WHAT IS A DEEP INJECTION WELL?

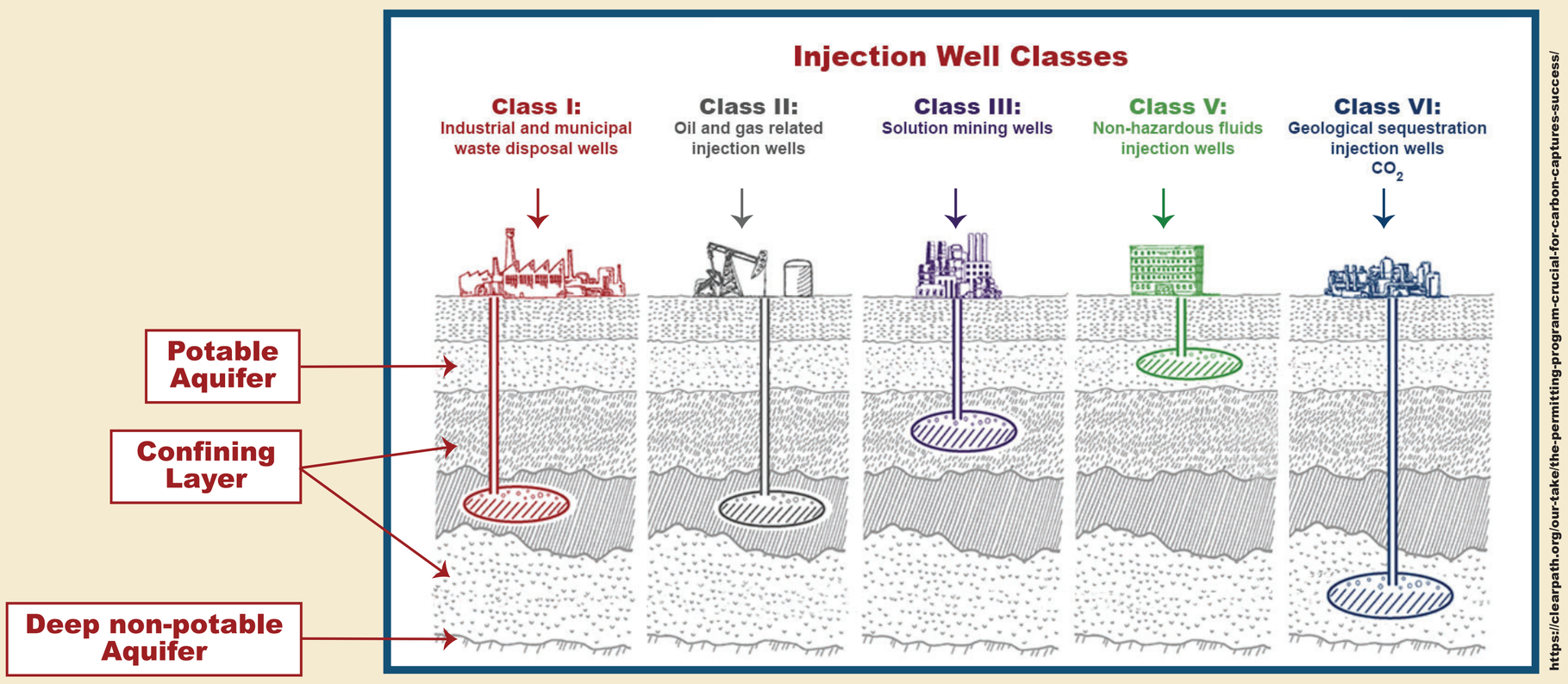
A Deep Injection Well (DIW) is an engineered system used to safely dispose of fluids, including landfill leachate. Class I DIWs are regulated by the Florida Department of Environmental Protection's (FDEP) Aquifer Protection Program under the Environmental Protection Agency's (EPA's) Underground Injection Control program.

