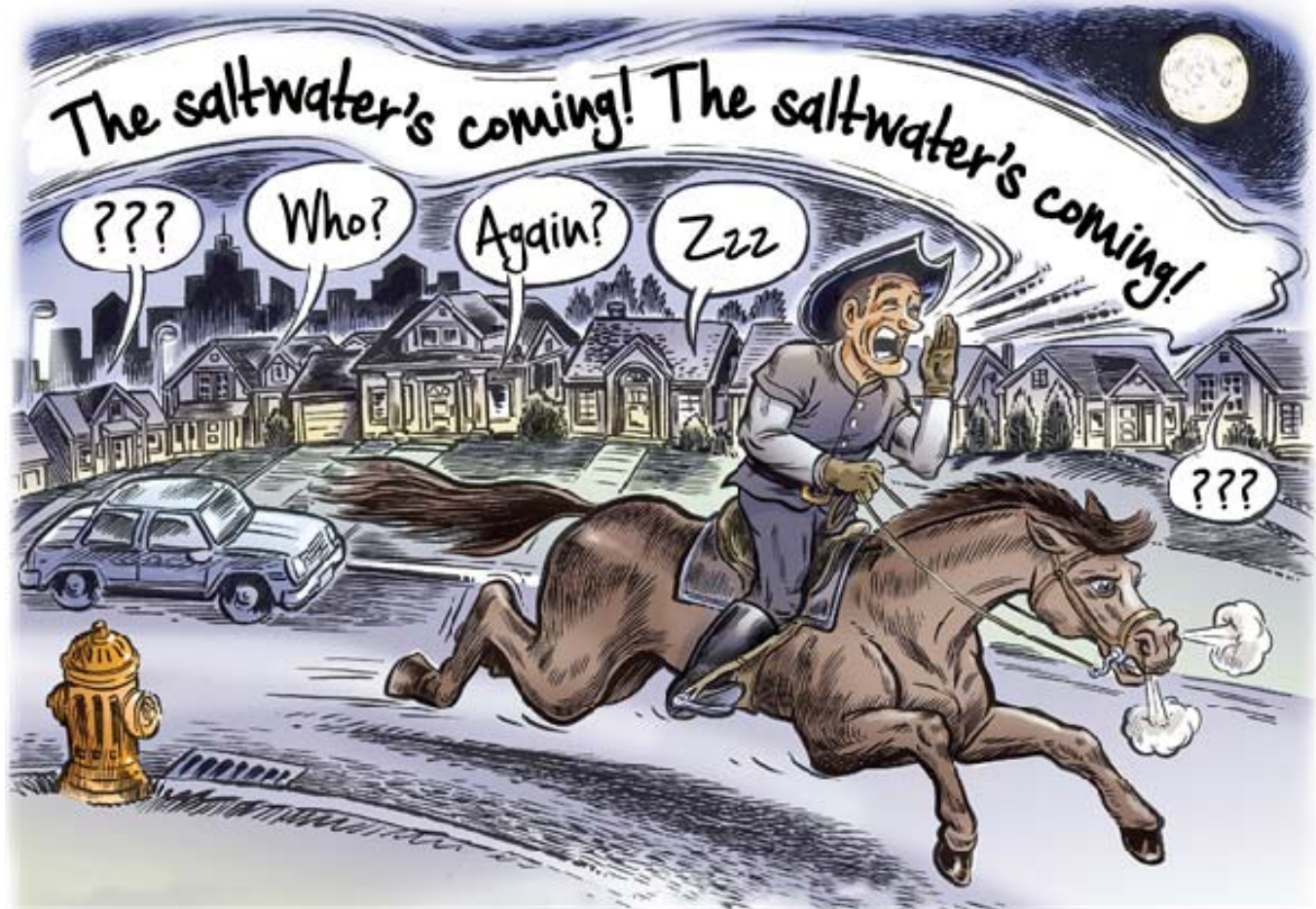


City of Hallandale Beach

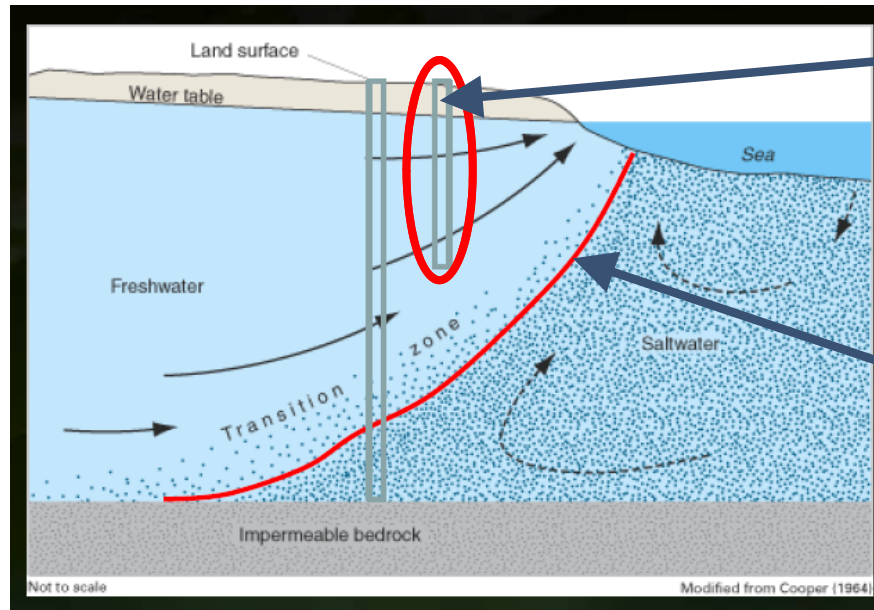
# Raw Water Supply – Planning for the Inevitable

Steven Parkinson, PE

June 2018



