

**EIS prepared in accordance with PNG, international and industry standards and best practice**

- The Wafi-Golpu Environment Impact Statement (EIS) was been prepared based on PNG guidelines, policy and law and relevant international standards. These included:
  - International Council on Mining and Metals (ICMM) Sustainable Development Framework
  - Voluntary Principles on Security and Human Rights
  - The International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability
  - Equator Principles III

Chapter 3 of the EIS sets out in detail the Legal, Policy and Administrative Framework relevant to the Project. Wherever international standards are relevant to the EIS, they are cited in the relevant chapter.

**Tailings management solutions studied according to international best practice**

- The WGJV has studied tailings management solutions for the Wafi-Golpu Project according to international best practice. These studies have been independently verified as being in accordance with appropriate industry professional standards. The comprehensive study outcomes are presented in the Environmental Impact Statement (EIS - [www.wafigolpujv.com/eis](http://www.wafigolpujv.com/eis)), submitted to the State of PNG in June 2018, and have been assessed by CEPA, subject to an extended public review process, undergone three scientific Independent Peer Reviews, and evaluated by an independent expert Environment Council as part of the rigorous assessment process defined under the *Environment Act (2000)*.
- On-land Tailings Storage Facilities (TSF) for the Wafi-Golpu Project have been studied since 1993 and have included an extensive assessment program of 45 potential sites at a cost of over PGK15 million. This assessment is summarised in Chapter 7 of the EIS and provides the evaluation for the four best options that were progressed through Pre-Feasibility and Feasibility studies as appropriate.
- The feasibility assessment of TSF options has applied global best practices of the respective Australian and International guidelines according to the recognised Committee on Large Dams (ANCOLD and ICOLD), together with the ICMM Tailings Management Guidelines (2016) and appropriate IFC Performance Standards (2012). In addition, the WGJV has had individual studies verified by internationally recognised Competent Independent Reviewers and has had the overall assessment independently verified as being in accordance with appropriate industry professional standards.

**DSTP solution consistent with ICMM Principle and IFC Guidelines**

- The International Council of Mining and Metals (ICMM) allows for the consideration of alternative tailings management options based on a rigorous environmental and social impact assessment.
  - **ICMM Principle 6. Environmental Performance:** *“Riverine tailings, freshwater lake and/or shallow marine tailings disposal may be considered only if deemed to be the most environmentally and socially sound alternative, based on an objective and rigorous environmental and social impact assessment of tailings management alternatives.”*  
<https://www.icmm.com/mining-principles/6>
- The International Finance Corporation (IFC), which reflects the general requirements for lender institutions, similarly requires a rigorous

assessment of environmental and social considerations to inform the selection of a Deep Sea Tailings Placement (DSTP) option.

- **IFC Environmental, Health and Safety Guidelines MINING:** *“If and when DSTP is considered, such consideration should be based on detailed feasibility and environmental and social impact assessment of all tailings management alternatives, and only if the impact assessment demonstrates that the discharge is not likely to have significant adverse effects on marine and coastal resources, or on local communities.”*  
<https://www.ifc.org/wps/wcm/connect/595149ed-8bef-4241-8d7c-50e91d8e459d/Final%2B-%2BMining.pdf?MOD=AJPERES&CVID=jqezAit&id=1323153264157>

### ***DSTP not banned by ICMM, the IFC or Australia***

- Claims that ICMM, the IFC and Australia bans DSTP are incorrect.

DSTP is not banned in Australia. As in Papua New Guinea, any DSTP proposal would need regulatory approval after going through an Environmental Impact Assessment process.

The practicality of DSTP varies based on differing geographical and environmental conditions. Conditions in Australia are very different to conditions in Papua New Guinea. Firstly, Australia has an extensive continental shelf that can extend for tens to hundreds of kilometers from shore and is also relatively shallow and with a gentle slope, whereas Papua New Guinea has very deep water close to the coast. The Markham Canyon in the Huon Gulf is one of the world’s deepest near-coastline marine canyons. Secondly, Australia has relatively low rainfall and low seismic activity that makes on-land tailings dam management more technically feasible and economic, especially since most mines are also remote from the coast. In contrast, many areas of Papua New Guinea have high rainfall and high seismicity.

