been agreed amongst IME (as the project owner), PTPP (main contractor), and SPT (sub-contractor of tunnel specialist).

Note: The expected completion of tunnel construction is by April 30th, 2020. This includes all the required works, such as shotcreting, concreting, backfill foam and grouting tunnel lining.

4. Based on point number 3 above, IME is expected to commence its full operation by July 2020. The commissioning operation is expected to start from May until June 2020.

   Note:

   - *IME to circulate the latest updated presentation material prepared by PTPP and SPT to the Oversight Committee; which has been presented during the meeting on February 11th, 2020.*
   - *The deadline of IME's COD set by PLN is by January 21st, 2021.*

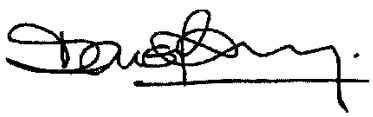
5. **Contractor guarantee.** IME has a contractual document with the contractors regarding the project's contractor guarantee. Worst case, if there's a failure in the construction, IME is able to claim the compensation to the contractors up to the maximum amount of the project cost (refers to the construction contract with the contractors); the ratio is 1-to-1.

4. **Chain of command and reporting.** There was a discussion point regarding the chain of command and reporting between the international engineer expert (which is currently hired by IME) and the Oversight Committee and/or the other parties (i.e. NI as the indirect shareholder of IME). In summary, NI Management Team to review the current chain of command and reporting and later on to decide the most "optimized" line of command and reporting; which ultimately will give "comfort" and a win-win solution to all parties.

5. DEP gave a presentation summarizing the status of tunneling at December 9th 2019, the date of the last Lau Gunung Oversight Committee meeting. The presentation outlined the poor response of the contractor to the recommendations to improve tunnel construction performance and quality, including the production of a weekly construction progress report.

6. **Request from the Oversight Committee to IME.** A periodically update on the planned activities and targets. Oversight Committee requested the report is made on a weekly basis and highlighting the tunnel construction progress which is considered as the most critical work. The draft template including the Key Performance Indicators (KPIs) based on the latest SPT schedule, will be circulated by the Oversight Committee to be approved by IME.

The meeting was closed by the Chairman at 12.15pm



(Dr. David E. Parry, Chairman)