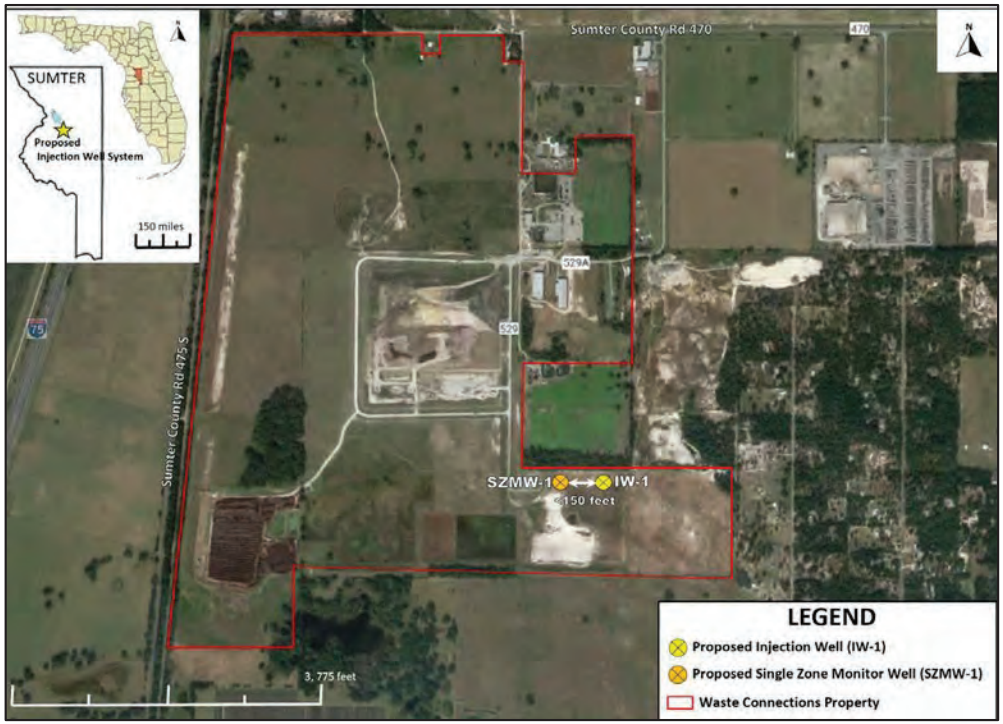


Heart of Florida Landfill Leachate Disposal Well

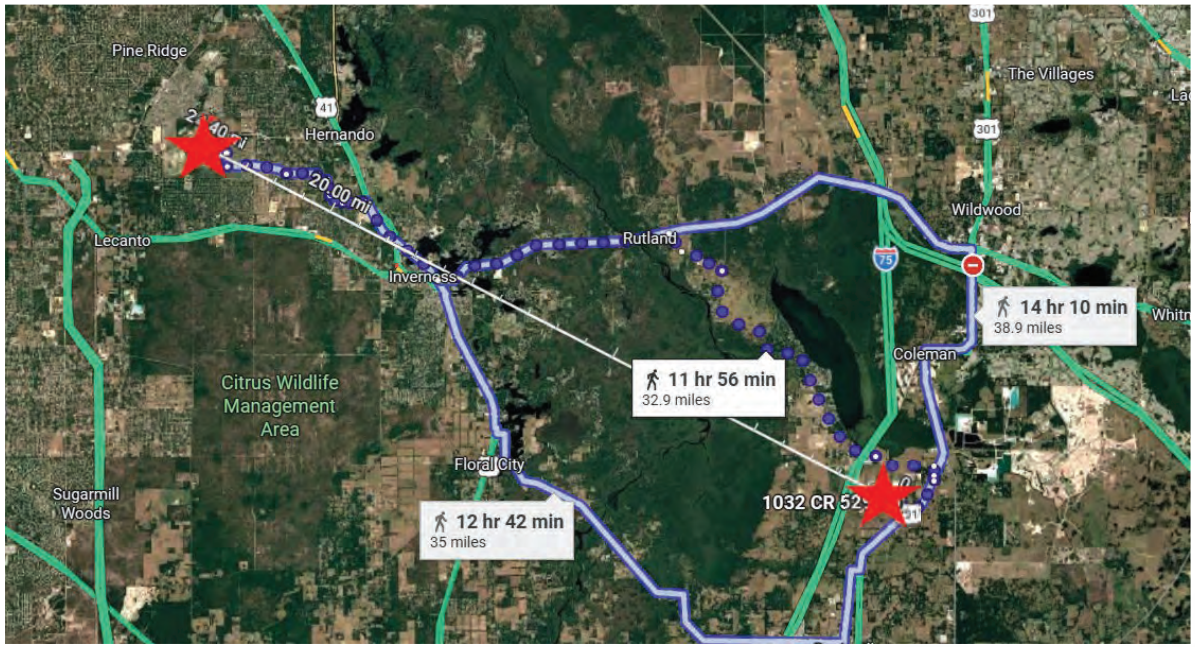
INTERA

Outline

- Issue Background
  - Landfill Background
  - Proximity to WRWSA Wellfield
  - HOFL Permits
  - Leachate
  - General Injection Well Information
- Status of Current Activities
  - Proposed DIW Construction
  - Hydrogeology & Potentiometric Maps
- Future Expectations
  - Plan for Class I DIW
  - Potential well problems, failure modes, and mitigation
  - Recommendations
  - Wellhead Protections Zones

WRWSA Proximity to Landfill

Landfill and proposed injection well are approximately 24 miles southeast of WRWSA Charles A Black Wellfield



INTERA

Heart of Florida Landfill (HOFL) Background

- Located in Sumter County north of Bushnell and southeast of Lake Panasoffkee between I-75 and 301

INTERA

Heart of Florida Landfill (HOFL) Background

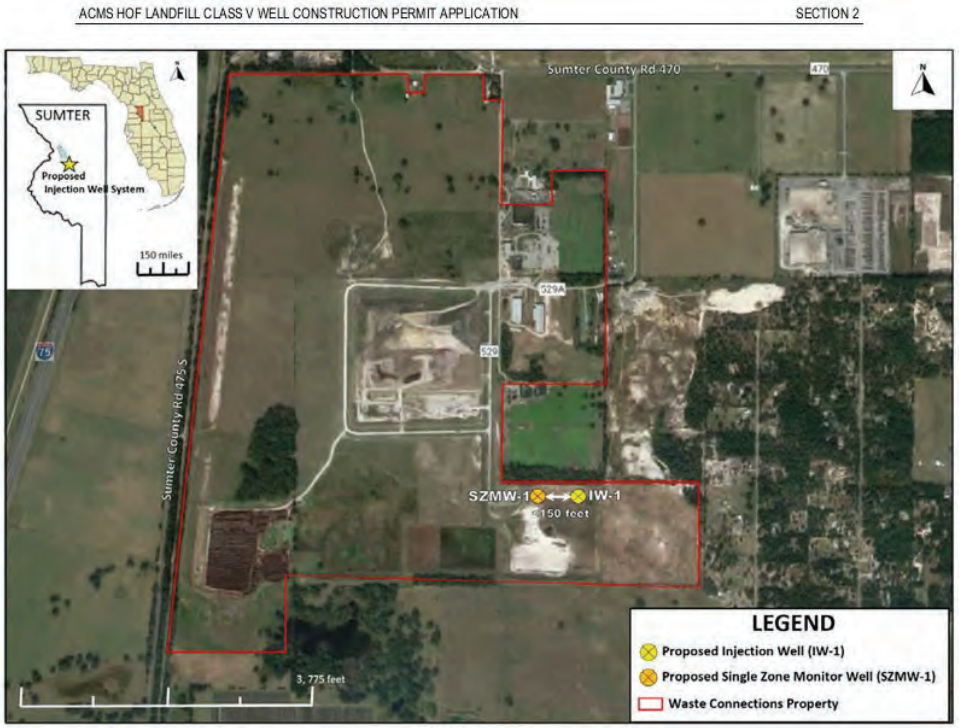


Figure 2-1
Heart of Florida Landfill Site Location Map

- Operated by A.C.M.S. Inc., a subsidiary of Waste Connections, Inc.
- Landfill began accepting waste in 2013.