## ***PNG Draft DSTP Guidelines in line with international best practice (ICMM and IFC)***

- The State of Papua New Guinea has developed Draft DSTP Guidelines (SAMS 2010) that are consistent with international best practice (ICMM and IFC) and similarly require (Section 3.1.1(2):
  - *“A full evaluation of all waste management options must be carried out to ascertain whether DSTP is the BEST option for dealing with tailings waste. The environmental impact statement (EIS) and supporting studies should compare DSTP with other land based options to ascertain the relative environmental and social impacts/risks from DSTP and other tailings disposal options.”*

**London Convention:** The London Convention and Protocol are focused on dumping of specified wastes at sea, and do not apply to land-based aspects like deep sea tailings placement (DSTP) as proposed for the Wafi-Golpu Project.

## ***DSTP is the safest and most environmentally and socially responsible tailings management solution for the Wafi-Golpu Project***

- The WGJV commenced detailed DSTP studies in 2016 after identifying significant safety, environmental and social risks with on-land TSF options, especially in relation to the high seismicity, liquefiable soils and high rainfall. DSTP actually has a higher up-front cost compared to TSF due to the capital investment.
- The WGJV’s evaluation of a DSTP option has been undertaken in accordance with the DRAFT DSTP Guidelines for PNG and this concluded that DSTP is the safest and most environmentally and socially responsible tailings management solution for the Wafi-Golpu Project for the duration of its operations and beyond mine closure.

## ***Independent Peer Reviewers have confirmed WGJV has met the requirements of the Draft DSTP Guidelines for PNG***

- As part of the rigorous Environmental Assessment of the EIS, CEPA engaged three Independent Peer Reviewers (IPR). This included the internationally recognised specialist multi-disciplinary DSTP expertise of the British Geological Survey (BGS) in collaboration with the Scottish Association of Marine Sciences (SAMS), who authored the original 2010 Draft DSTP Guidelines for PNG.
- The WGJV has gone beyond international and PNG best practice by continuing its oceanographic investigations over the past four years and presented updates to CEPA, the Environment Council and the Prime Minister’s October meeting that confirmed the EIS prediction’s and that DSTP is the most responsible tailings management solution for the Wafi-Golpu Project.

**WGJV is committed to complying with all requirements under the Environment Act**

- The WGJV looks forward to constructively participating in any further regulatory processes under the *Environment Act* and remains confident that our international standard engineering and scientific studies clearly demonstrate that DSTP is the safest and most environmentally and socially responsible tailings management solution for the Wafi-Golpu Project.

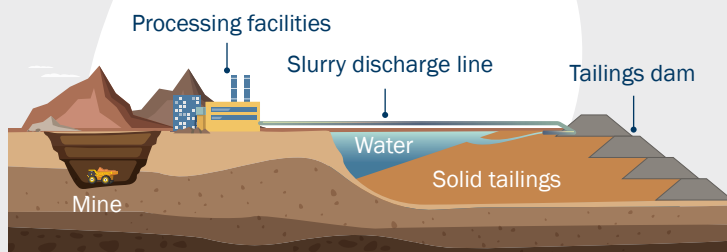
## **The Huon Gulf's unique features allow for environmentally sound DSTP**