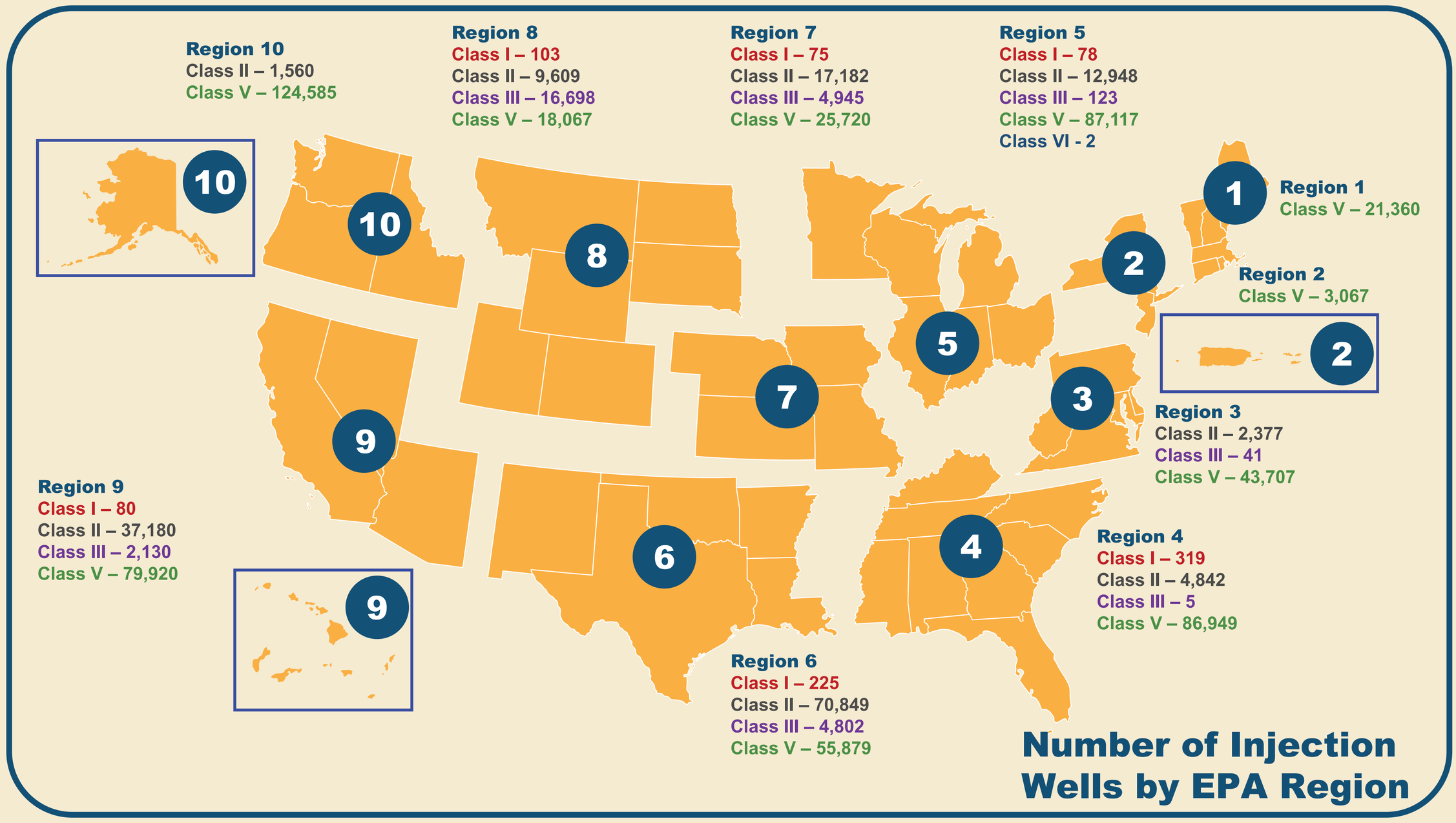
Monitoring is regulated under Rule 62-528.425, Florida Administrative Code (F.A.C.) and is accomplished using a dual zone monitoring well (DZMW) to confirm the long-term effectiveness of the confining zone. Reporting is performed under Rule §62-528.430(2), F.A.C.