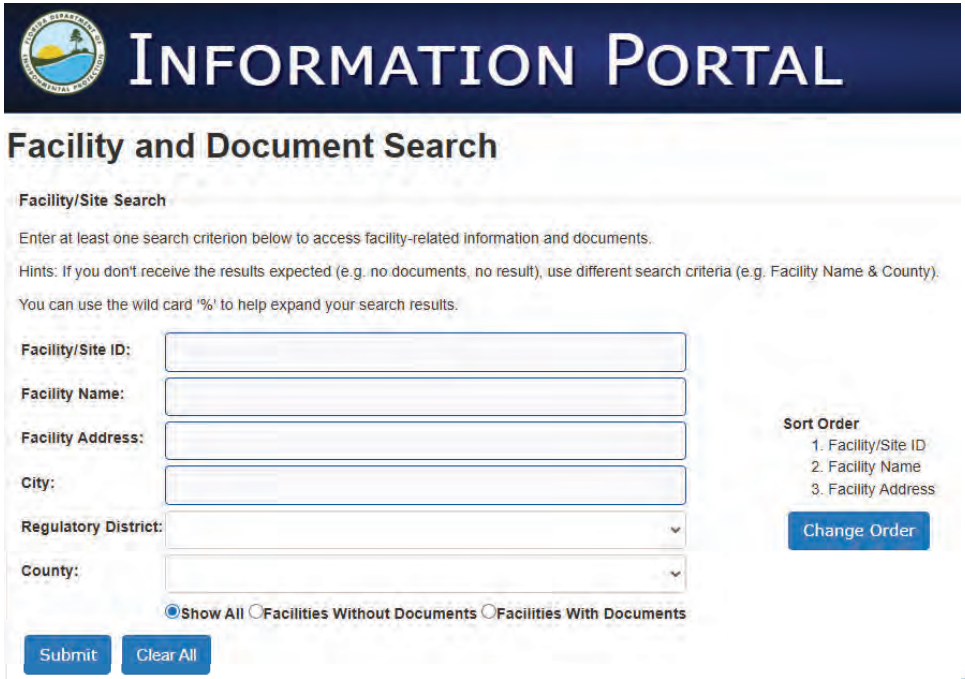
INTERA

Heart of Florida Landfill **Permits**

Florida Department of Environmental Protection

- Air Facility: **1190053**
- Solid Waste Facility: **85764**
- Underground Injection Control Facility: **108384**

- https://prodenv.dep.state.fl.us/DepNexus/public/searchPortal



INTERA

INFORMATION PORTAL

Nexus
Enterprise Solutions

Facilities Search Results

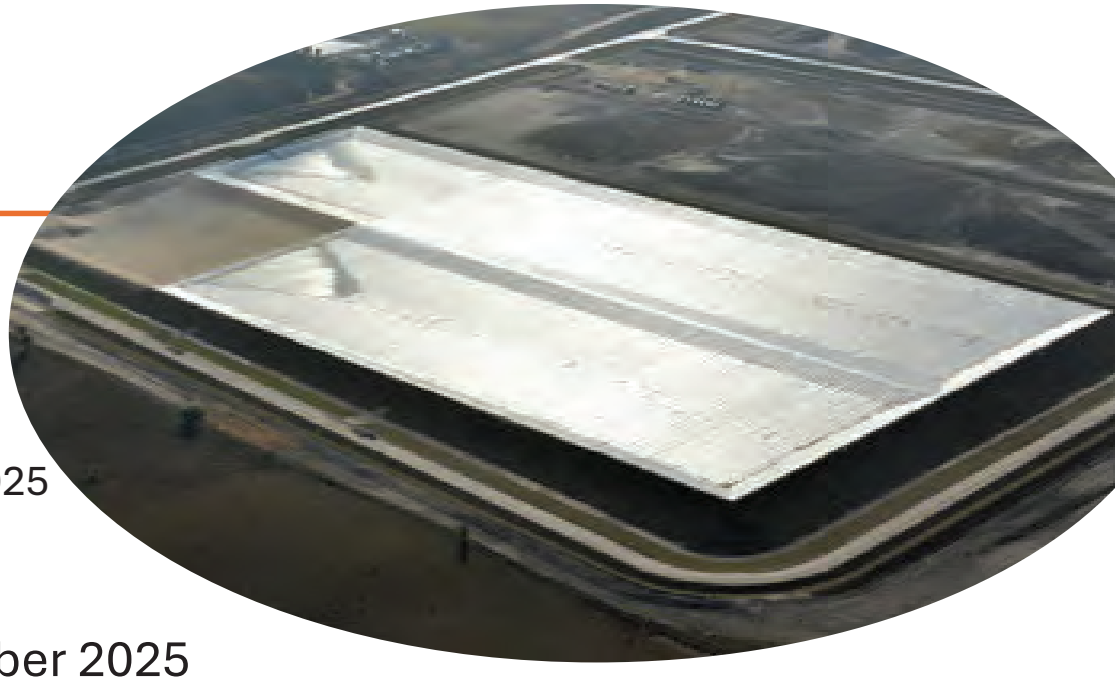
Criteria selected:
Facility ID = 108384
Searching For = Search all facilities

For additional information, select the hyperlinks under "Data Links" where available.
D - Provides a list of electronic documents associated with the facility.
F - Provides a facility summary report.
P - Provides facility-related permit information.
M - Provides a GIS map focused on the facility.
Q - Provides a contact for user questions and quality control.

Records on this page = 2 of 2
Your search returned these facilities:

Facility/Site Id	Facility Name	District	County	Address	City	Program	Facility Type	NPDES	Data Links
SQG_108384	CAR COLORS	N/A	HILLSBOROUGH	5101 SPRUCE 1	TAMPA	HW	HW		Q
108384	ACMS, INC. HEART OF FLORIDA	CD	SUMTER	1032 COUNTY ROAD 529	LAKE PANASOFFKEE	UIC	UIC		D P M Q

HOFL UIC Permit Overview



Class V Exploratory Well

- Application May 2024
- Issued March 2025
  - Major Modification Application August 2025
  - Application Withdrawn October 2025

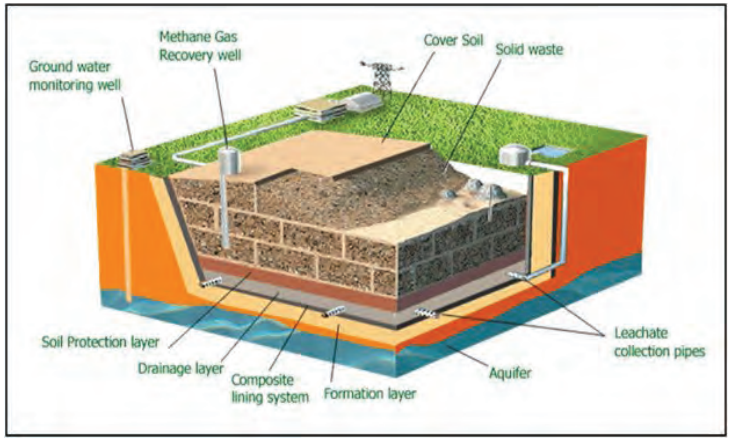
- Construction drilling began in December 2025
- 13 weeks of drilling , 1400 feet deep as of March 2, 2026

- After Construction
  - Testing
  - Apply to covert to **Class I Injection Well for leachate disposal**

INTERA

About Leachate

- Leachate is generated when rainwater percolates through landfill waste.
- Modern landfills have linings and leachate collection pipes.
- Leachate may contain concentrated levels of metals and other contaminants, but it is not typically classified as “hazardous waste.”



Source of graphic: Landfills - Collaborative Solid Waste Strategies

HOFL Leachate water quality testing data

(Source: Permit application, page 3-19)

Table 3-2
ACMS HOF Landfill Leachate Water Quality

Parameter	Units	Results
Inorganics		
Bromide	mg/L	71 I
Chloride	mg/L	4,000
Fluoride	mg/L	40 U
Sulfate	mg/L	400 U
Total Alkalinity	mg/L	3,400
Metals		
Aluminum	µg/L	2,400
Arsenic	µg/L	200
Barium	µg/L	60
Cadmium	µg/L	2.5 U
Calcium	mg/L	79
Chromium	µg/L	760
Copper	µg/L	50 U
Iron	µg/L	4,400
Lead	µg/L	15 U
Magnesium	mg/L	95
Manganese	µg/L	430
Mercury	µg/L	0.082 I
Potassium	mg/L	1,200
Sodium	mg/L	3,200
Zinc	µg/L	250 U

NA = Not applicable
I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U = The compound was analyzed for but not detected.

Primary Drinking Water Standards

- Fluoride: 4.0 mg/L.
- Arsenic: 0.010 mg/L.
- Chromium: 0.10 mg/L.

Secondary Drinking Water Standards

- Aluminum: 0.2 mg/L.
- Manganese: 0.05 mg/L.
- Chloride: of 250 mg/L.
- Sulfate: 250 mg/L.

