MASTER PLAN STUDY OF CONJUNCTIVE WATER SUPPLY SYSTEM FOR THE FEDERAL TERRITORY OF KUALA LUMPUR

01 | PROJECT OVERVIEW

1 PROJECT PROFILE

LOCATION	Federal Territory of Kuala Lumpur; six planning zones
PROGRAMME / FUND	Programme 5: Conjunctive Water Supply (SBAK), Eleventh Malaysia Plan (RMKe-11)
STUDY PERIOD	2017–2020 (completed in December 2021 due to COVID-19)
STUDY PURPOSE	Strengthen urban water security through integrated alternative water supply planning

2 FOUR STUDY OBJECTIVES

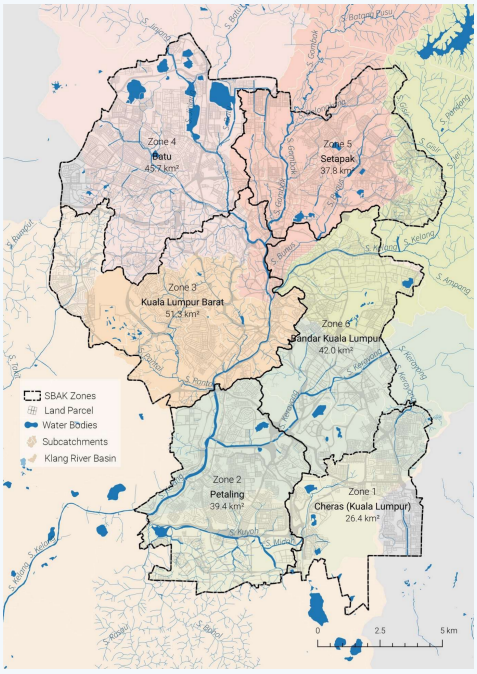
01 Identify and assess
Alternative resources for future water needs.

02 Optimise utilisation
Improve sustainable yield and availability.

03 Develop master plan
Integrate five resources, engineering concepts and cost-benefit assessment.

04 Plan integrated supply
Consider centralised/decentralised networks and drought resilience.

3 STUDY AREA AND APPROACH



ORIGINAL STUDY MAP

SIX PLANNING ZONES

Cheras (Kuala Lumpur), Petaling, Kuala Lumpur Barat, Batu, Setapak and Bandar Kuala Lumpur.

STUDY APPROACH

Resource inventory and field assessment; hydrological and demand analysis; treatment and network options; engineering feasibility and master plan.

Study-area map: Original Final Report, Figure 3-2, p. 35. Programme details: Final Report, Sections 1.4-1.6.

02 | ALTERNATIVE RESOURCES AND WATER DEMAND

4 ALTERNATIVE WATER RESOURCE POTENTIAL

RECOMMENDED PRACTICAL POTENTIAL

842.22 MLD

INITIAL ASSESSED

1,018.78 MLD

Practical scenario reduces groundwater use.

RAINWATER Roofwater for domestic non-potable uses.	**11.59 MLD**
STORMWATER Selected flood detention ponds; treatment required.	**239.74 MLD**
GROUNDWATER Managed wells and aquifers (initial: 265.91 MLD).	**89.35 MLD**
TREATED WASTEWATER Further treatment for industrial reuse.	**297.54 MLD**
RIVER LOW FLOW Diversion for treatment with environmental allowance.	**204.00 MLD**

Planning potential, not existing drinking-water production. Includes different end uses and requires treatment, infrastructure and operating validation.