PROTECTS DRINKING WATER

- Impermeable seals
- Redundant casing
- Cemented casing
- Continuous monitoring
- Testing and reporting

FUN FACTS





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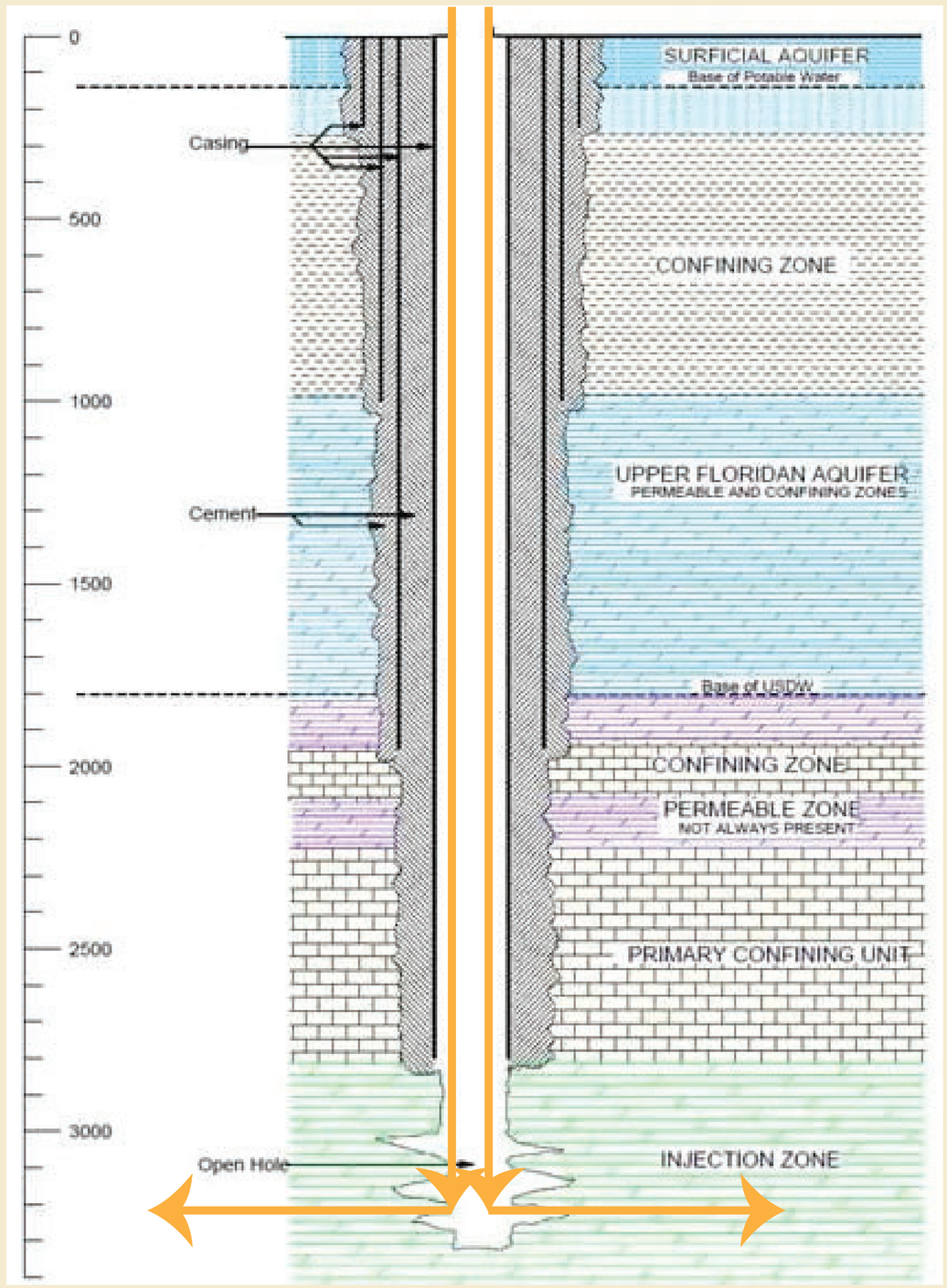
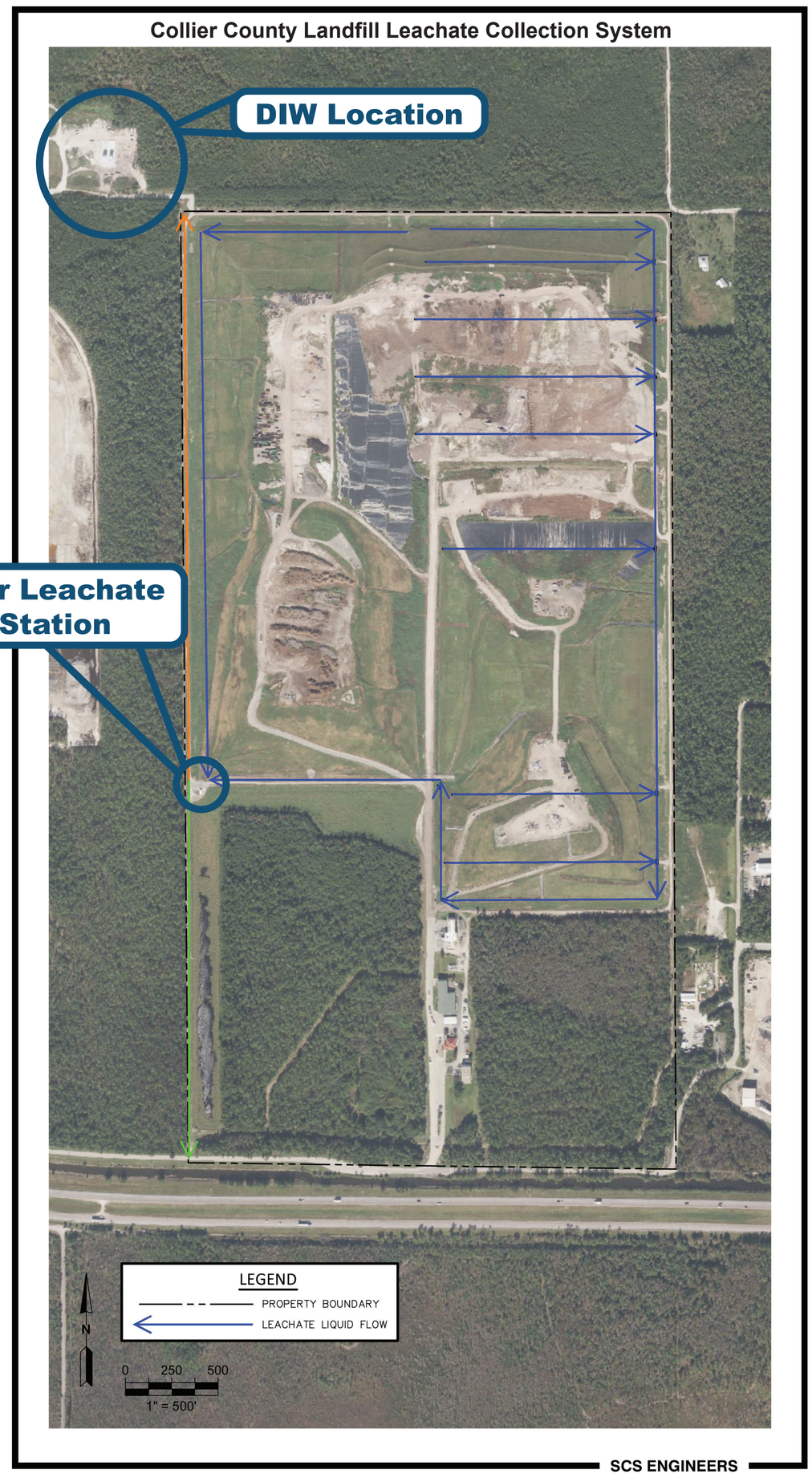
LIQUID MANAGEMENT - COLLIER COUNTY LANDFILL