INTERA

Typical Leachate Management Options

Leachate management regulated by FAC 62-701.500(8)

- On-site storage in open ponds or storage tanks
- Recirculate leachate
- Evaporate leachate
- Haul leachate to off-site facilities for treatment and disposal (e.g. treatment at a local wastewater treatment plant)
- Class I - deep injection well disposal

HOFL Leachate Handling History

- Prior to 2025 – Leachate stored onsite in 3.5-million-gallon storage bladders and 240,000 gallons of above-ground storage tanks, then hauled to local wastewater recovery facility for treatment.
  - 12 million gallons of leachate in 2023
  - equates to approximately 23 gallons per minute

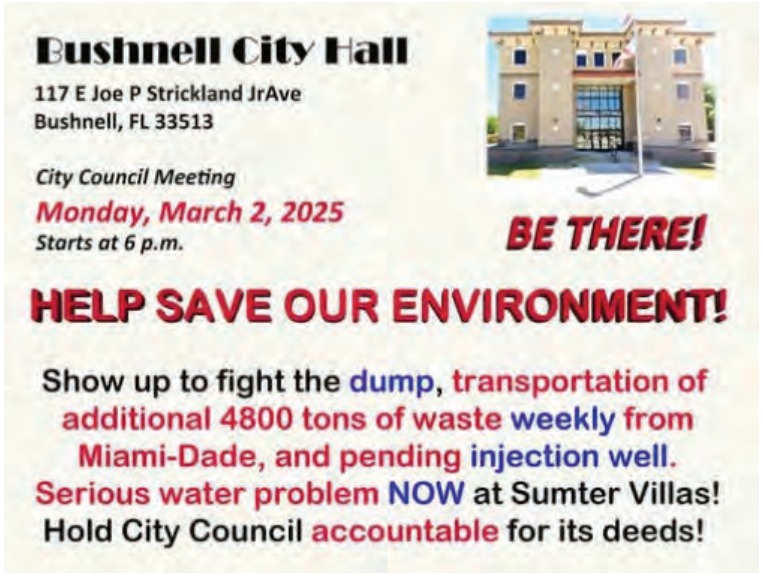
  (source: Class V injection well permit application, p. 3-18)

HOFL Leachate Handling History

- February 28, 2025 – ACMS began operating leachate evaporator.
- Summer 2025 – FDEP inspectors responded to local residents' odor complaints and inspections document odor problems.
- July 8, 2025 – ACMS decommissioned leachate evaporator.
- September 5, 2025 – ACMS surrendered evaporator permit.
- **December 11, 2025 – FDEP Consent Order issued on the Air Permit to resolve odor complaints. 21-day petition period opens.**
- **Part of issue resolution is plan to dispose of leachate in onsite deep injection well (DIW).**

Public Concerns

- Community concerns regarding the landfill include:
  - General concern regarding landfill operations.
  - Specific concerns regarding potential plans to accept waste from south Florida by way of new rail spur.
  - Persistent odor complaints.
  - **Concern about potential damage to Floridan aquifer from deep injection well (DIW).**
- Significant public write-in campaign requesting public meetings.

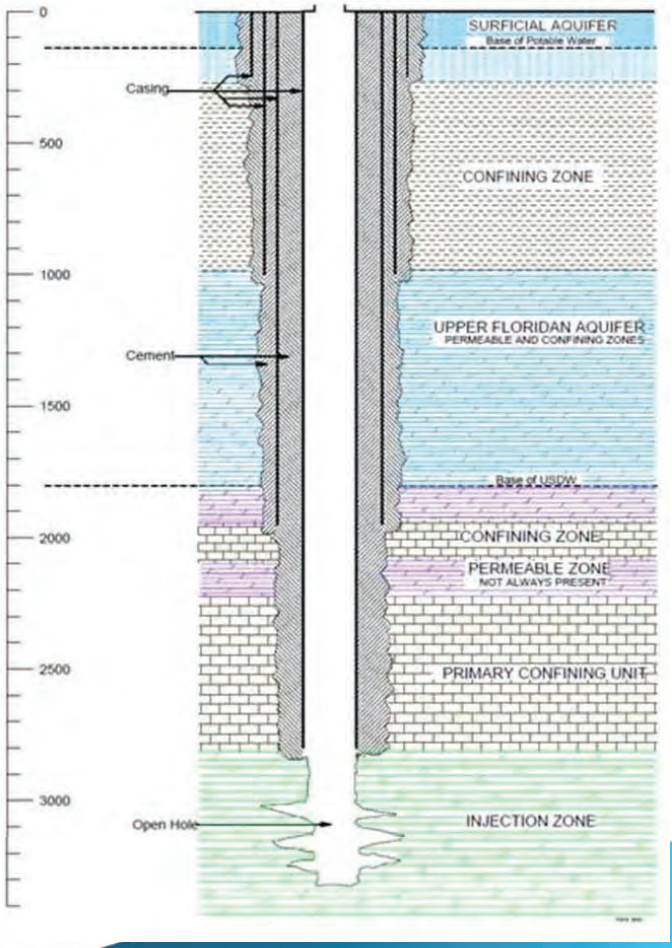


Major Types of Injection Wells in Florida

FDEP Underground Injection Control (UIC) office regulates DIW.

- **Class II** : Associated with oil and natural gas production.
- **Class III:** Mineral Extraction (none in Florida)
- **Class IV**: Dispose of hazardous or radioactive waste into the USDW (banned in FL)
- **Class VI**: Used for geologic sequestration of carbon dioxide

https://floridadep.gov/water/aquifer-protection/content/uic-wells-classification



INTERA

Major Types of Injection Wells in Florida

- **Class V Wells**: Disposal of non-hazardous fluids into or below USDW:
  - Aquifer Storage and Recovery (ASR) Wells: Store treated drinking water in an aquifer for future recovery.
  - AC return wells
  - Stormwater Drainage Wells: Manage stormwater runoff.
  - Exploratory Wells intended to eventually be Class I
  - Lake Level Control/Heat Pump Wells: Manage water levels or act as air conditioning return flow.
- **Class I Wells**: Used for injecting municipal or industrial wastewater deep below the lowest underground source of drinking water (USDW)
  - Class I wells typically start as “exploratory wells” permitted as Class V, and not allowed to inject fluids until regulatory criteria are met.

https://floridadep.gov/water/aquifer-protection/content/uic-wells-classification

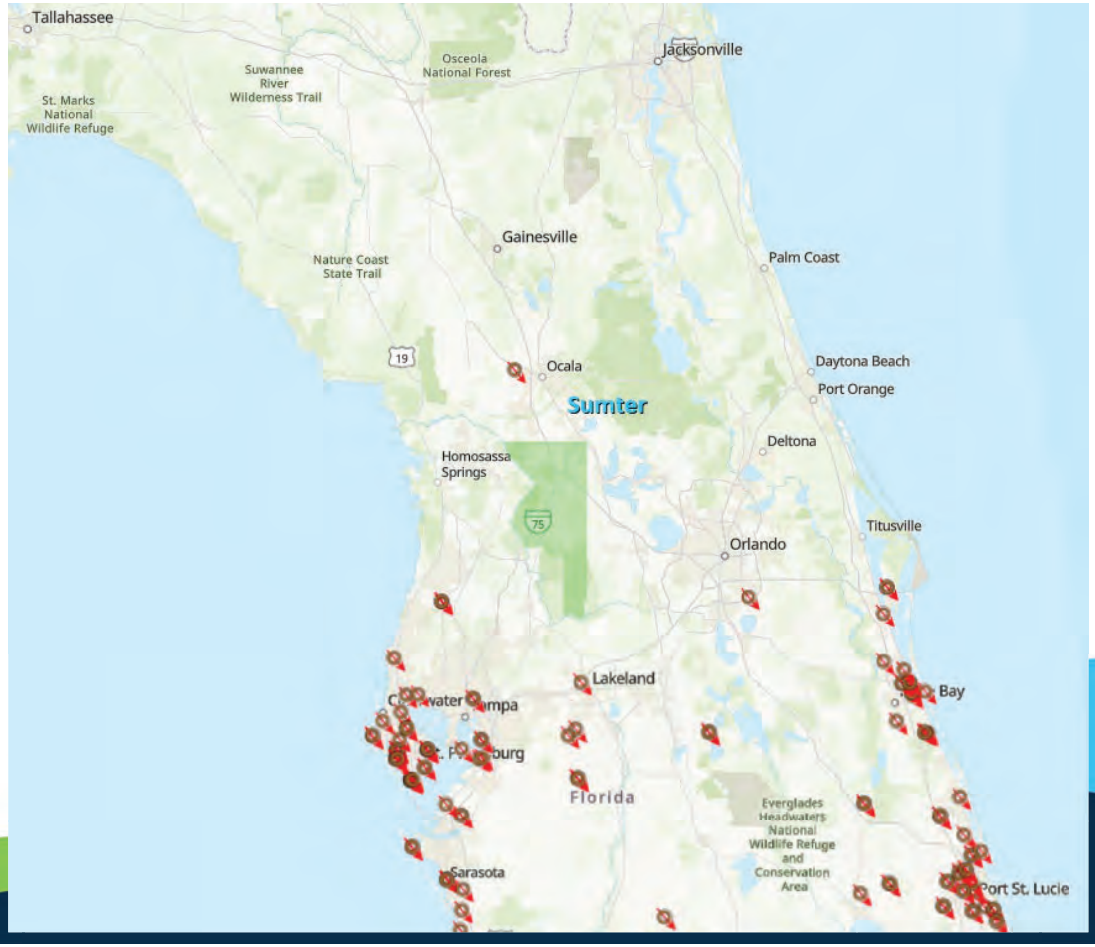
Pasco County Landfill Leachate Wells

INTERA

Existing Class I Injection Wells in Florida

Class I injection well locations:

- Marion County Northwest Water Reclamation Facility.
- Landfill leachate is Pasco County
- Orlando Utilities Commission for reverse osmosis concentrate



Class V Permit Requirements

- Class V exploratory permit for “exploration” is a preliminary step to a Class I permit for operations.
- Focus is construction and data gathering, NOT operational parameters (e.g. pressure, flow, disposal liquid chemistry).

