



Stormwater Harvesting and Reuse – Grange Golf Club

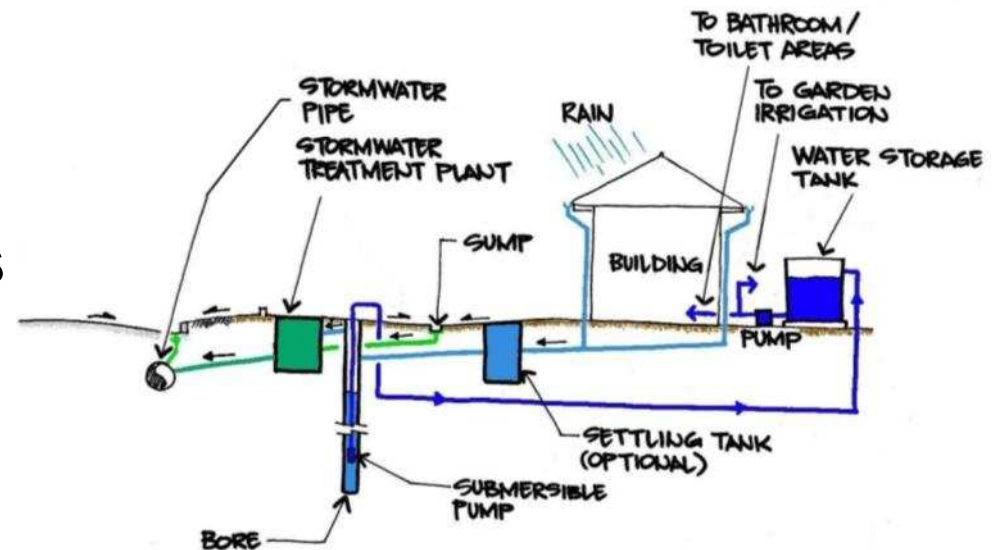
March 2011

Overview

- **Definition of stormwater harvesting**
- **Applications and benefits of stormwater harvesting**
- **Grange Golf Club Project**
- **What you need to know for harvesting stormwater**
- **Other water reuse sources**
- **Other examples of Aurecon water reuse projects**
- **Summary and conclusion**

Definition of Stormwater Harvesting

- Collection, treatment and reuse of storm runoff entering the stormwater drainage system
- Harvesting sources can include
 - Rainwater from roofs
 - Stormwater runoff from roads, paved areas etc



Stages in a Stormwater Harvesting Scheme

- Typically include:
 - **Harvest:** stormwater collected from a source
 - **Storage:** stormwater temporarily held in above or below ground storages to balance supply
 - **Treatment:** stored water is treated to ensure quality is fit for purpose
 - **Distribution:** treated stormwater reticulated to area of use

Potential Applications

- **In urban areas or new developments:**
 - **Residential uses (toilet, garden, car washing)**
 - **Irrigation of public areas**
 - **Industrial uses (washdown, cooling systems, dust suppression)**
 - **Ornamental ponds and water features (to maintain water level)**
 - **Aquifer storage and recovery**
- **Typically for non-potable uses, however, can be treated for human contact**

Potential Benefits

- **Can be effective in supplementing mains supply**
- **Reduce pressure on natural watercourses**
- **Improve and protect water quality of surface and groundwater**
- **Use of vegetation for treatment can protect and restore ecosystems and habitats**

Grange Golf Club Stormwater Reuse Project

- **Partnership between the State, Federal Government and the Grange Golf Club. The City of Charles Sturt is a key project supporter.**
- **Eastern course alongside Frederick Road**
- **Premier sporting venue, Australia's top 100 courses**