# The saltwater front continues to threaten our City wells



City Well pumping from the Biscayne Aquifer

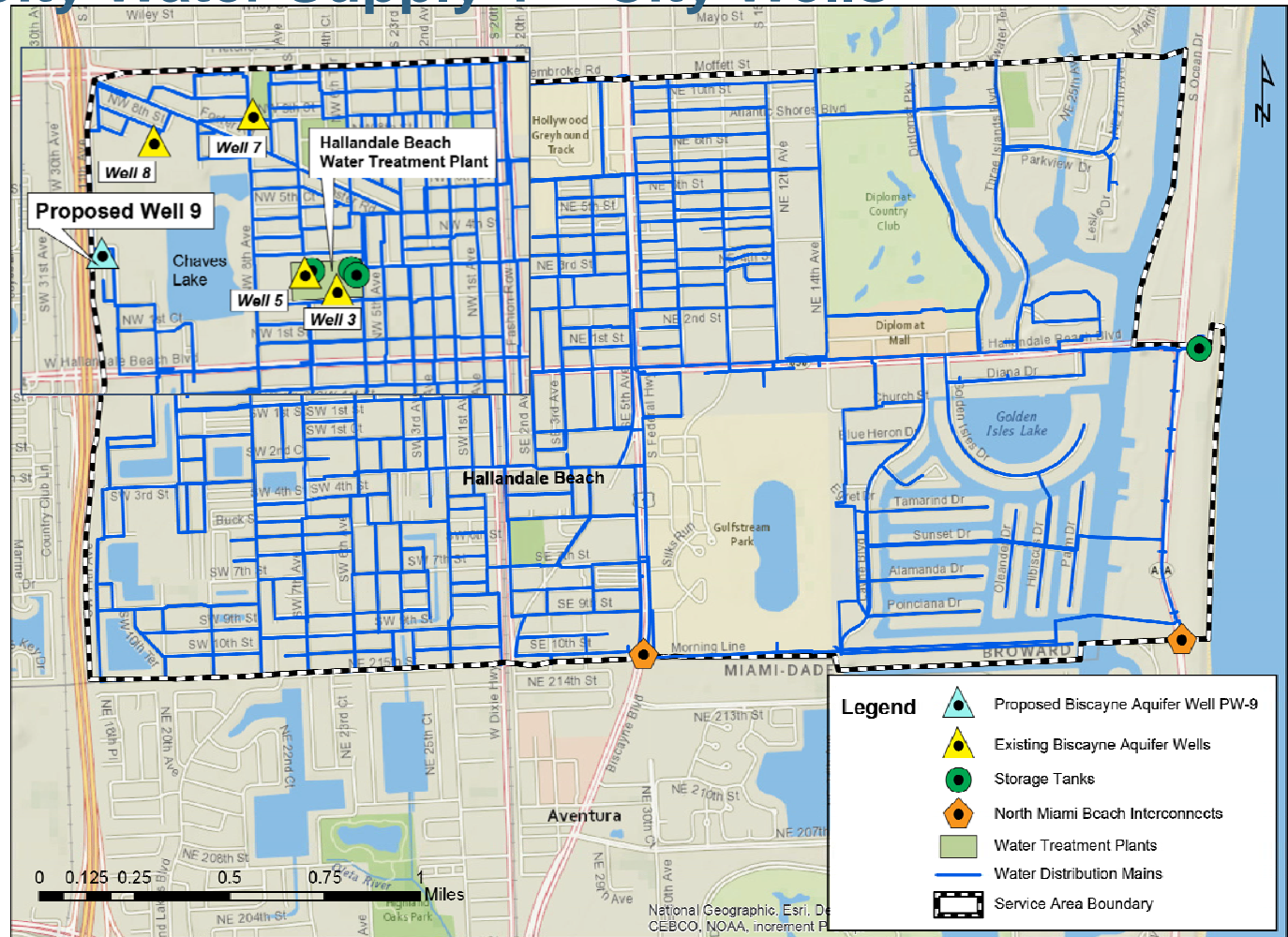
Saltwater Front pushing towards Biscayne Aquifer wells