- Permit requirement categories:
  - **General Requirements**
  - **Site Requirements**
  - **Construction and Testing Requirements**
  - **Quality Assurance/Quality Control**
  - **Reporting Requirements**
  - **Abnormal Events**

Injection Well Design & Construction Team

- Engineer of record, JMG Engineering, Inc. (Jason M. Gorrie, P.E.)
- Geologist of record, HydroGeo Consulting, LLC. (Michael Weatherby, P.G.)
- Youngquist Brothers, LLC. (Fort Myers, FL) Construction responsibility.

Similar team for Pasco County leachate disposal well.

- Permitting authority – Florida DEP, Underground Injection Control (UIC) - Dr. Richard Lobinske
- ARCADIS Inc. reported to be consulting for City of Bushnell on advisory basis.

INTERA

Information from HOFL Class V Permit

- Permit granted by FDEP UIC office on March 17, 2025.
- Facility ID 108384, Permit # 0450206-001-UC/5EX
- Class V exploratory well, designed for future use as Class I well.
- Class V well: **“The exploratory well permit does not allow injection into the well or disposal of wastewater. A future Class I injection well application for construction and testing is required before injection and operational testing after the exploratory phase.”**

- Injection Well designated name IW-1 to inject below confining layer.
- Monitor well designated name SZMW-1, located 150 ft. from IW-1 to monitor above confining layer.

Well Design Schematic

(Source: Permit application, page 2-3)

- Proposed leachate injection in the open hole below USDW confining layer, at depth of 2,700 – 3,200 ft. BLS.
- SZMW-1 is monitoring well to test base of lower Floridan aquifer for potential influence of leachate. Estimated depth of 1,950 to 2,050 ft. BLS (adjustable based on conditions found).
- Both wells designed with concentric rings of seamless steel casing, cemented in place, with final fiberglass reinforced plastic (FRP) liner.

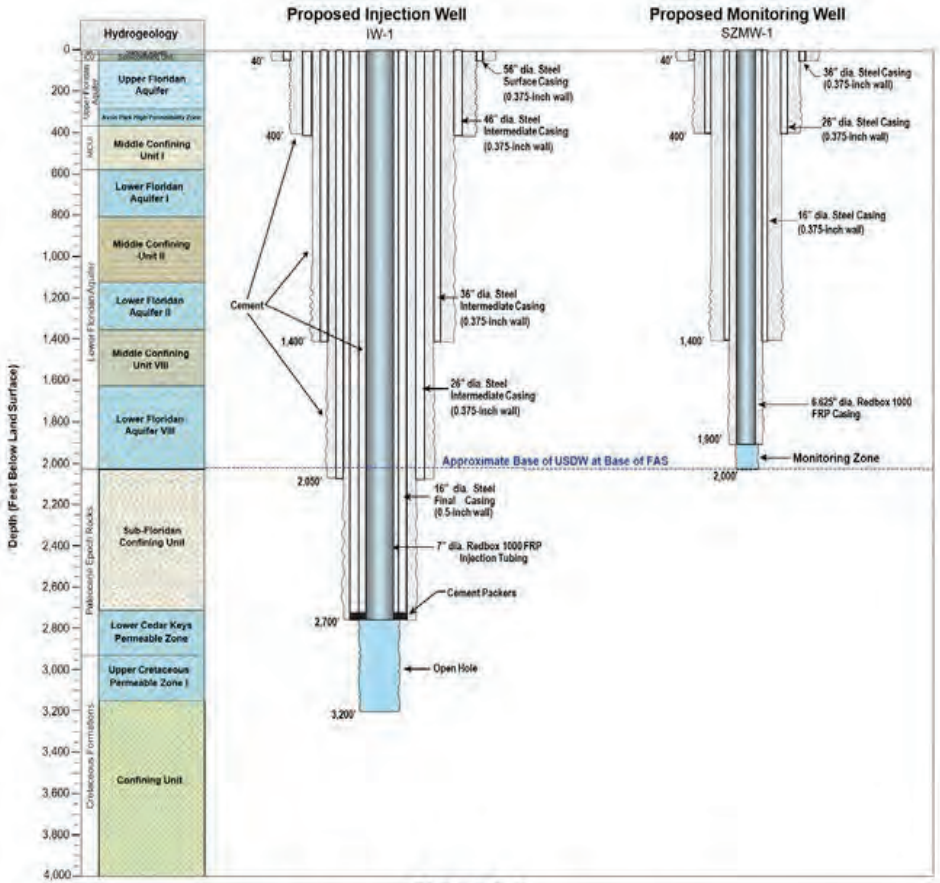


Figure 2-2
Wells IW-1 and SZMW-1 Design Schematic

INTERA

Casing Plan

- 5 concentric casing types planned.
- All casings extend from surface downward.
- Casings cemented in place prior to next segment of construction.
- Intermediate casing helps isolate "fresh water" strata from brackish USDW.
- Final casing extends below the base of the lowest USDW.

(Source: Class V permit application p. 2-20)

Table 2-7
Injection Well Casing Summary

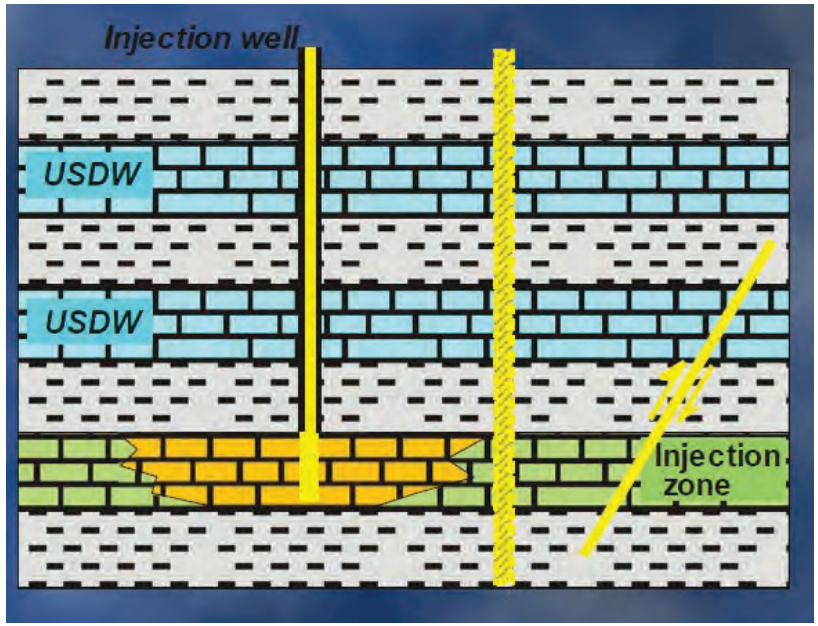
Casing String	Casing Diameter (inches)		Casing Wall Thickness (inches)	Approximate Casing Depth (feet bls)
	Inside	Outside		
Surface Steel Casing*	55.25	56.00	0.375	40
Intermediate Steel Casing	45.25	46.00	0.375	400
Intermediate Steel Casing	35.25	36.00	0.375	1,400
Intermediate Steel Casing	25.25	26.00	0.375	2,050
Final Steel Casing	15.00	16.00	0.500	2,700
7-inch diameter Red Box 1000 FRP Tubing	6.21	6.71	0.25	2,700
Anticipated Total Depth				3,200

Note: *Depth to be selected by the CONTRACTOR.

INTERA

Hydrogeologic Prerequisites for Class I DIW

- Below the lowest Underground Source of Drinking Water (USDW).
- Total dissolved solids > 10,000 mg/L
- Sufficient transmissivity to accept the expected quantities
- Sufficient layer of confinement must exist between the lowest USDW and the zone of injection



Calculation of “radius of influence”

(Source: Permit application, page 2-11)

Calculation of Potential Injection Well Radius of Influence
ACMS, Inc. Heart of Florida Landfill Well IW-1

Project Assumptions:

Factor	Value	Units	Comments
Thickness of the Injection Zone	200	feet	Sub Floridan
Aquifer Porosity	0.2	unitless	
Flow Rate	0.36	MGD	250 gpm
Injection Period	10	years	

1. Calculate the Water Volume Injected (Vw) into the Injection Well:
(= flow * duration)

Flow (mgd)	Duration (yrs)	Vw (ft^3)
0.36	10	175,668,449

2. Calculate the Aquifer Volume (Va) Affected by Injected Water:
(= water volume/porosity)

Vw (ft^3)	Porosity	Va (ft^3)
175,668,449	0.2	878,342,246

3. Determine the Aquifer Area Affected (Aa) by Injection Activities:
(= Aquifer Volume/effective aquifer thickness)

Va (ft^3)	D (ft)	Aa (ft^2)
878,342,246	200	4,391,711

4. Determine the Effective Radius (Re) Due to Injection Activities:
[= sqrt(Aa/Pi)]

Aa (ft^2)	Re (feet)
4,391,711	1,182

Assuming the injected water flows away from the injection well in a radial manner, the injection front is estimated to propogate 1,182 feet from the injection after 10 years of operation.

Figure 2-4
Calculated Injection Well Radius of Influence after 10 Years

- “Radius of influence” calculation required to estimate area of potential project impacts.
- **Estimated “radius of influence” = 1,182 ft.**
- Equivalent to area of 4,392,000 Sq. Ft.
- Calculation assumptions:
  - 10 Years of operation
  - Constant daily flow of 250 gpm (0.36 MGD, assumed maximum flow rate)
  - Injection zone thickness = 200 ft.
  - Porosity = 0.2 (unitless)
  - Uniform hydrogeology (i.e. no major fissures or fracture zones to influence fluid transport.)