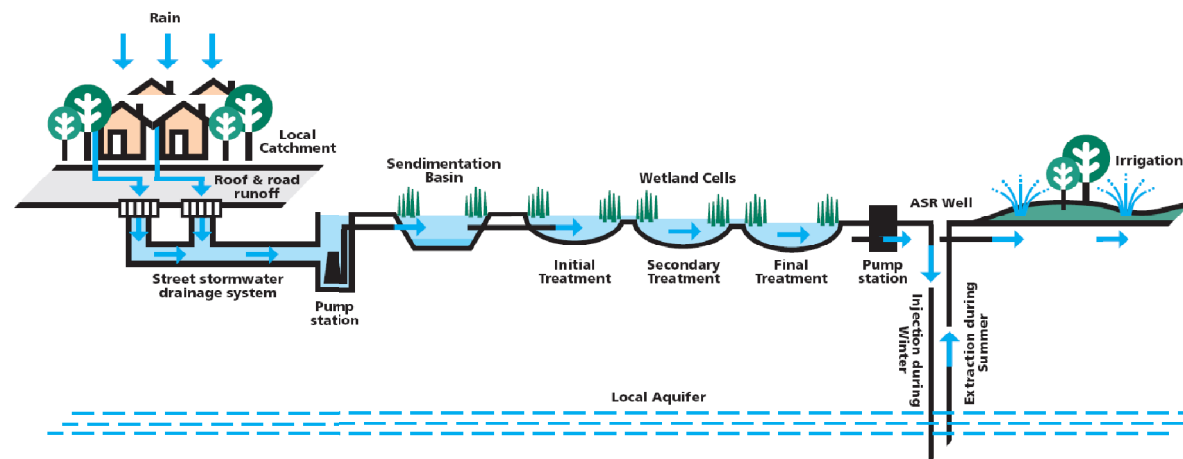
Need for the Project

- **Used groundwater for irrigation since inception, 320ML/a from aquifer**
- **Long term slow decline in aquifer supply**
- **Increasing salinity**
- **Non-sustainable use of stormwater**

