Water-energy linkages: implications for Evans Head

CADEER Project workshop

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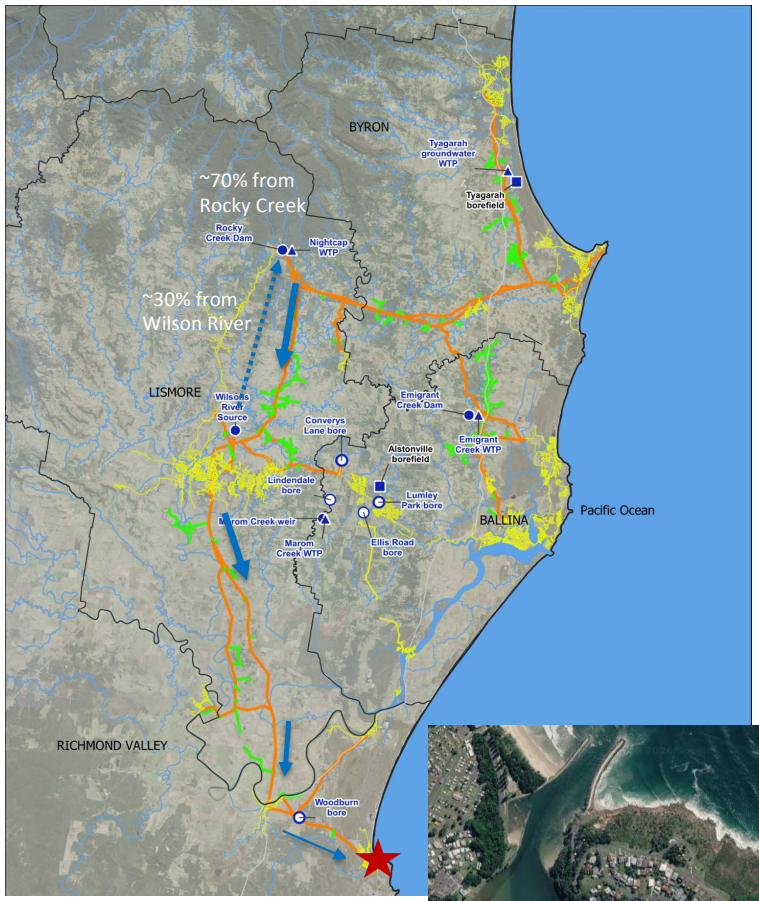
Australian Rivers Institute

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Photo: RVC

Evans Head potable water supply





Hydrosphere Consulting (2022) Rous Regional Supply: Future Water Project 2060

Evans Head is at the bottom end of the distribution from Nightcap Water Treatment Plant (WTP), and shared with Ocean Shores, Byron, Ballina and Lismore

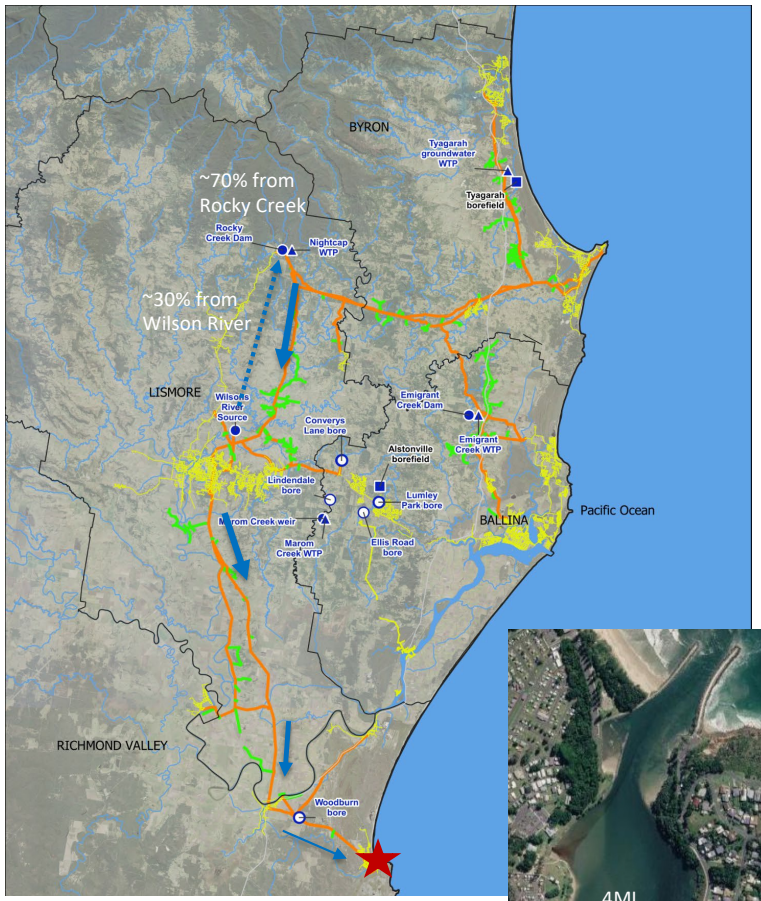
- Gravity fed (>200m head), distribution system
- Woodburn bore used only as an emergency supply (when Rocky Creek Dam <60% - i.e. rarely)
- 4 ML lower main storage (50m) – currently provides ~3-4 days supply (for all uses)
- 0.5 ML upper storage (60m) – supplies only a small area on the headland