INTERA

HOFL Leachate production data 2022-2023

(Source: Permit application, page 3-18)

Table 3-1
ACMS HOF Landfill Leachate Water Quantity

Month	Year 2022	Year 2023	Highest Volumes (between 2022 and 2023)
January	579,368	941,906	941,906
February	752,494	1,233,962	1,233,962
March	770,753	1,029,832	1,029,832
April	714,521	754,940	754,940
May	867,782	622,050	867,782
June	854,896	696,489	854,896
July	636,987	710,182	710,182
August	779,165	931,532	931,532
September	584,951	958,002	958,002
October	743,462	1,318,379	1,318,379
November	691,039	1,191,065	1,191,065
December	762,565	1,518,338	1,518,338
Annual Total Flow Disposed (gallons)	8,737,983	11,906,679	12,310,816
Annual Average Continuous Flow (gpm)	**16.6**	**22.7**	**23.4**

- Data presented to support estimates for future leachate production.
- Leachate is created by rainfall percolating through landfill.
- Currently, leachate is stored on site and then trucked to local WRF for treatment.
- **Radius of influence (ROI) calculation based on assumed continuous pumping of 250 gpm.**

INTERA

One Mile “Area of Review” (AOR) Radius

(Source: Permit application, page 2-13)

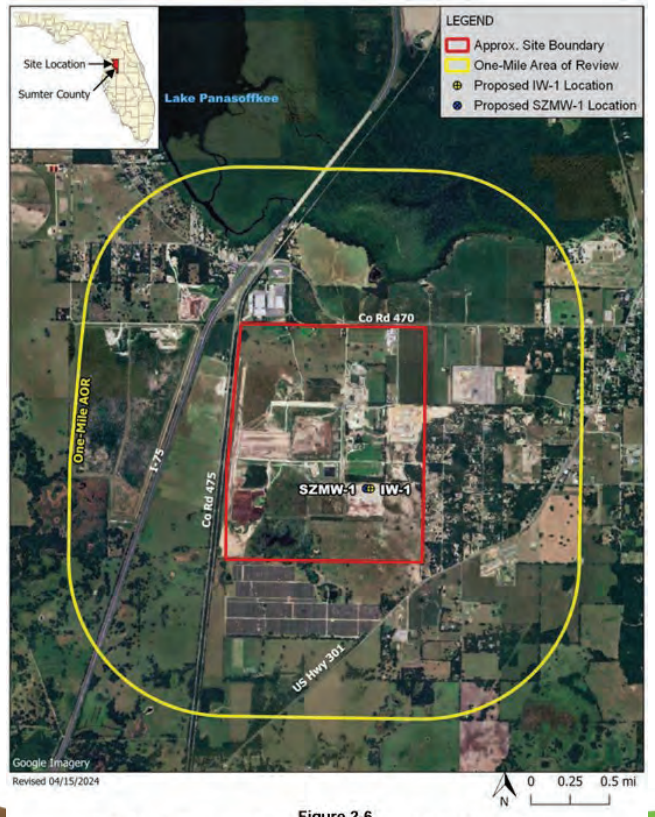


Figure 2-6
HOF Landfill Injection Well Location 1-Mile Area of Review Radius

- AOR used to evaluate potential impacts of project on neighboring wells.
- Permittee required to provide an inventory of existing wells within AOR.
- Review identified 729 existing wells.

INTERA

One Mile “Area of Review” (AOR) Radius

(Source: Permit application, page 2-14, 2-15)

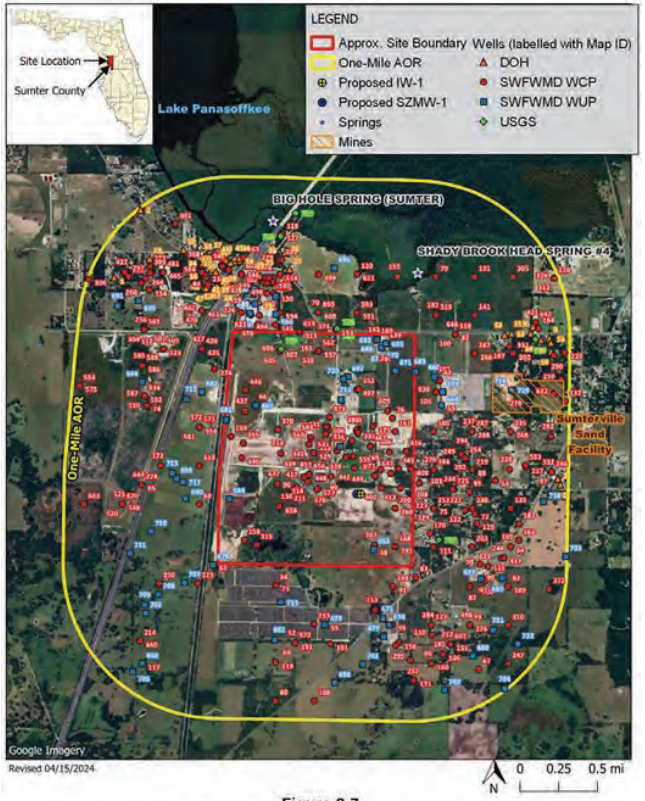


Figure 2-7
HOF Landfill Area of Review Well Locations with Identifier

- Review identified 729 existing wells.

Table 2-3
Summary of Permitted Wells

Agency Database	Domestic	Industrial/ Commercial	Irrigation	Mining	Monitor	Agricultural	Public Supply	Livestock	Remediation/ Recovery	Plugged	Test	Other
WUP	0	9	18	0	0	20	0	3	0	2	0	9
WCP	176	6	63	0	166	0	17	3	0	162	12	6
FDOH	24	0	1	0	0	0	24	0	0	0	0	1
FGS	0	0	0	0	0	0	0	0	0	0	0	0
USGS	0	0	0	0	7	0	0	0	0	0	0	0
FDEP	0	0	0	0	0	0	0	0	0	0	0	0
729 Wells	200	15	82	0	173	20	41	6	0	164	12	16

Note: The well types for the USGS wells were not provided in the database but are assumed to be monitor wells.

Table 2-4
Summary of Permitted Wells Maximum Depth (Feet)

Agency Database	Domestic	Industrial/ Commercial	Irrigation	Mining	Monitor	Agricultural	Public Supply	Livestock	Remediation/ Recovery	Plugged	Test	Other
WUP	-	380	550	-	-	325	-	90	-	250	-	382
WCP	337	295	650	-	145	-	970	90	-	368	185	380
FDOH	60	-	-	-	-	-	200	-	-	-	-	-
FGS	-	-	-	-	-	-	-	-	-	-	-	-
USGS	-	-	-	-	170	-	-	-	-	-	-	-
FDEP	-		-	-	-	-	-	-	-	-	-	-

Table 2-5
Summary of Permitted Wells Greater than 350 Feet in Depth

Agency Database	Domestic	Industrial/ Commercial	Irrigation	Mining	Monitor	Agricultural	Public Supply	Livestock	Remediation/ Recovery	Plugged	Test	Other
WUP	-	1	4	-	-	1	-	-	-	-	-	1
WCP	1	-	13	-	-	-	1	-	-	1	-	2
FDOH	-	-	-	-	-	-	-	-	-	-	-	-
FGS	-	-	-	-	-	-	-	-	-	-	-	-
USGS	-	-	-	-	-	-	-	-	-	-	-	-
FDEP	-		-	-	-	-	-	-	-	-	-	-

INTERA

Deep wells within AOR

(Source: Permit application, page 2-19)

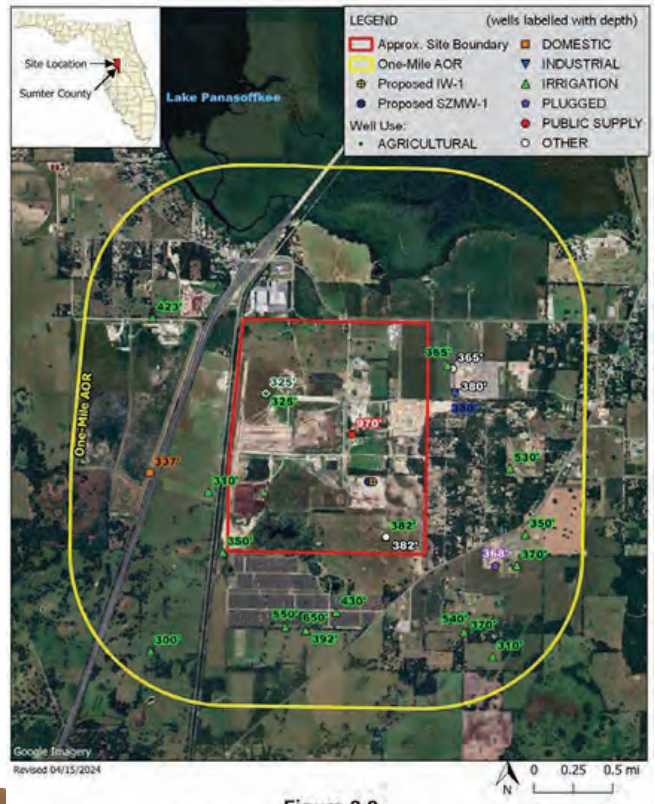


Figure 2-9
Area of Review Wells Deeper than 300 Feet

- Existing wells with depth > 300 ft. BLS.
- **Important because improperly abandoned deep wells can act as a conduit or short circuit.**
- Only 1 public water supply well (depth = 970 ft.)
- "No wells penetrate the proposed **injection zone** from approximately 2,700 feet to 3,100 feet bls."
- "No wells were identified within the 1-mile AOR that penetrate into the existing proposed **monitoring zone** from approximately 1,950 feet to 2,050 feet bls."