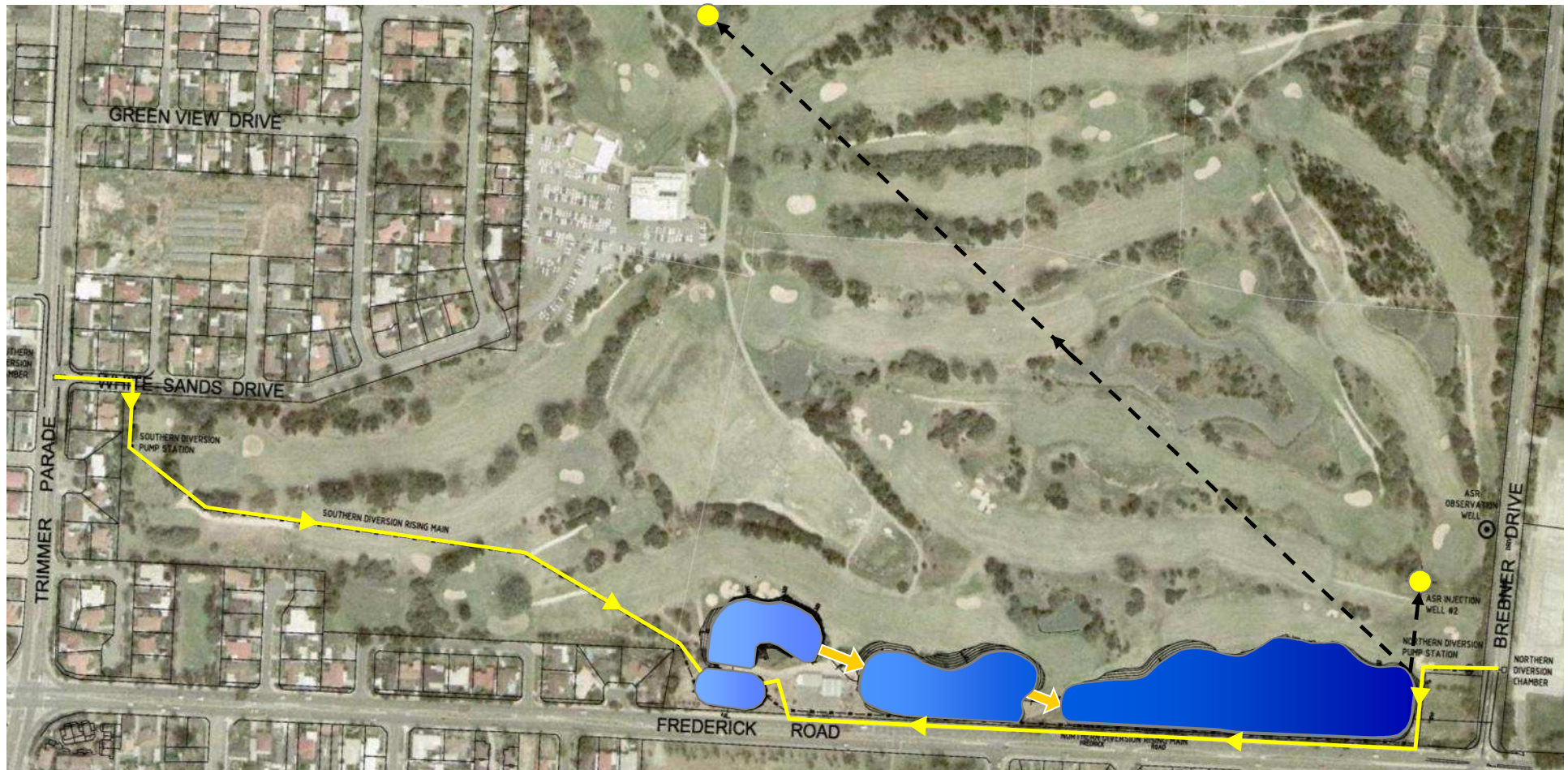


Project Overview

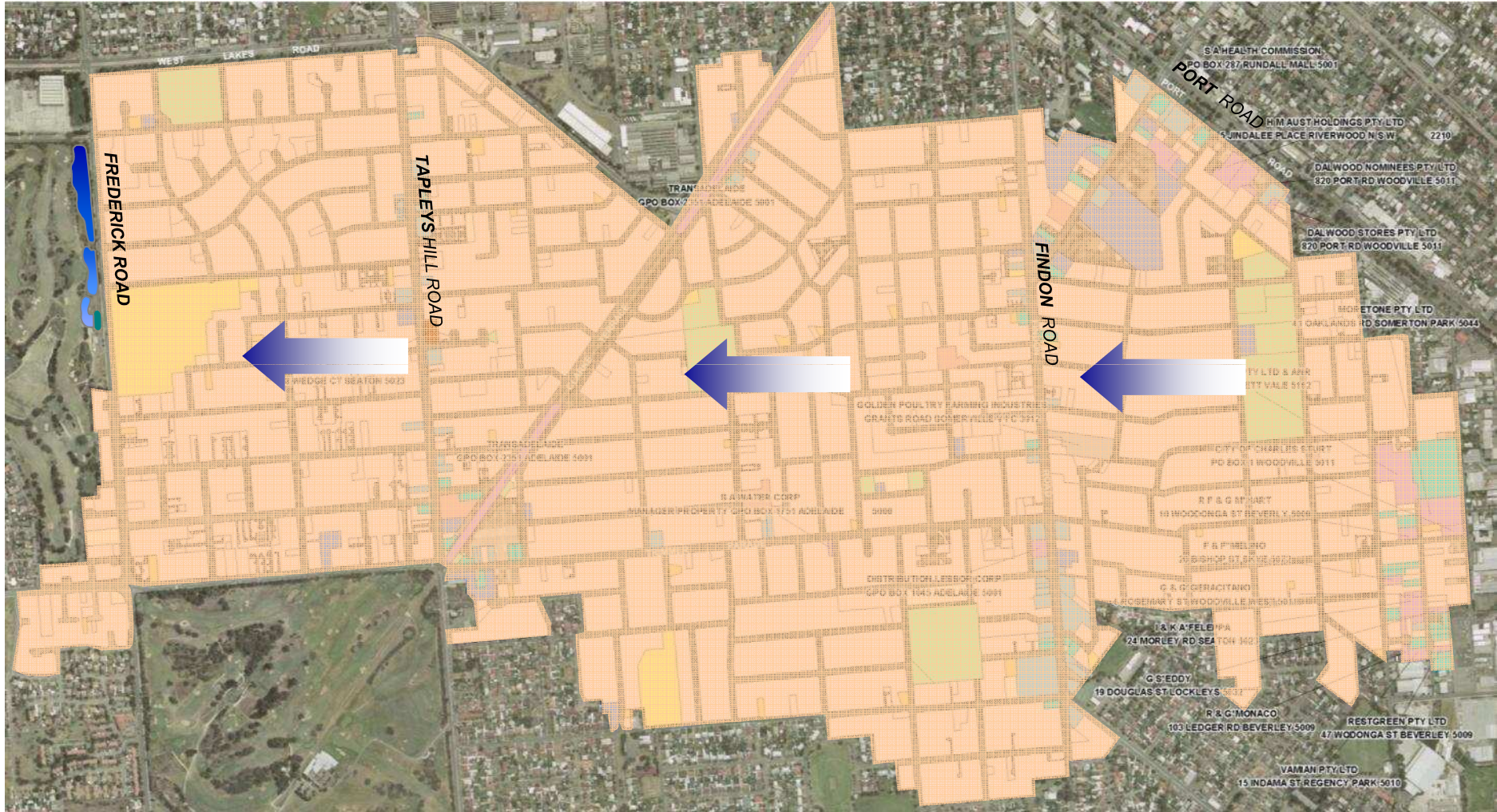
- Stage 1: Stormwater **harvested** from 410 ha local catchment
- Stage 2: **Stored** in wetlands, uses natural processes to **treat** and clean the stormwater
- Stage 3: ASR to **store** treated stormwater 200 m underground, for **irrigation** in summer



