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Media Release

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## **GROUNDWATER WITHDRAWAL IS NOT A VIABLE OR SAFE OPTION FOR PENANG**

- **Limited potential groundwater yield due to limited land area.**
- **Risk factors include land subsidence (land sinking), flooding during wet seasons and groundwater contamination.**

PENANG, Monday, 14.6.2021: Groundwater withdrawals may not be a viable or safe option for Penang due to socio-geographical factors and high risks.

It is Perbadanan Bekalan Air Pulau Pinang Sdn Bhd's (PBAPP's) viewpoint that groundwater withdrawals do not represent a rational long-term water supply solution for Penang, due to the following key factors:

- The State of Penang occupies a total land area of 1,048 sq km. As such, the potential volume of groundwater that may be available is low due to Penang's small geographical footprint.
- "Land subsidence" (land sinking) is a negative aspect of groundwater withdrawals that has been scientifically researched and documented worldwide. Bangkok (Thailand), Java (Indonesia) and Venice (Italy) reportedly suffer from land subsidence related to groundwater exploitation.

In Malaysia, Kelantan is one of the highest groundwater consumption states. A 2018 paper published by researchers from the University of Otago, Dunedin, New Zealand\* notes that land in northern Kelantan has been subsiding at a maximum rate of about 4.22mm a year.

It should be noted that Penang is a highly developed and densely populated state with many high-rise buildings. Potential damage from land subsidence may be catastrophic in urban areas.

- Flooding is a natural ramification of groundwater over-exploitation. A study in Bangkok has noted that a loss of ground surface volume of approximately 0.1m<sup>3</sup> resulted from every 1,000 litres of groundwater pumped. Deep-well pumping in Bangkok has caused significant land subsidence over the past 35 years and flooding threatens the city annually, as related to environmental factors such as climate change, streamflow, rising sea levels, deforestation, high precipitation and land use changes.

Floods that threaten Kelantan on an annual basis may also be due to similar factors (according to the University of Otago research paper), with groundwater extraction-induced land subsidence being one of the likely contributory factors.

- According to the \*\*US Environment Protection Agency (EPA):

“In areas where population density is high and human use of land is intensive, groundwater is especially vulnerable. Virtually any activity whereby chemicals or wastes may be released to the environment, wither intentionally or accidentally, has the potential to pollute groundwater. When groundwater becomes contaminated, it is difficult and expensive to clean up.”

Meanwhile the \*\*\*US Centers for Disease Control and Prevention (CDC) notes that:

“Contaminated groundwater can make people sick. Human activities contaminate groundwater. These human causes may include incorrect use of fertilisers and pesticides; poorly situated, constructed or maintained septic systems; improper removal or storage of wastes; mining and construction; and chemical spills at worksites.”

Clearly, in Kelantan, groundwater withdrawals are regarded as a solution to meet water demand in the rural areas.

However, in Penang, groundwater withdrawal is an unsuitable water supply solution, in terms of higher risks versus lower (potential) rewards, due to differing circumstances and a different socioeconomic environment. This the reason why groundwater has not been tapped in Penang since the first simple water supply system was commissioned here in 1805.

Groundwater should not be used or distributed on a “as-is-where-is”. From the water supply standpoint, groundwater should be regarded as raw water. With public safety and health in mind, groundwater must be pre-tested, properly treated and re-tested to be safe ...before distribution to the public.

As such, it makes more sense for Penang to focus instead on the following solutions to achieve long-term water supply security until 2050:

1. Conservation of Ulu Muda as a NCER water catchment area and protection Sungai Muda as an existing and proven primary raw water resource. PBAPP intends to continue abstracting raw water from Sungai Muda at the Lahar Tiang Intake in Penang to produce treated water for Penangites at reasonable costs.
2. Set-up the “Ulu Muda Basin Authority” (UMBA) to protect and manage water supply for 4.2 million people in Perlis, Kedah and Penang.
3. Realisation of the Sungai Perak Raw Water Transfer Scheme (SPRWTS) to tap a second major raw water resource. Abstracting raw water directly from Sungai Muda within Penang territory is free, and “importing” raw water from Perak is the next most cost-efficient raw water solution for Penang.
4. Implementation of Phase 1 of the Penang Desalination Water Supply Scheme (PDWSS). Penang is an island state surrounded by sea. Theoretically, unlimited volumes of seawater may be desalinated to meet Penang’s water needs during dry seasons when river water levels run abnormally low. This is the key reason why Singapore is using desalination to ensure water supply security in the 21<sup>st</sup> Century.

Thank You.

\* “Groundwater extraction-induced land subsidence: a geodetic strain rate study in Kelantan, Malaysia” – Chien Zheng Yong, Paul H. Denys and Christopher F. Pearson, Journal of Spatial Science.

\*\* <https://www.epa.gov/sites/production/files/2015-08/documents/mgwc-gwc1.pdf>

\*\*\* <https://www.cdc.gov/healthywater/drinking/groundwater-awareness-week.html>

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