INTERA

Floridan Aquifer & Central Florida

- Central Florida has the thickest layer of the Floridan aquifer.
- In Sumter County aquifer is roughly 1,800 feet thick.
- Base of Floridan aquifer estimated to be at roughly 2,000 feet below land surface (bls).

(Source of figure: [Revised Hydrogeologic Framework of the Floridan Aquifer System in Florida and Parts of Georgia, Alabama, and South Carolina, 2015-TN4577.])

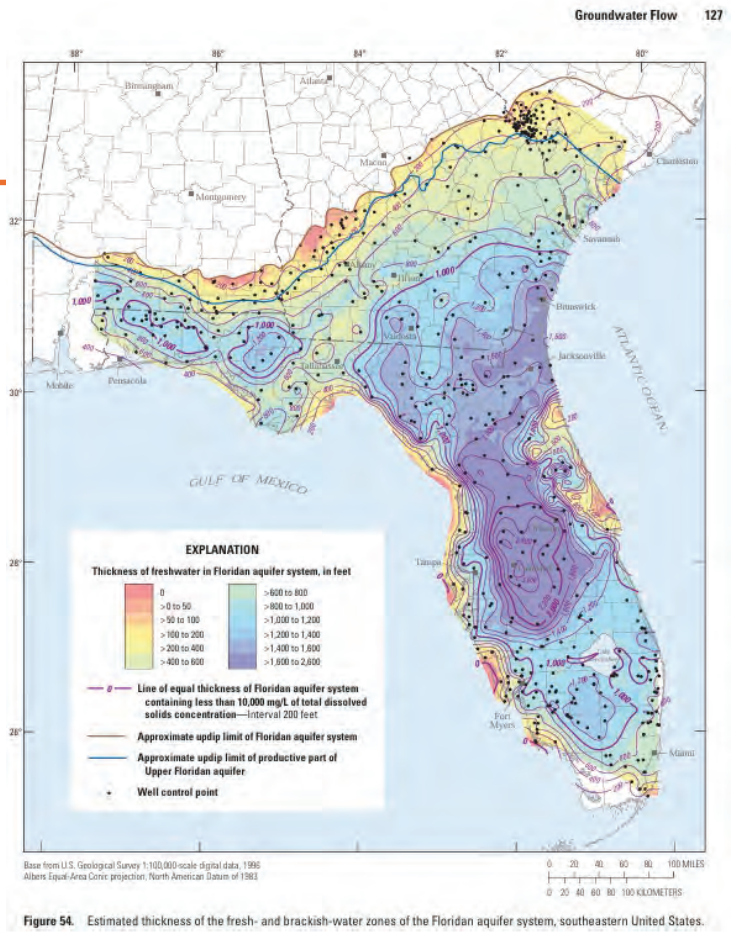


Figure 54. Estimated thickness of the fresh- and brackish-water zones of the Floridan aquifer system, southeastern United States.

INTERA

Estimated depth to base of Floridan Aquifer

(Source: Permit application, page 3-4)

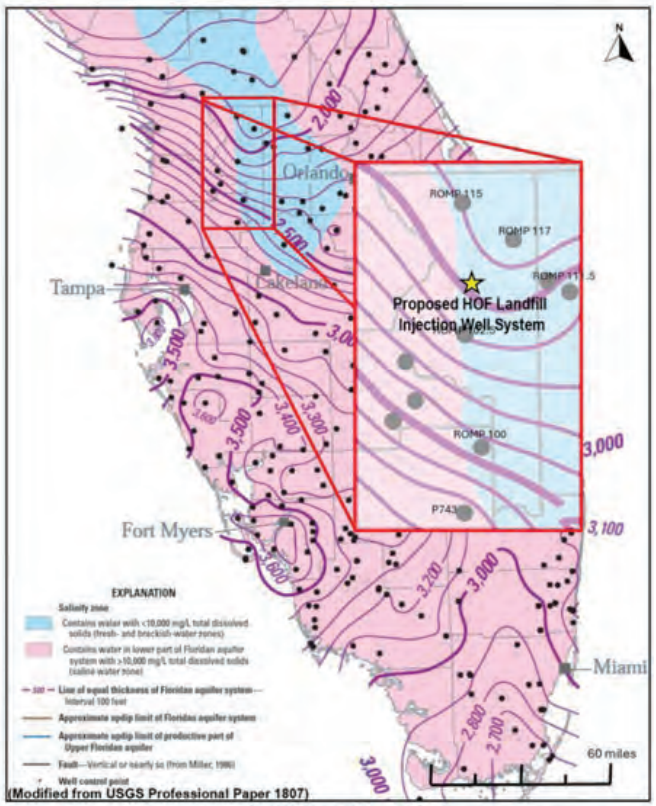


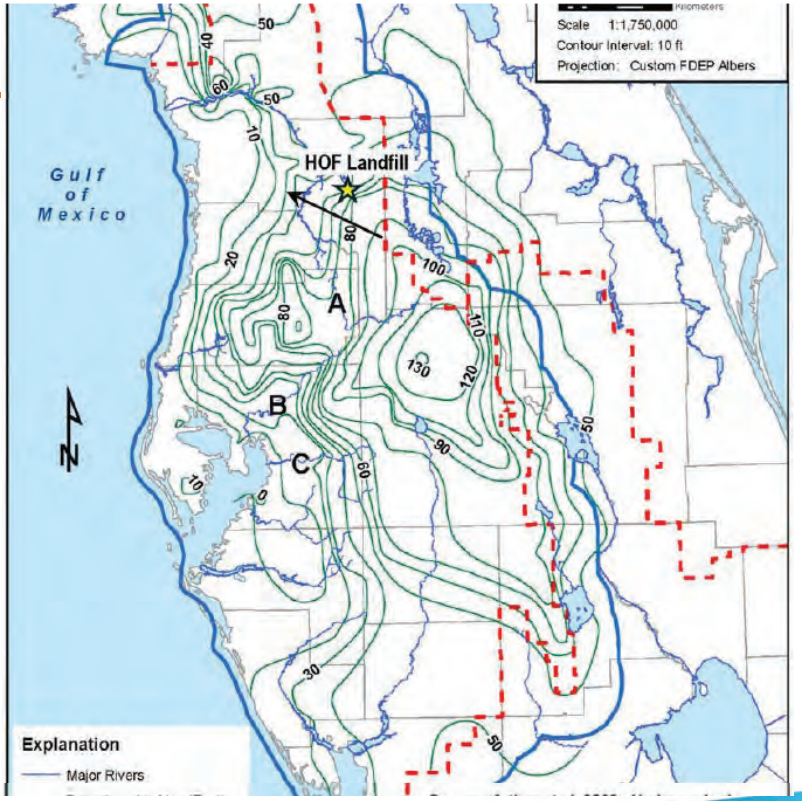
Figure 3-2
Floridan Aquifer System Base of the USDW

- Class I wells required to discharge to geologic layer below lowest USDW.
- **"Based on available information, the base of the USDW is anticipated to occur between 2,000 to 2,100 feet bls at the ACMS HOF Landfill site."**

INTERA

Potentiometric Surface

- Potentiometric surface of the Upper Floridan
- Principal flow direction in the area of the landfill
- Injection well will follow the same principle flow direction