From SFWMD Salt Water Intrusion Mapping Update, 1/20/15

## ...and limits our total pumpage from the Biscayne Aquifer.

# City Water Supply 1 = City Wells

The City's Biscayne Aquifer wells are located on the west side of the City – with PW 9 to be located to the west of Chaves Lake.

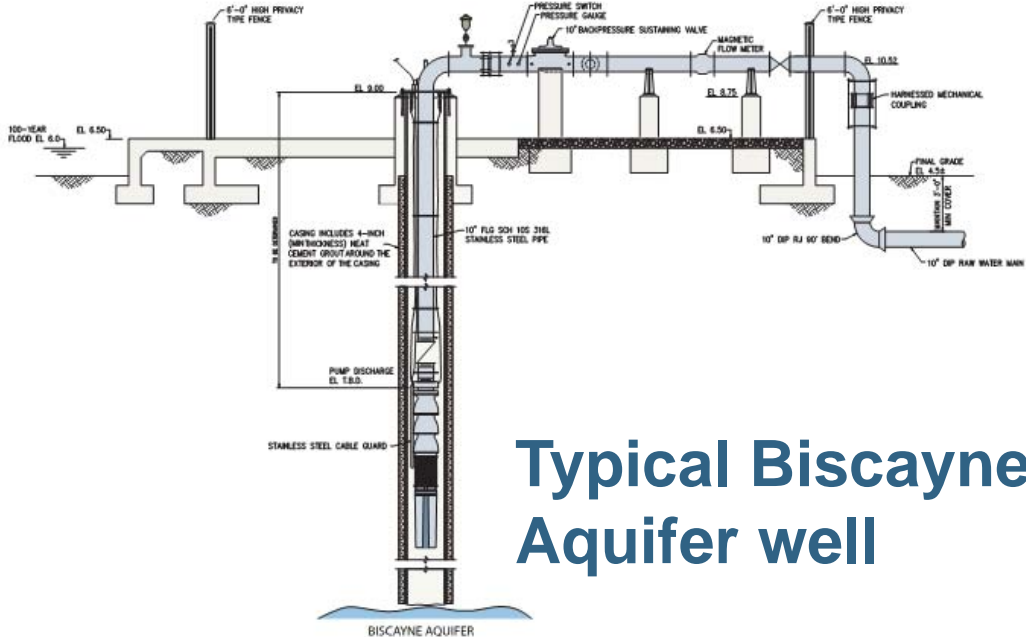


National Geographic, Esri, De  