Historically, landfill leachate was conveyed to the South County Regional Water Reclamation Facility.

The new DIW offers a long-term sustainable solution for liquids management at the landfill and frees capacity at the South County Regional Water Reclamation Facility.



Injection Well (IW)

Well Name	WACS Testsite ID	Well Depth (Feet bls)	Casing Diameter (OD* Inches)	Casing or Tubing Type	Casing Depth or Interval (Feet bls)
IW-1	14055	2,900	40	Steel	306
			30	Steel	1,303
			20	Steel	2,225
			8.8	FRP	2,216
			Open Hole		2,225 – 2,900

Injection Well Notes: Constructed with new, unused steel and fiberglass-reinforced plastic (FRP) with a fully cemented annulus. *Outside diameter (OD)

Monitor Well (MW)

Well Name	WACS Testsite ID	Monitor Zone	Casing Diameter (OD Inches)	Casing Type	Casing Depth (Feet bls)	Monitoring Depth (Feet bls)
DZMW-1			26	Steel	306	
			16	FRP	1,055	
	30953A	Upper Zone				1,055 – 1,144
			6.1	FRP	1,338	
	30953B	Lower Zone				1,338 – 1,571

Monitor Well Notes: Constructed with new, unused steel and FRP with the fully cemented annulus except for an open zone to allow for sample collection.