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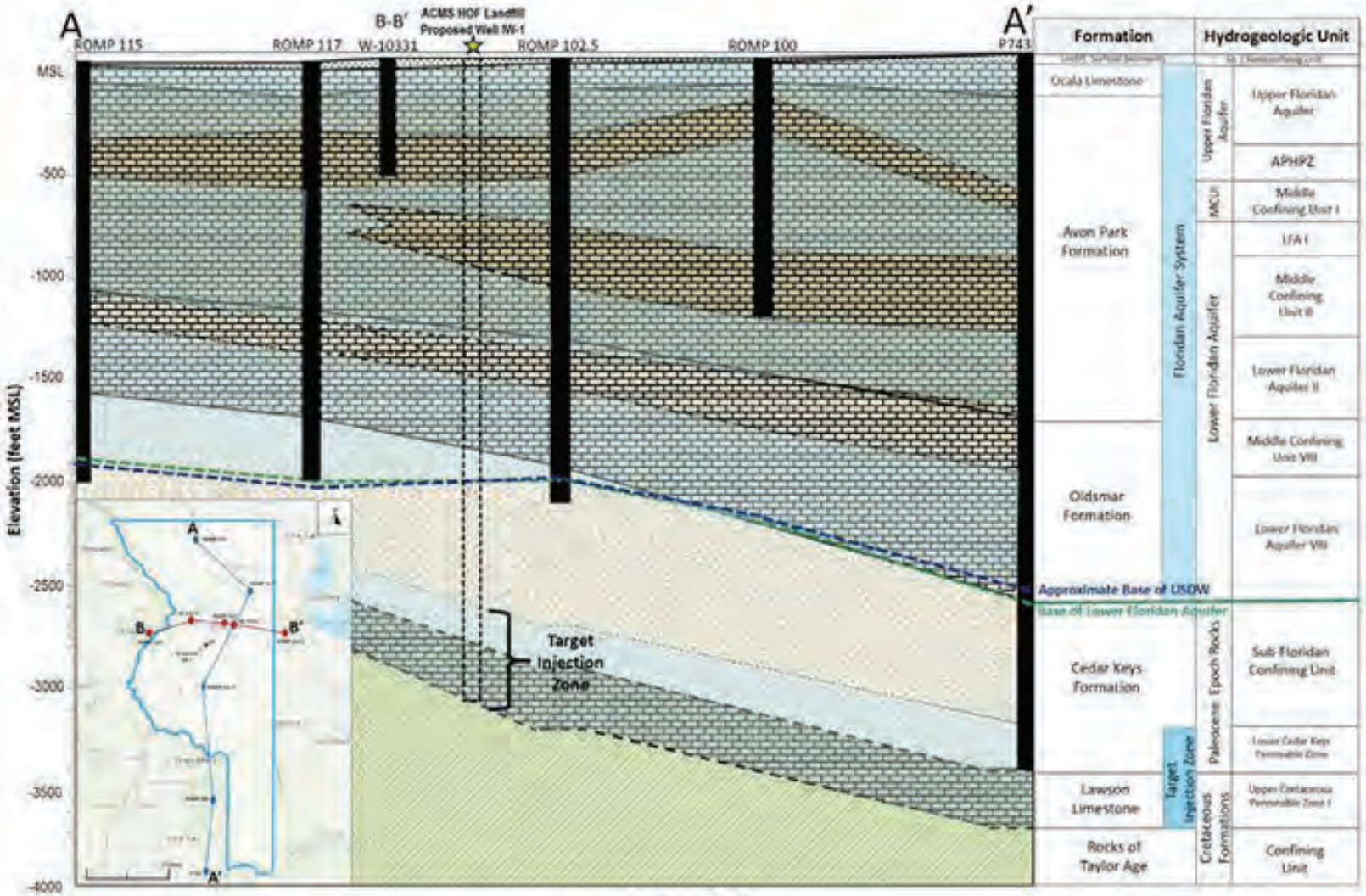


Figure 3-8
North South Cross Section A-A'

Source: Permit application, page 3-15

INTERA

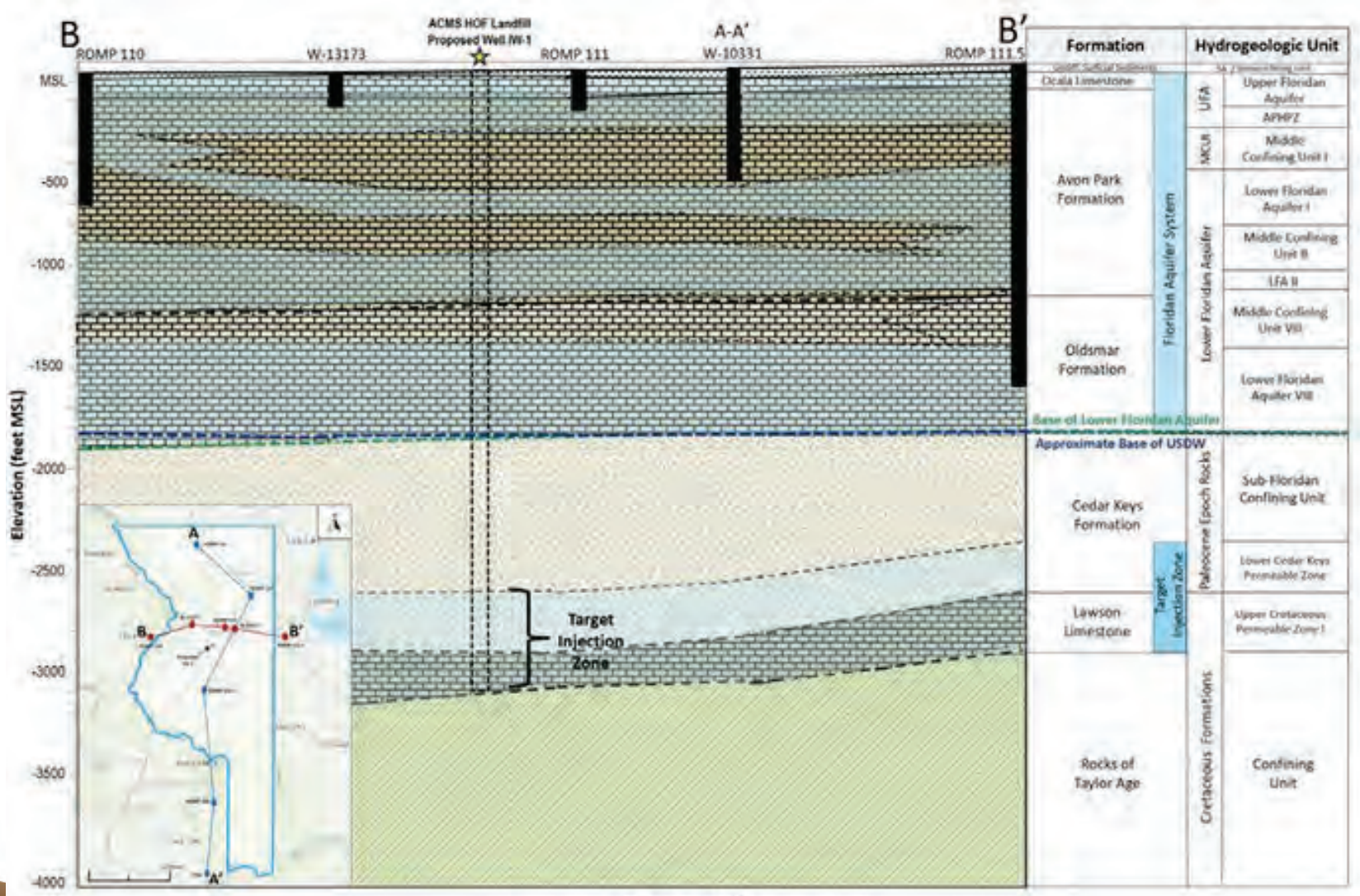
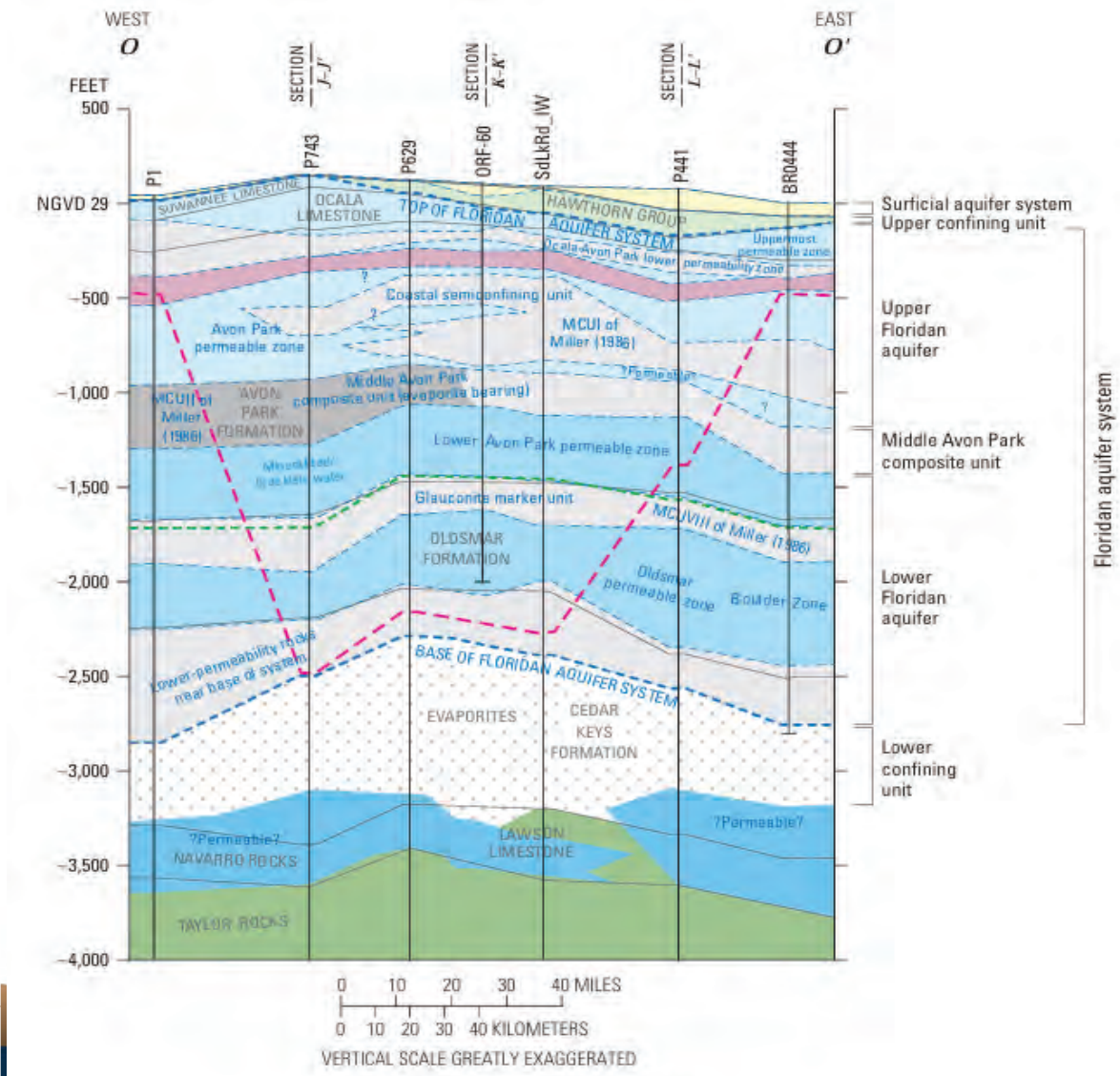


