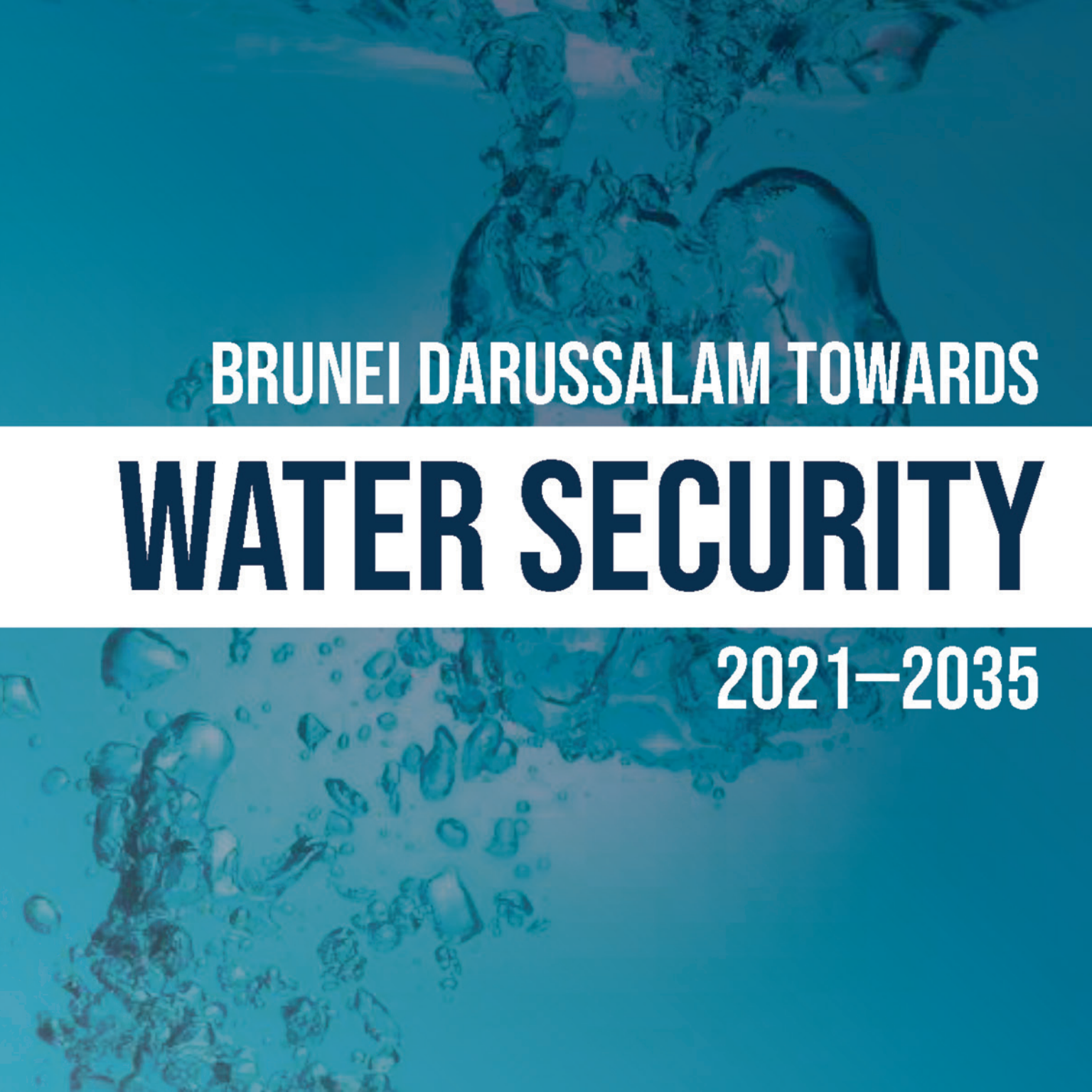

BRUNEI DARUSSALAM TOWARDS

WATER SECURITY

2021–2035

BRUNEI DARUSSALAM TOWARDS WATER SECURITY 2021–2035

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CONTENTS

FOREWORD

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

In Brunei Darussalam, citizens and residents have long enjoyed clean water at a turn of their taps from home for many decades. This is a remarkable development for Brunei as globally 2.2 billion people still have no access to safe drinking water and many countries are still making great efforts to provide clean water. Not only that Water reports from the United Nation Sustainable Development Goals have also clearly indicated accessibility to clean water contributes positively to the economic growth and high standard of living of a country.

We then should not take water for granted as it is a finite resource. Water is important for everyday use in cooking, shower, drinking and, the performance of religious activities as well as for many industrial processes. More importantly, water has a direct impact on the environment; to ensure rivers flow and to maintain healthy terrestrial and aquatic ecosystems.