In the event of major water supply disruption:

- 3,000 pax
  - Average use @150 L/day = 0.45 ML/day (~10 days supply)
  - WHO 'intermediate' level of access @50 L/day = 0.15 ML/day (~30 days supply)
- 12,000 pax during holidays
  - Average use @150 L/day = 1.8 ML/day (<3 days supply)
  - WHO 'intermediate' level of access @50 L/day = 0.6 ML/day (~8 days supply)

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Energy needs for water supply and treatment



Hydrosphere Consulting (2022) Rous Regional Supply: Future Water Project 2060



Energy requirements:

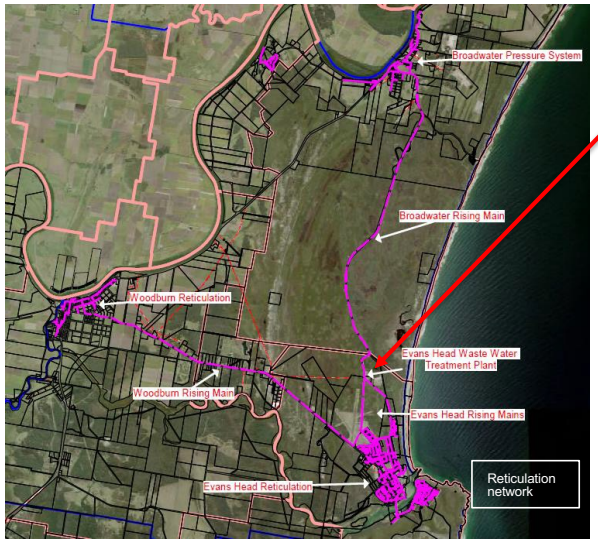
- No major pumping needs – Evans storages are gravity fed from source
- Booster pump on main water storage maintains higher water pressure.
- Nightcap WTP average demand – ~3,554 MWh/yr (~7% from solar and batteries) to treat ~12,000 ML/yr.
- Estimated energy use for treatment of Evans Head drinking water
  - 3,000 pax: 0.45 ML/day @ ~300 kWh/ML = 135 kWh/day
  - 12,000 pax: 1.8 ML/day @ ~300 kWh/ML = 540 kWh/day

In the event of major electricity supply disruption:

- 2 backup generators (700 kva and 400 kva) at Nightcap WTP and 13-14,000 L diesel storage
- Water storages unaffected – gravity fed but likely low pressure
- If needed, a portable generator can be used to supply booster pump on main water storage to maintain pressure

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Energy needs for wastewater treatment





RVC (2026) Evans Head STP pollution incident response management plan

Evans Head Sewage Treatment Plant (STP)

- Also treats waste from Woodburn and Broadwater
- 8 pumping stations (4 more at Woodburn)
- Average STP load = 1,876 kL/day

Energy use:

- Average energy use for the STP (past 2 years) = 983 kWh/day
- Estimated energy use by pumping stations (past 2 years) = ~30kWh/day

In the event of major electricity supply disruption:

- A portable backup generator is moved between pump stations (may not be possible during flood). Pump stations have ~8 hrs storage.
- Only a few houses in Evans have pressure sewage systems (these use ~200 Wh/day). Each has ~850 L storage (= 2-3 days without power).
- Only one constructed overflow in operation (southside of the bridge). Recently upgraded to increase storage capacity.
- WQ and health issues from overflows during prolonged power disruption

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