CEBCO, NOAA, Inverment P

# The City wells are monitored through a salt water monitoring network.



# The salt water monitor wells provide warning of intruding salinity into the Biscayne Aquifer wells.

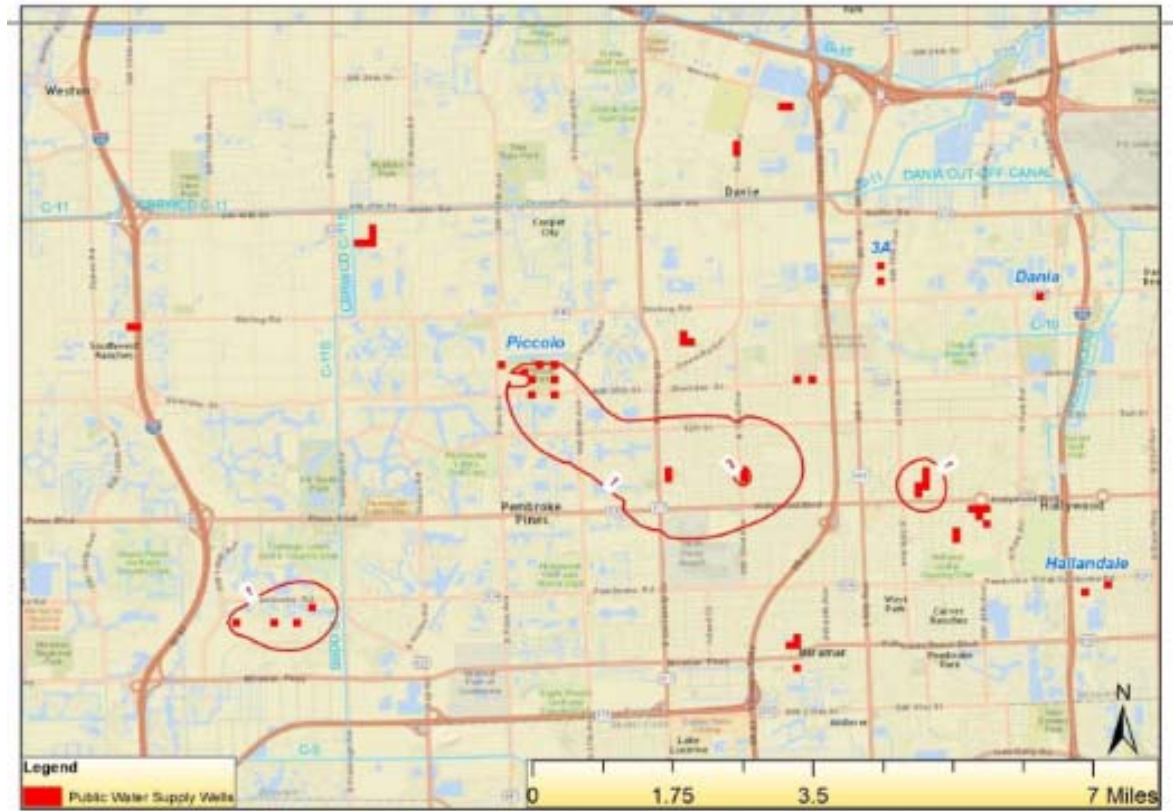


## Typical Biscayne Aquifer well



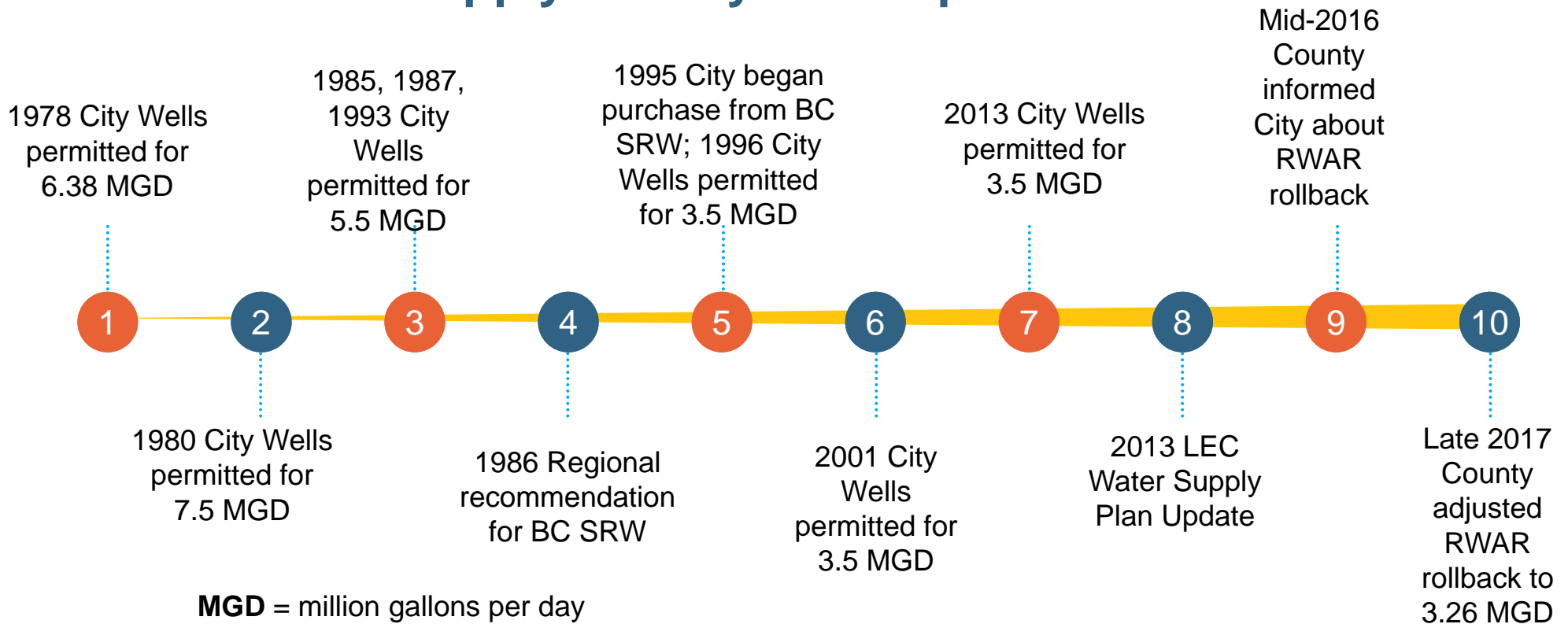
## City Water Supply 2 = Broward County Wells