5 WATER DEMAND AND POTENTIAL CONTRIBUTION

2021 | BASELINE		2030 | FUTURE	
Demand including NRW	**1,163.7 MLD**	Demand including NRW	**1,241.1 MLD**
Demand excluding NRW	**831 MLD**	Demand excluding NRW	**939 MLD**
72.4% Coverage incl. NRW	**101.4%** Coverage excl. NRW	**67.9%** Coverage incl. NRW	**89.7%** Coverage excl. NRW

HOW TO READ THE COVERAGE FIGURES

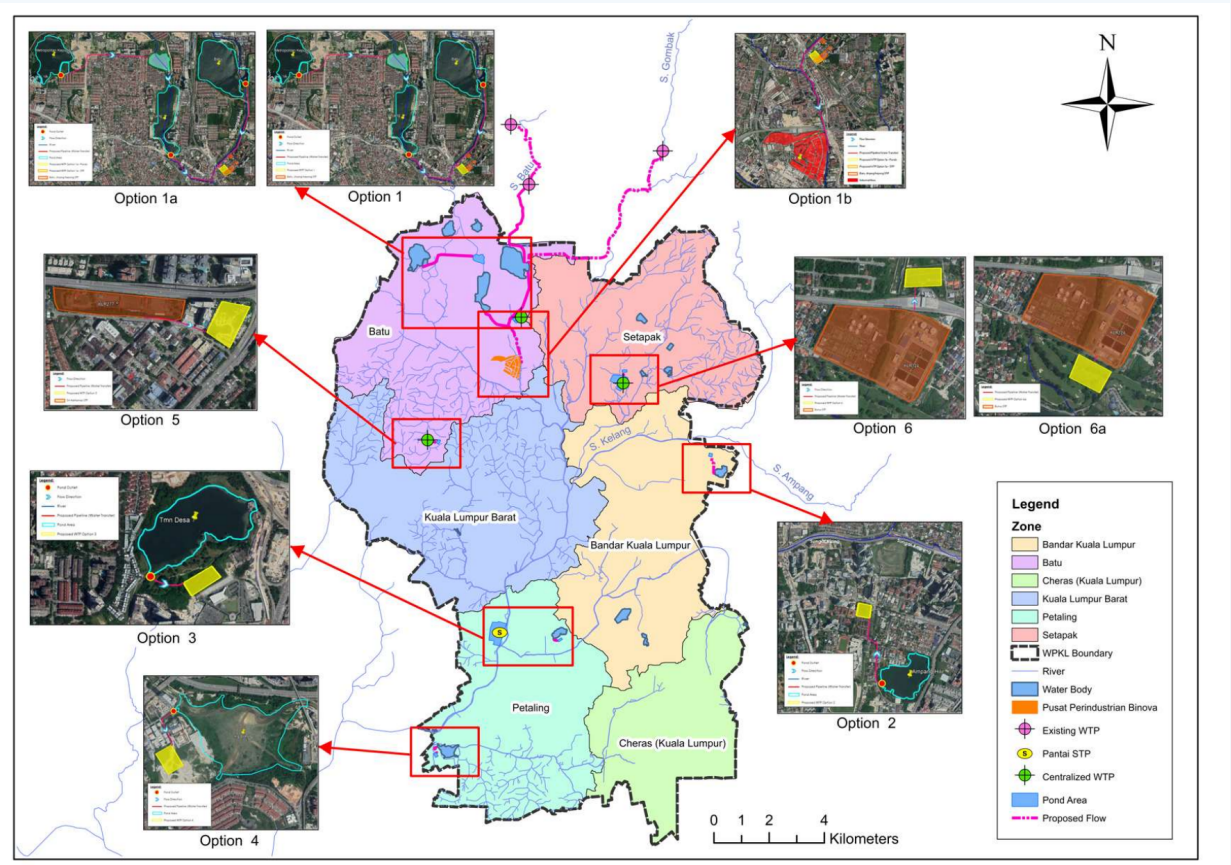
842.22 MLD is compared against total water demand. It includes potable, industrial and domestic uses, so these percentages are not equivalent to treated drinking-water supply capacity.

AWR = alternative water resources; NRW = non-revenue water. Final Report, Tables 23-1 to 23-5 and 28-1 to 28-8.

03 | CONJUNCTIVE WATER SUPPLY MASTER PLAN

6 INTEGRATED MASTER PLAN

A hybrid centralised and decentralised supply network links locally available water sources with suitable treatment and delivery infrastructure.



Original Figure 23-14: Conjunctive Water Supply Master Plan, Final Report, p. 776.