System Schematic



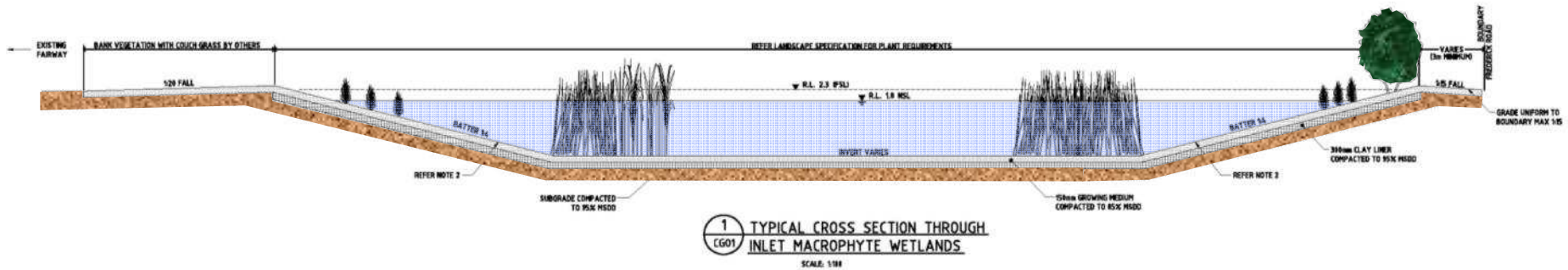
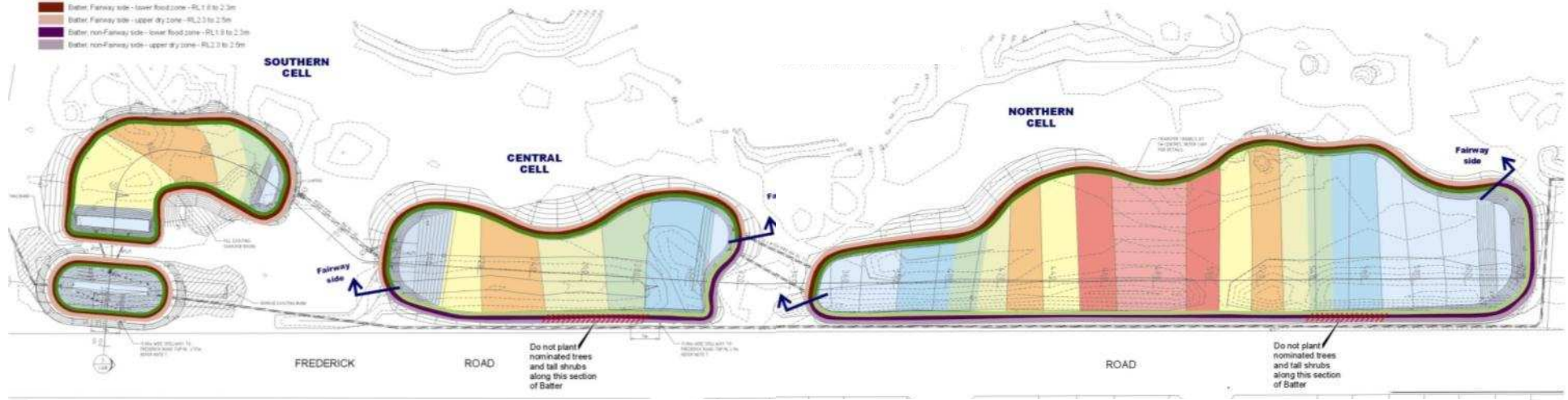
Stormwater Catchment