The Broward County South Regional Wellfield ( BC SRW) at Brian Piccolo Park is located farther west.



End of 1-in-10 Dry Year Cumulative Drawdown (ft) in Layer 1 for South Regional 2065 Allocation 17.32 MGD (Run3)

# Because of the saltwater threat, the City of Hallandale Beach's Water Supply History is Complex



**MGD** = million gallons per day

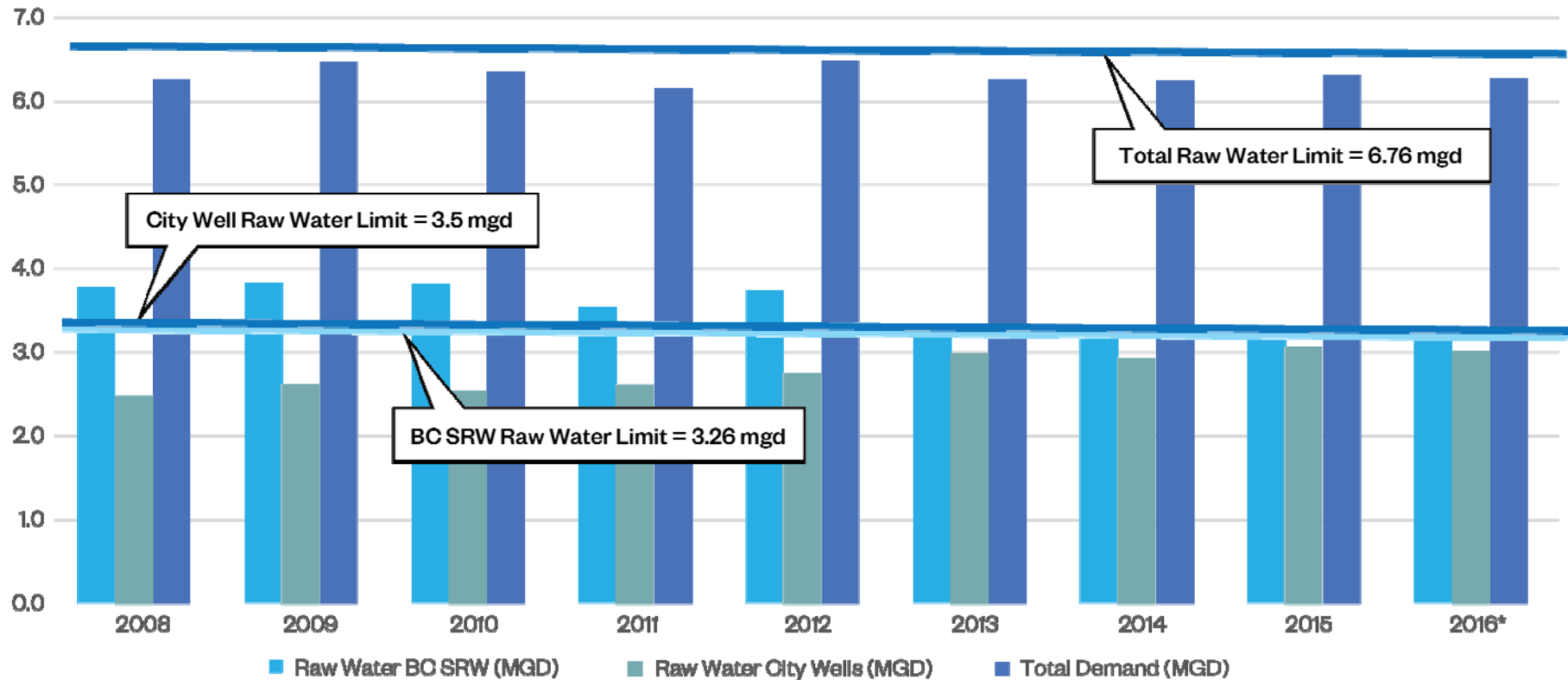
**BC SRW** = Broward County South Regional Wellfield at Brian Piccolo Park