7 SIX PROPOSED OPTIONS

01 BATU POND CLUSTER
Pond integration, wastewater treatment and industrial-transfer variants.

02 AMPANG HILIR
41 MLD pond potential; nearby treatment facility.

03 TAMAN DESA
16.11 MLD pond potential; possible Pantai STP integration.

04 KG BOHOL
36.66 MLD pond potential; local treatment and transfer.

05 SRI HARTAMAS
27.54 MLD STP potential; assess treatment site.

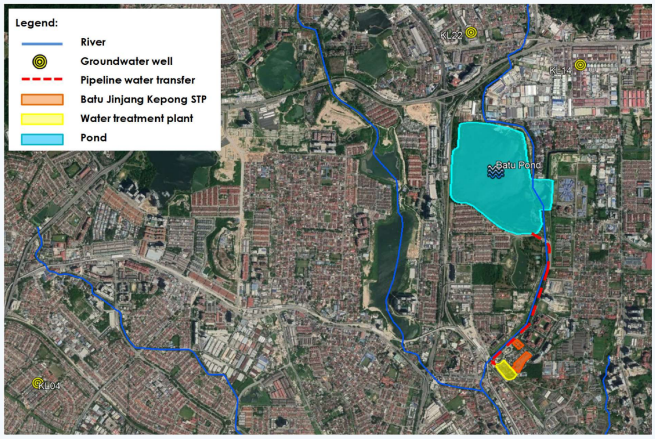
06 BUNUS
135 MLD STP potential; alternative treatment sites.

The six proposed options and variants require further feasibility and delivery assessment. STP = sewage treatment plant.

04 | PILOT, TRANSFERS AND WAY FORWARD

8 PILOT PROJECT AND POTENTIAL WATER TRANSFERS

BATU POND PILOT

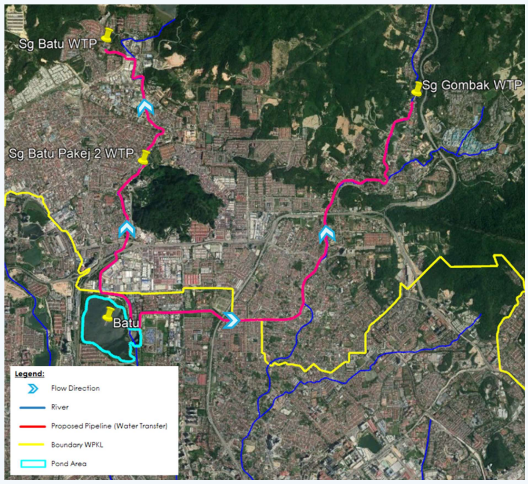


ASSESSED POND SAFE YIELD

95 MLD

Pilot concept combines pond water, groundwater and nearby STPs. Verify intake, treatment, pumping and coordinated flood-control operations.

POTENTIAL WATER TRANSFERS



PROPOSED RECEIVING WTPs

Sungai Batu	6.81 km
Sungai Batu Package 2	3.63 km
Sungai Gombak	8.40 km

Assess receiving capacity and raw-water compatibility.

9 SUMMARY OF STUDY FINDINGS

842.22 MLD
Practical AWR planning potential

5 SOURCES
Across six planning zones

SIX OPTIONS
Plus variants and Batu pilot

10 CONCLUSION AND WAY FORWARD

A decentralised/hybrid urban water supply system can diversify sources, support reuse and storage, and strengthen resilience to drought and variable rainfall.

01 Adopt 842.22 MLD as the practical AWR planning basis for potable, industrial and domestic uses.

02 Develop the hybrid supply system through the six proposed options; advance the Batu Pond pilot and evaluate potential water transfers.

03 Assess ASR and MAR for groundwater utilisation and integrate NRW management to maximise the contribution of available resources.

Original figures: Final Report, Figure 24-1, p. 779; Figure 23-15, p. 778. WTP = water treatment plant; ASR = aquifer storage and recovery; MAR = managed aquifer recharge; NRW = non-revenue water.