The good outcome that we benefited today is not due to chance, but the direct result of proper planning and implementation by The Government of His Majesty Sultan and Yang Di-Pertuan Negara Brunei Darussalam through the Ministry of Development.

Planning ahead, the 'Brunei Darussalam towards Water Security 2021-2035' spells out further the Ministry's strategy and plan of execution to ensure that this privilege remains for many more years to come. It is a high-level strategic framework adopting four key strategies namely – Water Balance; Water Efficiency; Water Quality; Water Governance.

Though Brunei Darussalam is blessed with abundant water resources, its first strategy, Water Balance, is to ensure the resiliency of our water resources to future demand and the many challenges, including the impact of climate change. Equally important is to establish water-efficient practices to manage our future water demand.

The second key strategy, Water Efficiency, focuses on improving the efficiency of the whole water network, including the use of technology to produce adequate water to meet demand at all times and reduce water loss.

Water Quality is the third strategy to ensure our water resources remain unpolluted and attain consumers' confidence by continuing to supply high quality water. This will be executed through the enhancement of the water treatment, distribution processes and raw water quality monitoring program to ensure our treated water continually meets the highest standard.

Finally, the fourth strategy on Water Governance emphasised on change management within the organisation of the Department of Water Services including aspects of financial, human resource and organisation structure. This is imperative for the department to achieve high level of performance in its services' delivery to the consumers.

This 'Brunei Darussalam towards Water Security 2021-2035' is by no means exhaustive, as it is also adaptive to address future situations and challenges. Further, the publication hopes to impart water-related knowledge to everyone as water is a valuable resource. Saving water and using water wisely lies not on the action of one person but rather it is a collective effort from all.

YANG BERHORMAT DATO SERI SETIA IR. AWANG HAJI SUHAIMI BIN HAJI GAFAR

MINISTER OF DEVELOPMENT

Key Strategies for WATER SECURITY

"Ensuring long term supply of water for Brunei Darussalam through an effective water supply system and sustainable use"

– MOD Policy Framework 2018 – 2023 –

1 WATER BALANCE

Continuous water supply by increasing resilience of water resources and managing water demand

2 WATER EFFICIENCY

Improve overall efficiency of water network & reduce water loss

3 WATER QUALITY

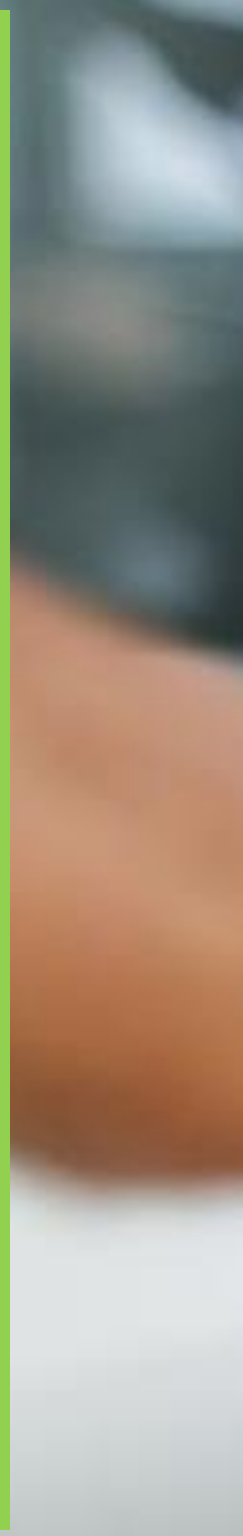
Clean and safe water for all to use

4 WATER GOVERNANCE

Strengthen governing environment of utility and improve service delivery

KEY STRATEGY 1

WATER BALANCE



WATER BALANCE

Negara Brunei Darussalam lies in the wettest zone of the equatorial belt and receives a high amount of rainfall – average of 2,909 mm annually. Its 3 main water supply systems namely, Brunei-Muara & Tutong, Belait and Temburong water supply systems supply water for both domestic and non-domestic uses in the country. Additionally, Brunei Darussalam has 4 dams; Mangkubau Dam in the Brunei-Muara District, Benutan Dam and Ulu Tutong Dam in the Tutong District and Kargu Dam in the Belait District. Benutan, Ulu Tutong and Kargu Dams are impounding reservoirs used to regulate Belait and Tutong rivers with a total storage capacity of 134 million m^3. The Mangkubau Dam has impounding capacity of 16.8 million m^3 and provide water supply to the population at Muara area.