PROTECTION OF UNDERGROUND SOURCES OF DRINKING WATER

- Confining zone prevents leachate migration into protected underground sources of drinking water
- Leachate injected under controlled pressure and flow
- Four cemented steel casing strings ensure mechanical integrity
- Adjacent dual zone monitoring well identifies fluid movement near the well bore and confirms long-term effectiveness of confining zone

FUN FACTS

- 24,000,000 gallons of leachate are produced annually from landfill activities (66,000 gallons per day)
- DIW has a permitted capacity of 2,170,000 gallons per day
- DIW saves $1,500,000 per year in operating costs

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TIMELINE AND COSTS

2014 - 2016

August 2014 - December 2016
Initial Planning, Design & Permitting

September 2016
FDEP Construction & Testing Permit Issued - 5 Years

2019

June 2019
Design Resumes

November 2019
Construction Commences on Well Drilling & New Water Main

2020 - 2021

April 2020 - February 2021
Well Drilling & Completion

February - September 2021
Aboveground Storage Tank (AST) Construction

July 2021
FDEP Permit Renewal Application Filed

2022

January 2022
Project Team Conducts Operation of DIW System for FDEP Inspection

February 2022
FDEP Approval to Commence Operational Testing for 2 Year Period
Operations Commence

March 2022
Commence Monthly Water Quality Monitoring of DIW & DZMW

March - September 2022
Final Site Improvements

March - November 2022
DIW Pump Station & Containment

May 2022
New FDEP Construction & Testing Permit issued - 5 Years

2023

March 2023
Required 12-Month Minimum Monthly Water Quality Monitoring will be Completed

2024

February 2024
Data Analysis & Operating Permit Application Due to FDEP

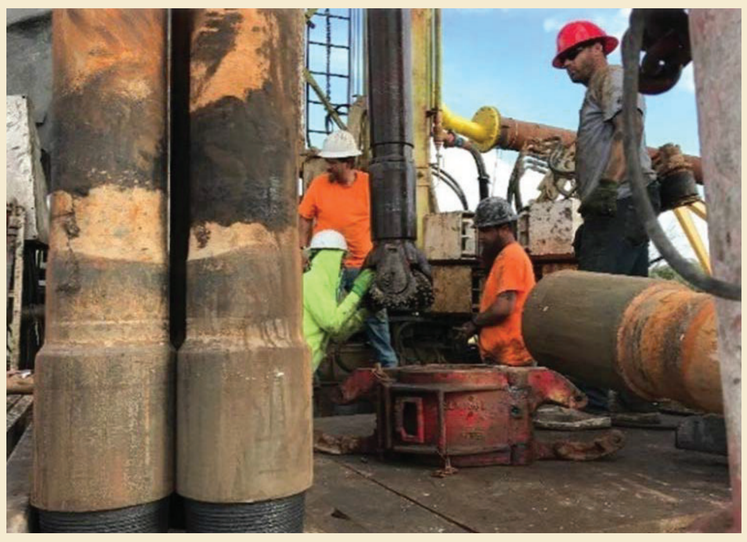
Summary of DIW Costs

Project Budget	**$13,372,482**
Planning, Design, Permitting, Construction	$2,444,782
Engineering & Inspection (CEI), Construction Administration, Supervisory Control and Data Acquisition (SCADA) Final Cost	$2,444,782
Construction Final Cost	$10,274,711
Total Project Costs	**$12,719,492**
Total Project Savings	**$652,989**
	5% Saved
ROI Projection	**8.5 Years**

Aboveground Storage Tank

- **Met start-up date (February 2022) by substituting variable frequency drives (supply chain delays) with soft starters**
- **In the first 10 months of operation, ~18,000,000 gallons of leachate were injected at a savings of ~$1,080,000 in disposal costs**
- **Each aboveground storage tank holds 50,000 gallons and has approximately 2,500 bolts!**