**RWAR** = Regional Water Availability Rule

**SFWMD** = South Florida Water Management District



# The City treats more than 6 million gallons per day (MGD)...



..and is approaching current permit limits.



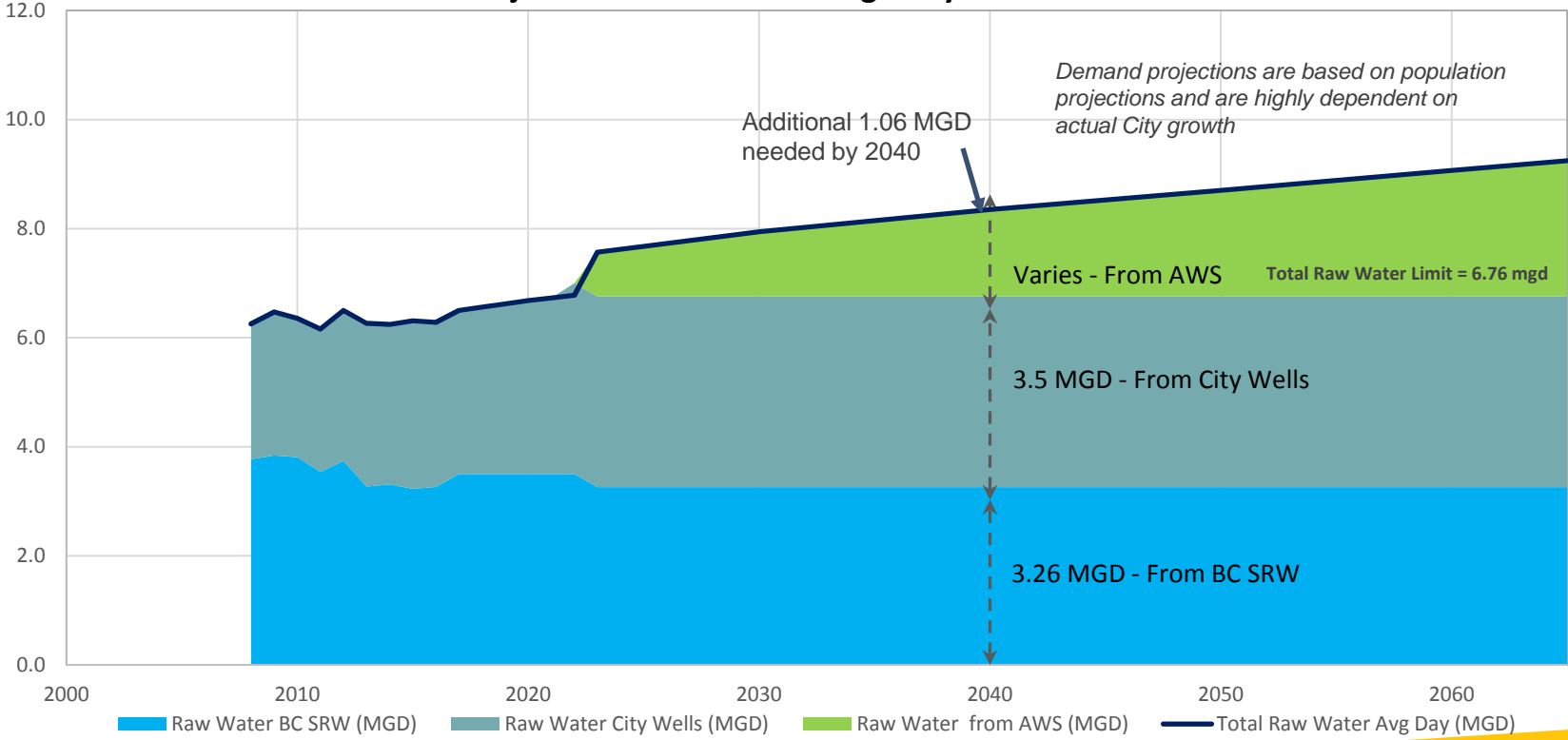


## The City has immediate need for Alternate Water Supply (AWS)

Year	Hallandale Beach Service Area	Total Raw Water Needed for City	Raw Water from BC SRW	Raw Water from City Wells	Raw Water Shortfall (from AWS)
	Population	Avg Day (MGD)	Avg Day (MGD)	Avg Day (MGD)	Avg Day (MGD)
2020	40647	6.68	3.26	3.42	0.00
2025	42110	7.68	3.26	4.03	0.39
2030	43574	7.94	3.26	4.03	0.65
2040	45818	8.35	3.26	4.03	1.06

# The City is now required to renew the SFWMD water use permit and...plan for AWS

### City of Hallandale Beach Projected Raw Water Average Day Demand



## Near Term and Long Term AWS Options Exist for the City

- **Request 0.53 mgd increase** in City allocation to 4.03 MGD (through ongoing SFWMD permitting efforts); **Construct PW 9, raw water pipeline, and RO skid** (currently budgeted)
- **C51 Participation** – sign Agreement for 1 MGD with Palm Beach Aggregates/then receive water through current BC SRW supply system (budgeted in recent rate study)
- **Floridan Aquifer/Reverse Osmosis Treatment** – study, model, plan, design and construct wells, reverse osmosis skids, additional water treatment plant infrastructure (consider for long term)



## Near Term and Long Term AWS Options Exist for the City

- **Increase City Allocation to 4.03 MGD Biscayne Aquifer (BA)**
  - \$0 (previously planned capital investments – PW 9 and RO Skid)
  - \$0.43 to \$0.86/1,000 gallons (O&M total)
    - \$0.03/1,000 gallons (O&M – water supply – BA wells)