Brunei Darussalam's water demand, however, has been increasing over the years. Its consumption on domestic water is one of highest in the region at 380 litre per capita per day. Growing industries and uncertain weather pattern add pressure on the nation's water supply.

With this in hindsight, Brunei Darussalam strives to ensure its water supply is weather resilient and can cater for future demands. A major part of the initiatives will include conservative measures and policies formulation to increase water efficient practices in both domestic and non-domestic sectors.

KEY PERFORMANCE INDICATOR

	NOW	2025	2035
RIVER BALANCE YIELD[0]	40%	40%	40%
FORECASTED DEMAND[1]	456MLD	652MLD	796MLD
DIVERSIFIED SUPPLY	LOCAL CATCHMENT	LOCAL CATCHMENT	LOCAL CATCHMENT DESALINATION
DOMESTIC CONSUMPTION[2]	380 lpd	360 lpd	290 lpd
NON-DOMESTIC CONSUMPTION[3]	24 MLD	32 MLD	47 MLD

OBJECTIVE	PROGRAM	DELIVERABLES
To ensure continuous water supply and resilience of water resources	Enhancement of water resources management	• Water Demand Study / Masterplan • Feasibility studies on water resources • Smart Water Resources Management • Dam Safety Plan • Water Data Hub • Construction of new dams / Water Treatment Plants / Reservoirs • Upgrading of existing Water Treatment Plants
To manage water demand of domestic and non –domestic sectors	Water Conservation	• Water Tariff • Policy and regulation related to water savings and water usage efficiency • Introduction of Water Usage Efficiency Standards and Labelling Scheme • Education and awareness campaigns • Use of water efficient devices • Water Audits • Water Consumption Survey

[0] Water Balance Sheet

[1] Water Demand Study 2006

[2] Annual Household Water Usage Survey

[3] Royal Haskoning DHV Final Draft Report on Brunei Darussalam Water Study 2021

KEY STRATEGY 2

WATER EFFICIENCY

WATER EFFICIENCY

The people of Negara Brunei Darussalam have long enjoyed clean water from their taps for everyday use. River water is pumped to water treatment plants and treated to drinking water quality and transported via water pipes to consumers. Brunei Darussalam's water network spans all four districts with 8 water treatment plants and 3,815 km of water pipes in total. A majority of the water treatment plants were built in the 60's & 90's and are in need of refurbishment to replace aging equipment and machinery.

Due to also increase in water demand and changing river water quality, refurbishment and upgrading of water assets are critical to ensure the water network is operating at optimal conditions. This would mean high efficiency in water production at the water treatment plants, reduction of water loss and leakages as well as water disruptions.

While the Department of Water Services as public water utility is currently able to supply sufficient water to its customers, its water network loses huge volumes as non-revenue water is as high as 45%. A major part of the initiatives will be to make comprehensive monitoring and data analysis of the water network to enable proper infrastructure planning and development as well as sustainable use of our water resources.

KEY PERFORMANCE INDICATOR

	NOW	2025	2035
NON – REVENUE WATER[4]	45%	30%	25%
WATER TREATMENT PLANTS PRODUCTION EFFICIENCY	456MLD	652MLD	796MLD

[4] Calculation based on overall total of water balance

OBJECTIVE	PROGRAM	DELIVERABLES
To improve overall efficiency and to reduce water loss in the water network	Water Loss Reduction	• Water Treatment Plant Refurbishment • Reservoir repair • Pipe Replacement • Active leakage detection (Mains leaks and service connection leaks) • Real-time pressure and flow management • District Metered Areas (DMAs) non-revenue water study • Water balance reporting (monthly) • Centralised Operation Control Centre • Centralised Asset Management System • Policy and enforcement • Smart Water Meter Management • Meter Replacement • Customer meter management

KEY STRATEGY 3

WATER QUALITY

WATER QUALITY

One of the top priorities for quality living is to have access to high quality potable water. Brunei Darussalam has abundant fresh water and its catchment areas are protected from unlawful use and water pollution. The river water quality is important as it influences the water treatment processes and influences the health of the hydrological system. A healthy system will in turn provide better quality water and a more resilient ecosystem.

Brunei Darussalam has also invested in 8 water treatment plants with dedicated water testing laboratories and teams where water testing are carried out every 2 hourly on a daily basis to ensure that the water meets WHO Drinking Water Guideline. Under the Water Quality Monitoring Program, water samplings from designated locations which include schools, mosques, community clinics and consumers' houses in all four districts are tested routinely.

Over the years, the Department of Water Services as public water utility has also actively replaced old pipes to improve robustness of the water network and reduce incidents of pipe leaks or pipe bursts. More improvements are in the pipeline including water quality enhancement studies for river water, real-time water quality monitoring for the water network as well as conduct regular risk assessment program such as the water safety plan.