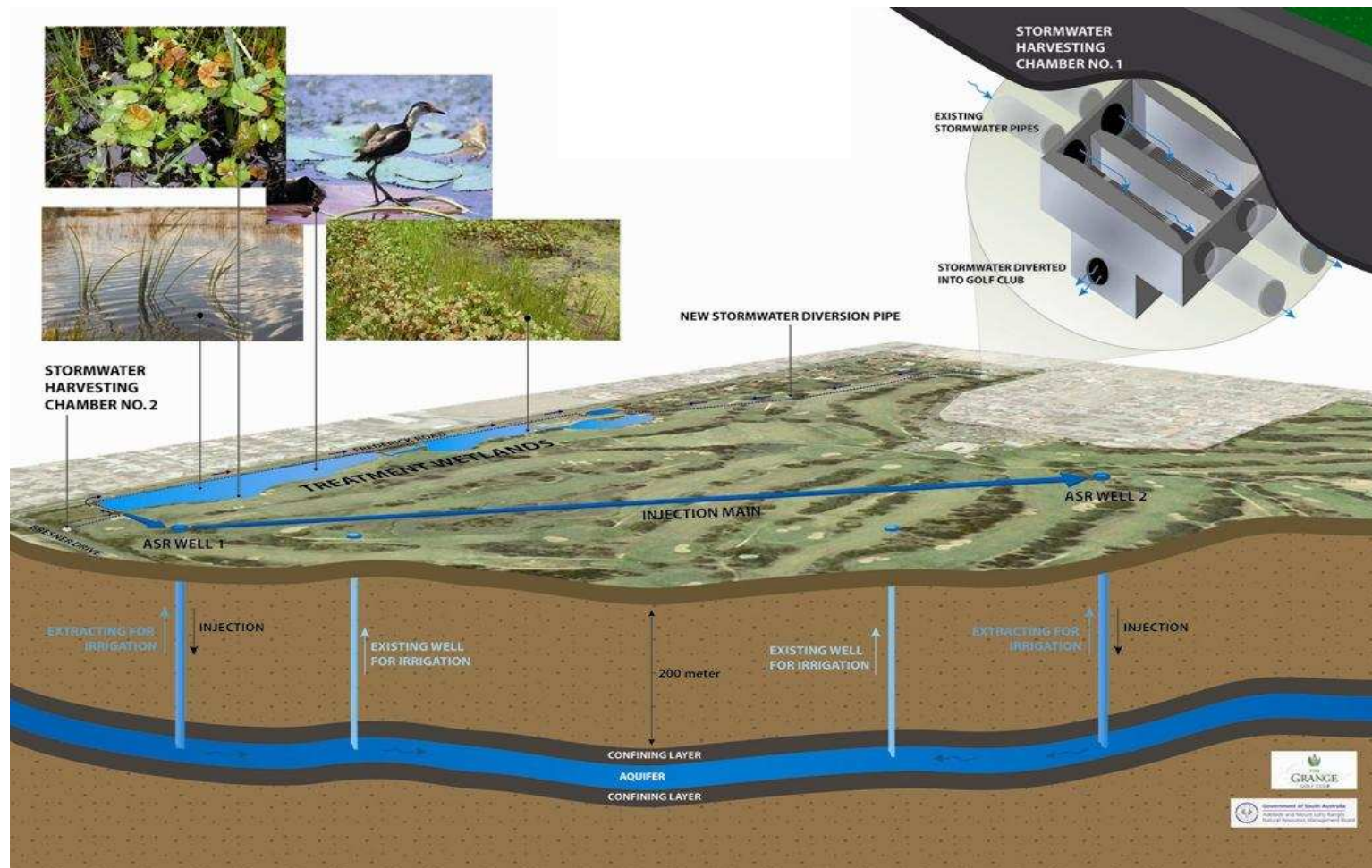
Macrophyte Wetlands

LEGEND

- Pool - RL < 1.2m
- Deep Marsh - RL 1.5 to 1.45m
- Marsh - lower zone - RL 1.45 to 1.525m
- Marsh - upper zone - RL 1.525 to 1.6m
- Shallow Marsh - lower zone - RL 1.6 to 1.7m
- Shallow Marsh - upper zone - RL 1.7 to 1.8m
- Littoral Zone, Fairway side - RL 1.8m
- Littoral Zone, non-Fairway side - RL 1.8m
- Equipment Zone - lower zone - RL 1.9 to 2.0m
- Equipment Zone - upper zone - RL 2.0 to 2.1m
- Batter, Fairway side - lower flood zone - RL 2.1 to 2.3m
- Batter, Fairway side - upper dry zone - RL 2.3 to 2.5m
- Batter, non-Fairway side - lower flood zone - RL 1.9 to 2.1m
- Batter, non-Fairway side - upper dry zone - RL 2.1 to 2.3m



Aquifer Storage and Recovery



Project Summary

- **GGC ideal candidate, high demand, land available and ample harvesting source**
- **Approx 72% of runoff from catchment is harvested**
- **Nominal extraction of 300 ML to 320 ML per annum**
- **Wetlands to cleanse stormwater also offers biodiversity habitat, course appeal, aesthetics and promotes community awareness**
- **Great example of sustainable water management**

AWA Award



- The project has been recognised as the **Best Water Project** awarded by the **Australian Water Association South Australian Division** in **2007**

What you need to know

- **Water demand: How much water do I need?**
- **Location and volume: Where does the stormwater run and how much comes off the catchment?**
- **What sort of pollutants can I expect?**
- **What treatment technologies are available?**
- **What storage options are available?**
- **What sort of risk management will be acceptable?**
- **What statutory requirements/approvals are necessary?**

What you need to know

- **Limitations...**
 - **Variability of rainfall**
 - **Large storage volumes that can have a high capital cost**
 - **Pollutants from catchment may be difficult to determine**

Other Water Reuse Sources

- **As well as stormwater, other sources of water for reuse include:**
 - **Groundwater aquifers including storage and recovery (ASR)**
 - **Grey water (sinks, showers, basin wastes etc)**
 - **Black water (combined waste including toilets)**
 - **Saline water**

Other Examples of Aurecon Water Reuse Projects

- **Bianco Building Supplies**
 - **Stormwater collection and treatment in wetlands**
 - **On-site black water treatment**
 - **Vehicle washdown using water from wetlands and roof water**
 - **Toilet flushing using roof water and treated black water**

Other Examples of Aurecon Water Reuse Projects

- **Jacobs Creek Visitors Center**
 - **Roof rainwater collected for toilet flushing water**
 - **State-of-the-art waste water treatment of all waste water generated on the site, sterilisation and re-use for irrigation, all black water treated to Class A**
- **St Peters College**
 - **Water recycling, utilising ASR into three of the buildings, with all water reuse towards toilet flushing**

Other Examples of Aurecon Water Reuse Projects

- **Royal Adelaide Golf Club**
- **Glenelg Golf Club**
- **Grange Golf Club Expansion**

Summary and Conclusion

- **Stormwater harvesting provide excellent source of non-potable water**
- **Implemented in existing urban areas or part of new developments**
- **No two projects are the same, good planning required for successful scheme**
- **Use other water sources for an environmentally sensitive development**



Thank you

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