FUN FACTS



Deep Injection Well Drilling

Aboveground Storage Tank Construction

Deep Injection Well/Dual-Zone Monitoring Well Sampling

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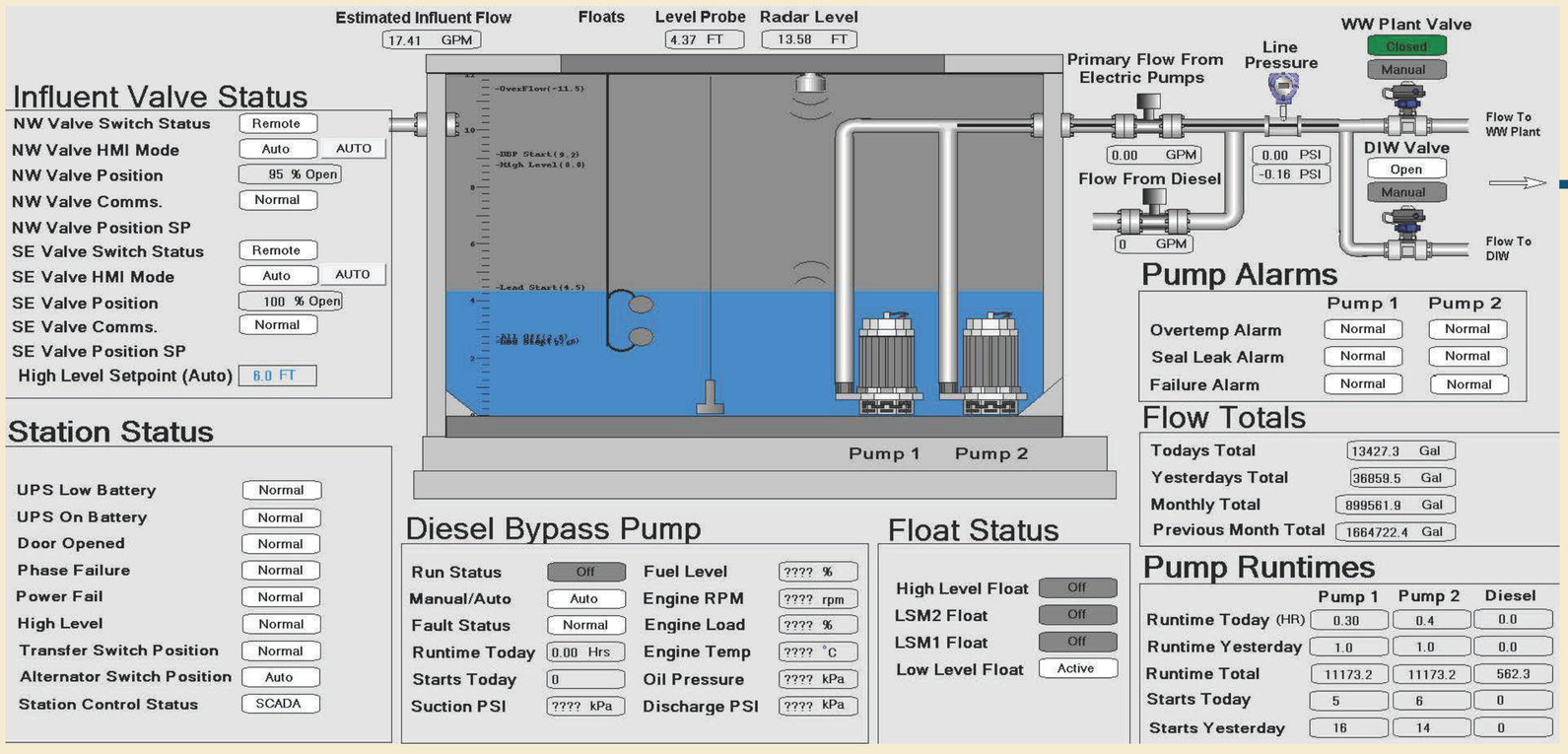
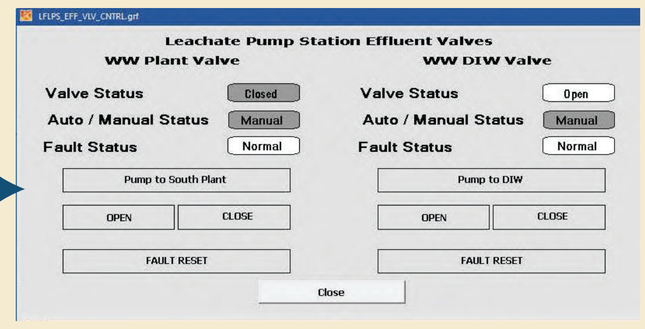
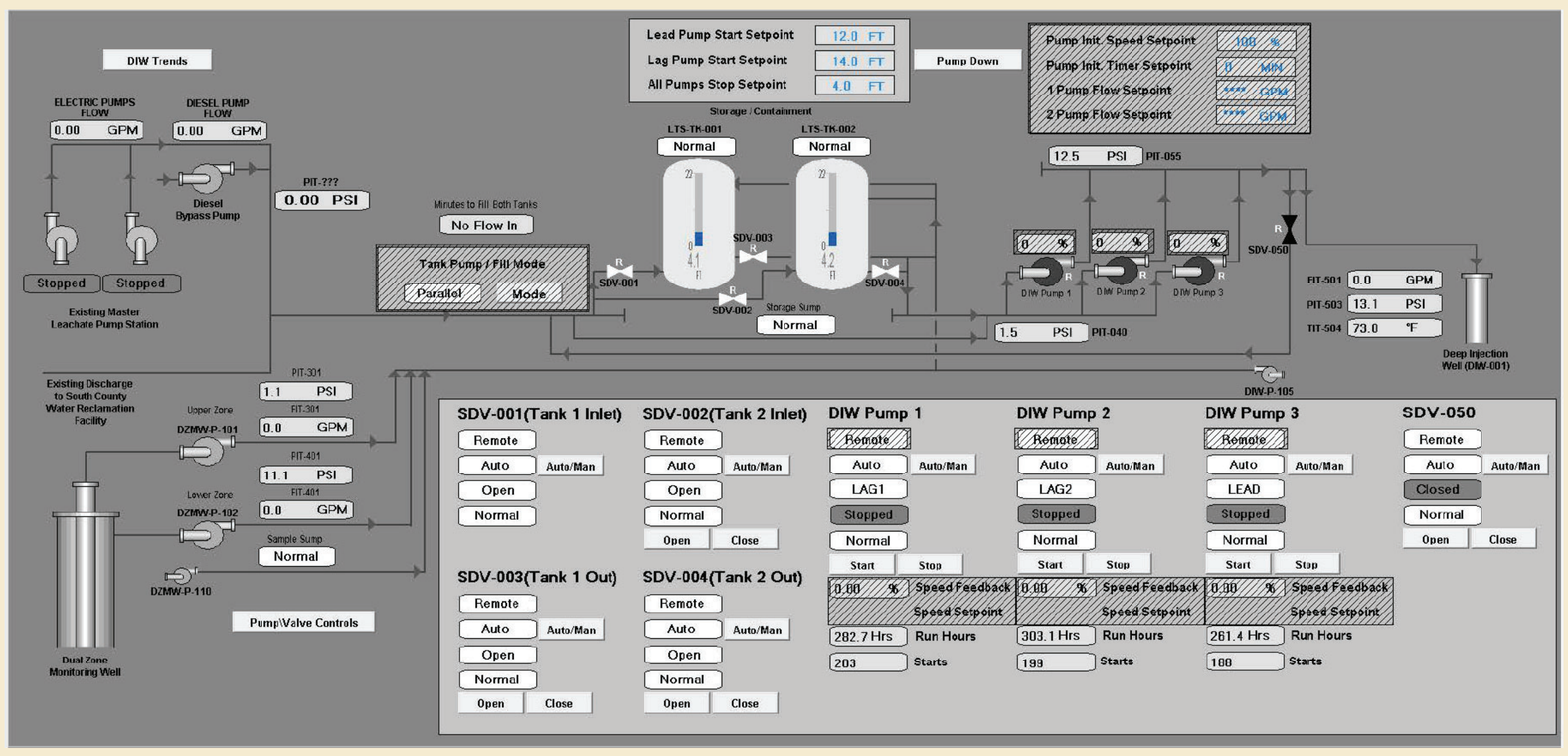
RESILIENCY AND STATE OF THE ART TECHNOLOGY







BENEFITS

- Long-term, sustainable liquids management system with room for future expansion
- Dual casing and dual zone monitoring to protect aquifers
- Approved by EPA and FDEP as sustainable and reliable disposal
- Hurricane resiliency
- Small surface footprint
- SCADA system provides 24/7 state-of-the-art remote monitoring
- Provides redundant disposal systems

Dual Zone Monitoring Well

Aboveground Storage Tank Foundation Pour

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