    - \$0.40/1,000 gallons (O&M - Lime Softening – while wells remain fresh)
    - \$0.83/1,000 gallons (O&M – reverse osmosis – if wells become salty but still treatable)

Adds 0.5 MGD  
of Biscayne  
Aquifer supply  
through City  
Wells

## Near Term and Long Term AWS Options Exist for the City

- **C51 Participation (Raw Water Purchase through BC SRW)**
  - \$4.60 million (capital – C51)
  - \$1.06/1,000 gallons (O&M – total)
    - \$0.009/1,000 gallons (O&M – water supply – PBA - C51)
    - \$0.085/1,000 gallons (O&M – water supply – SFWMD - C51)
    - \$0.006/1,000 gallons (O&M – water supply – LWDD - C51)
    - \$0.23/1,000 gallons (O&M – water supply – BC SRW)
    - \$0.73/1,000 gallons (O&M – water treatment (nanofiltration))

Adds 1.0 MGD  
Biscayne  
Aquifer supply  
through County  
wells

## Near Term and Long Term AWS Options Exist for the City

- **Floridan Aquifer/Reverse Osmosis Treatment**

- ~\$11.5 million (capital – FA wells plus pipeline, WTP improvements)
- \$0.97\*/1,000 gallons (O&M – total)
  - \$0.14/1,000 gallons (O&M – water supply – FA wells)
  - \$0.83/1,000 gallons (O&M – water treatment - reverse osmosis)

\* Capital and O&M costs are dependent on water quality (chlorides/TDS) and resultant safe yield of Floridan Aquifer – TBD during well modelling and development

Adds 1.0 MGD  
AWS through  
Floridan Aquifer  
wells



## Next Steps



**Sign** Agreement to Continue with C-51 Reservoir as the Identified AWS for Near Term



**Continue** SFWMD Permitting with AWS Identified



**Weigh** Benefits and Risks of Options and **Select** Long Term AWS for Study and Design

**Update** CIP Accordingly

# Questions?