KEY PERFORMANCE INDICATOR

	NOW	2025	2035
WATER QUALITY COMPLIANCE[5]	60%	100%	100%
INTEGRATED SMART WATER QUALITY ALERT SYSTEM	25%	50%	100%

[5] Calculation based on 30 samples for selected parameters only

OBJECTIVE	PROGRAM	DELIVERABLES
To provide clean and safe water to all	Water Quality Management	• Policy and reform • Water Quality studies • Real-time testing and analysis • Integrated water quality data management • Quality Management System • Awareness campaign

KEY STRATEGY 4

WATER GOVERNANCE

WATER GOVERNANCE

While the Department of Water Services has been able to provide access to clean and safe drinking water supply to all, there are still room for improvement to achieve high level of performance of services delivery to consumers.

The department aspires to achieve this by strengthening its institutional framework, reviewing its organizational structure and strategy plan as well as enhancing human resource and financial management.

This necessitates the department to develop a comprehensive strategic plan with relevant targets and key actions to achieve the goals. In addition, the department is keen to adopt an optimal organization structure with the right staff skills to be supported by various training and development programs. In particular, close supervision and mentoring from senior management have been identified to be key success factors which can enhance knowledge and work performance of officers and staff in the department.

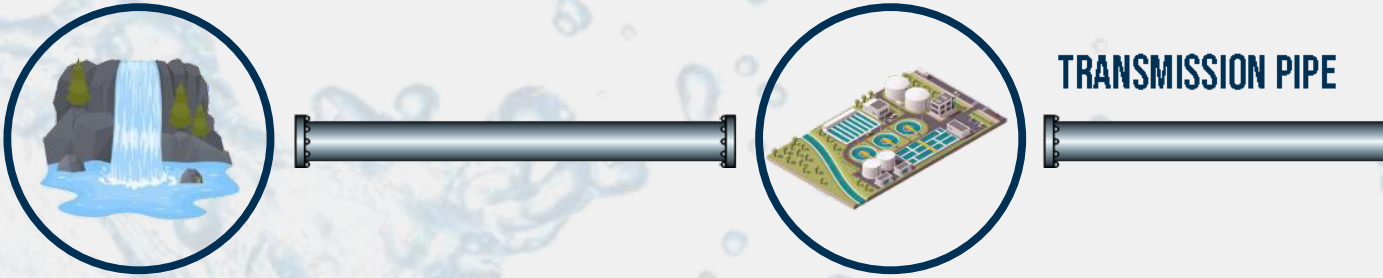
KEY PERFORMANCE INDICATOR

	NOW	2025	2035
FINANCIAL MANAGEMENT	BASIC	GOOD	WELL-PERFORMING
HUMAN RESOURCE MANAGEMENT	ELEMENTARY	GOOD	WELL-PERFORMING
ORGANISATION AND STRATEGY	BASIC	GOOD	WELL-PERFORMING

OBJECTIVE	PROGRAM	DELIVERABLES
To provide clean and safe water to all	Financial[6]	• Accounting / Expenditure Management
	Human Resources[6]	• Staffing levels and planning • Management and staff training • Management and staff performance / Competency Evaluation • Staff recognition and incentives
	Organisation and Strategy[6]	• Autonomy–status organisation • Strategic Plans / KPI reporting • Integrated IT system

[6] Royal Haskoning DHV Final Draft Report on Brunei Darussalam Water Study 2021

BRUNEI DARUSSALAM ROADMAP TOWARDS WATER SECURITY 2021 - 2035



RAW WATER

- Increasing River Capacity Through Dams
- Study on Alternate Water Resources
- New Water Demand Study
- Raw Water Quality Study
- Real-time monitoring of hydrometric data

WATER PLANT

- Future Water Treatment Plants
- Refurbishment / Upgrading of Water Treatment Plants
- Real-time Water Quality Analysis

TRANSMISSION PIPE

- Replacement of Ageing Pipes (Transmission and Distribution)

METER

- Installation of Smart Water Meters
- Replacement of Water Meter

NON-DOMESTIC

DISTRIBUTION PIPE

DOMESTIC

WATER STORAGE TANK

- Construction and Refurbishment Works for Water Storage Tanks
- Real-time Water Quality Program

DISTRIBUTION PIPE

- Active Leakage Detection Program
- Real-time pressure, flow and water quality analysis

- Conduct awareness & Water Audit Programs
- Establish Water Efficient Practices for Non-Domestic and Domestic Sectors
- Standardize & use water efficiency products for domestic and non-domestic sectors

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