- The WGJV has monitored currents in the Huon Gulf now for 4 years and these currents, together with detailed bathymetry, help to inform the DSTP model predictions, which is that the tailings footprint will be along the axis of the Markham Canyon with no deposition above 200m depth.
  - The Markham Canyon is an ideal location for DSTP as it forms a continuation of the Markham River and transports significant amounts of natural river sediment into very deep water. The amount of tailings contributed to the Huon Gulf will form less than 20% of the existing natural sedimentation. The Markham Canyon does not host high biodiversity or fisheries because of the significant natural sediment transport down this conduit to very deep water, including through regular submarine landslide events that scour the canyon.
  - The completion of data collection and modelling for DSTP related studies was undertaken in accordance with the Draft General Guidelines for DSTP in PNG. In addition, the WGJV chose to apply the more stringent ANZECC/ARMCANZ\* guidelines to assess potential impacts to water quality and marine species arising from the subsea disposal of tailings
- \* Australian and New Zealand Environment and Conservation Council/ Agriculture and Resource Management Council of Australia and New Zealand*
- The DSTP system is not predicted to affect people's livelihood. The EIS studies predict no affect on the coastal environment, productive surface waters, community health or fisheries.
  - The tailings pipeline through Lae poses no specific harm to the community and is similar to the existing buried sewerage and infrastructure pipelines beneath the road network.
  - The Concentrate Storage Facilitate at the Port of Lae has a purpose-built water treatment plant to achieve PNG water quality criteria at the point of discharge.

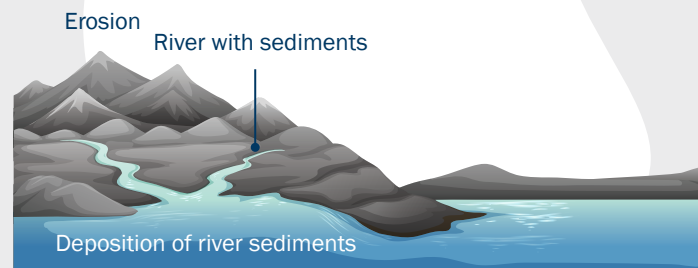
## The Wafi-Golpu Joint Venture is confident that DSTP is the safest and most environmentally and socially responsible tailings management solution for this project

Tailings are what is left after the copper and gold are removed from crushed ore rock. When the ore is brought up out of the mine to the process plant, it is mixed with water and ground down to the consistency of fine sand in the turning mills. The valuable minerals are separated from the rest of the ground rock and made into a concentrate. The left over fine sand-like material is referred to as tailings, which then needs to be stored in a safe and environmentally sustainable manner. This information sheet explains why Deep Sea Tailings Placement, or DSTP, is the leading environmentally sustainable option for tailings storage at Wafi-Golpu.

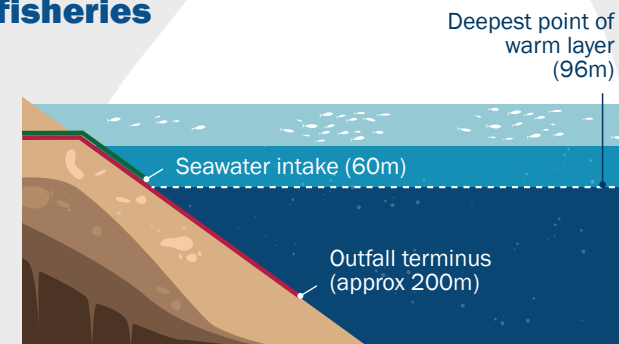
### Traditional land-based tailings storage at Wafi-Golpu poses significant risks



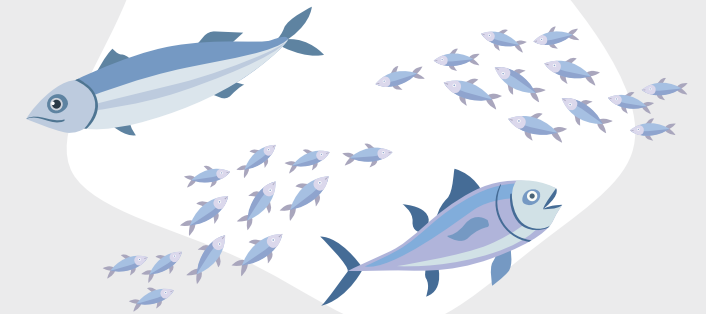
### The Huon Gulf – unique features allow for environmentally sound DSTP



### DSTP will not impact the productive surface waters or fisheries



### No cyanide to be used in ore processing at Wafi-Golpu – Huon Gulf fish will be safe to eat



Many factors need to be taken into account when considering an option such as a tailings dam, including site geology, topography, soil conditions, earthquake or seismic risk, climatic conditions, environmental, social and cultural setting, the nature of the tailings and legacy provisions. Some tailings disposed of on land can produce acid and release heavy metals if exposed to oxygen – a process which cannot occur underwater.

The land area required to store the tailings would result in a large disturbance footprint of between 4.2 and 33.75 square kilometres depending on total storage volume and embankment height. This disturbance footprint would cover areas which could have both high environmental, social and cultural values, as well as require the displacement of communities and their livelihoods.

45 potential sites have been examined and assessed for their suitability and they all involve significant risks and constraints. Risks are present due to the high seismicity, liquefiable soils and high rainfall of the region. Papua New Guinea is one of the most seismically active regions in the world. Many of the possible sites have active geological faults which would intersect the dam walls presenting considerable seismic risk.

Even after mine closure a land-based dam would require ongoing management and maintenance over a long period.

Near the city of Lae and further east, numerous rivers enter the Huon Gulf, discharging large quantities of rocks, gravel, sand, silt and clay into the ocean. As a result, there are no coral reefs in this area.

Below sea level in the Gulf, the sea floor plunges steeply into the 700-metre-deep Markham Canyon. The canyon is a continuation of the Markham River with coarse sediment flowing along the bottom of the ocean. The sediment that deposits on the flanks of the canyon builds up, becomes unstable and slides down the steep slope into the canyon via a naturally occurring submarine landslide.

The floor of the canyon does not have clear water suitable for most fish life and lacks biodiversity because of the river material. Very little sea life can exist because the ongoing dynamic sediment transport down the canyon creates a hostile environment, together with the periodic submarine landslides.

The tailings from Wafi-Golpu are predicted to settle to the sea floor and mix with the sediment discharged from the local rivers. It will be mixed with the river sediment and represent only a small percentage (<20%) of the total sediment flow in the area.

Tailings from Wafi-Golpu DSTP will not affect the warm upper layer of the ocean that is biologically productive and used by local fisherman. The ocean in the Gulf has layers which do not mix with each other under any seasonal conditions. The warm layer containing most of the biological production ceases at 96 metres below the surface, well below the level at which local fishermen catch their fish.

Wafi-Golpu DSTP would use a pipeline to transport tailings to a depth of approximately 200 metres below the surface. This is below the maximum mixed layer depth, where there is no upwelling and the dense tailings slurry is prevented from rising up into the less dense and warmer layer of the ocean. Prior to delivery to the ocean, the tailings are diluted with sea water extracted from over 60 metres in depth, and any small bubbles in the tailings are allowed to escape, further ensuring there is nothing in the tailings to carry them upward.

After exiting the pipe, around 60% of the tailings would flow like a river down the sea floor slope to the bottom of the Markham Canyon, where they will mingle with the river sediments and ultimately be buried by the river materials. The remaining 40% are predicted to form plumes well below the surface at a depth of 300 to 500 metres before they too deposit at depth.

The separation of valuable minerals from ground rock is achieved by frothing the ore using compounds similar to detergents. No cyanide is to be used in this process at Wafi-Golpu meaning the leftover tailings will not have been exposed to this toxic material.

In any case, these tailings will be discharged at depths way below where local fish are caught for eating.

The Wafi-Golpu Project conducted environmental studies focused on fish catches in the area proposed for DSTP as well as control areas far from the site. These studies provided confidence that the proposed DSTP operations are not predicted to affect the communities' fish catch including that of commercial fisheries, and the fish will remain safe to eat.

The Wafi-Golpu Project will look to purchase locally caught fish to serve in our own camp dining rooms. We propose to continuously monitor catches and undertake scientific studies on fish to check there is no accumulation of metals in their flesh or organs.