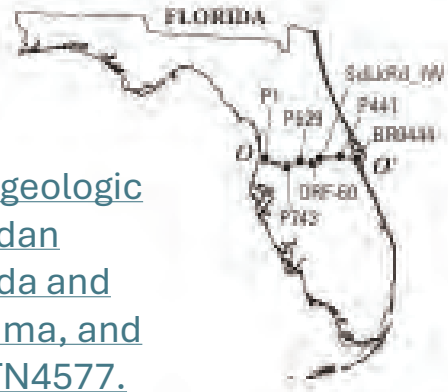
Figure 3-9
East West Cross Section B-B'

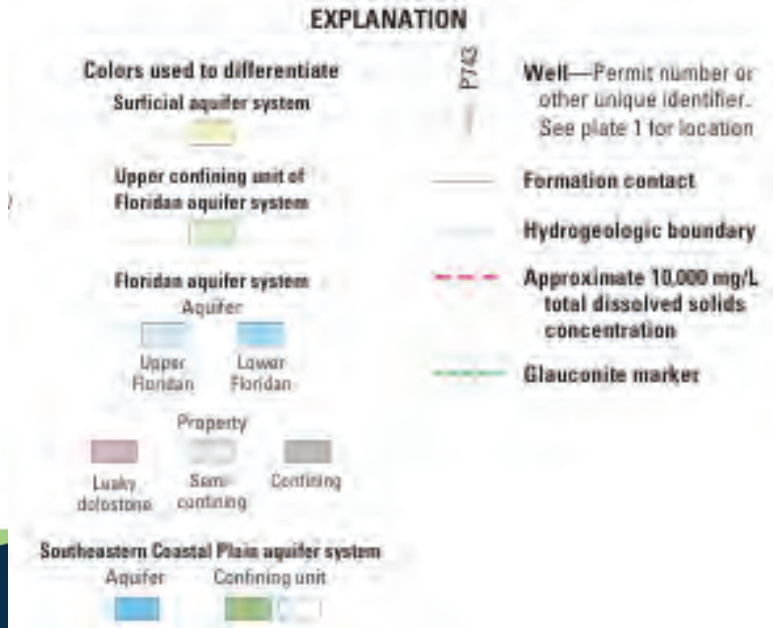
Source: Permit application, **page 3-16**

INTERA



Source: [Revised Hydrogeologic Framework of the Floridan Aquifer System in Florida and Parts of Georgia, Alabama, and South Carolina, 2015-TN4577.]

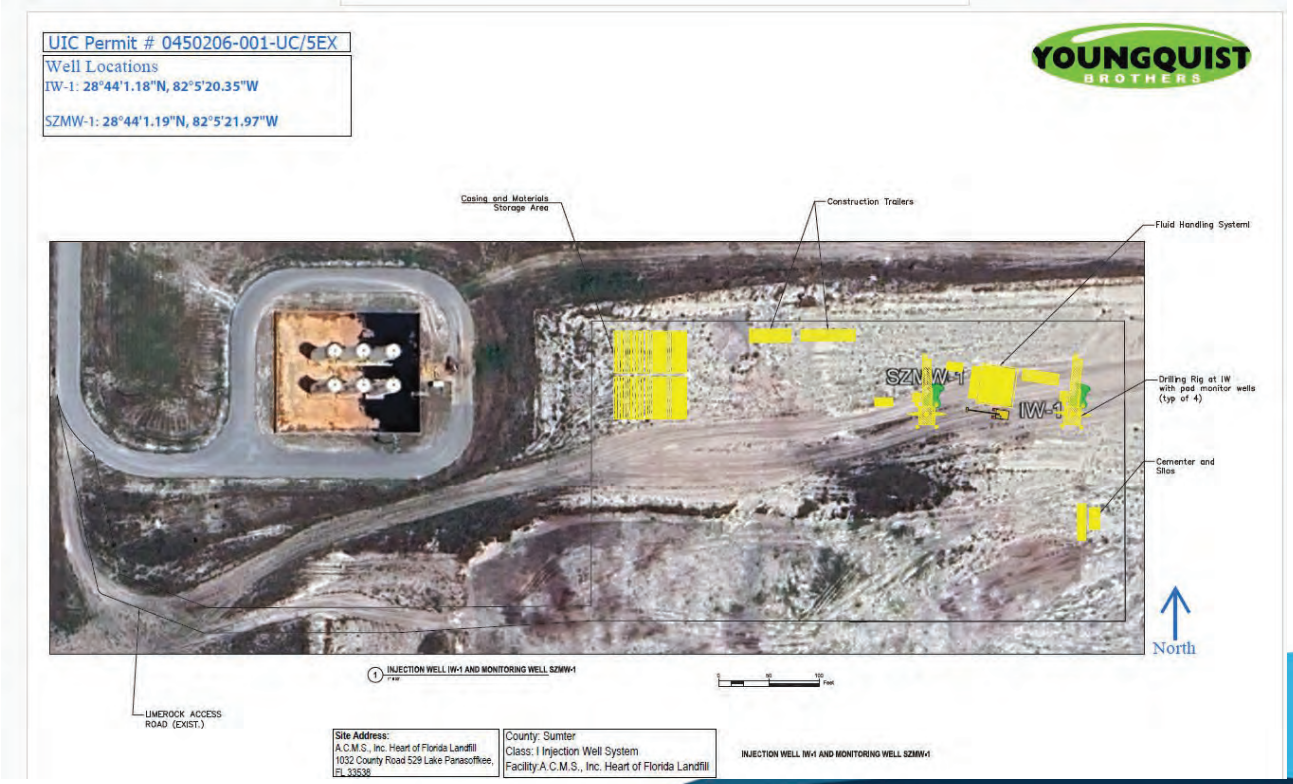




Approved Site Plan

- Youngquist Brothers develop site plan.
- FDEP approved plan on 10/28/2025.
- Well construction begins on 10/30/2025.

- Yellow shading shows:
  - Casing storage
  - Construction trailers
  - Drill rigs
  - Drill fluid handling



INTERA

Potential well problems, failure modes, and mitigation

Construction failures

- Mistakes in grouting of casing
- Failure to adjust well depth to meet actual conditions

Mitigation Strategy

- Qualified Contractor
- QA/QC program, testing and independent review of progress
- Weekly Reporting to FDEP

Potential well problems, failure modes, and mitigation

Unexpected hydrogeology issues

- Unknown fracture zones
- Insufficient confining layer

Mitigation Strategy

- Geophysical testing and sampling during construction

Potential well problems, failure modes, and mitigation

Water quality problems

- Reduced injection zone transmissivity due to scaling or bacteriological fouling

Mitigation Strategy

- Injectate water quality testing program
- Pretreatment capabilities
- Periodic well maintenance

Potential well problems, failure modes, and mitigation

Operational failures

- Excessive maximum flow or pressures

Mitigation Strategy

- Continuous monitoring of flow and pressures
- Adequate on-site leachate storage to reduce peak flows
- Periodic testing program (e.g. mechanical integrity testing)

Potential well problems, failure modes, and mitigation

Inadequate financial resources for well abandonment

- Well not properly abandoned

Mitigation Strategy

- Requirement for bond/insurance

Plan for Class I DIW – Step 1

Implementation of Class I DIW project requires:

- Completion of Class V exploratory well and monitoring well
- Mechanical integrity testing of wells under pressure
- Demonstration that hydrogeology is suitable
- Baseline groundwater sampling

Plan for Class I DIW – Step 2

Class I permit application process

- Permit application
- Permit review & potential requests for additional information
- Injection and transmissivity testing
- Draft Permit Issuance including operating requirements
- Notice of Intent to Issue
- **Public comment periods & public meetings**
- Final Permit issuance

INTERA

Plan for Class I DIW – Step 3

Operation of Class I DIW

- Continuous monitoring of flow & pressures
- Routine monitoring of leachate water quality & pretreatment
- Routine water quality sampling from monitoring well
- Periodic testing and maintenance requirements

Recommendations

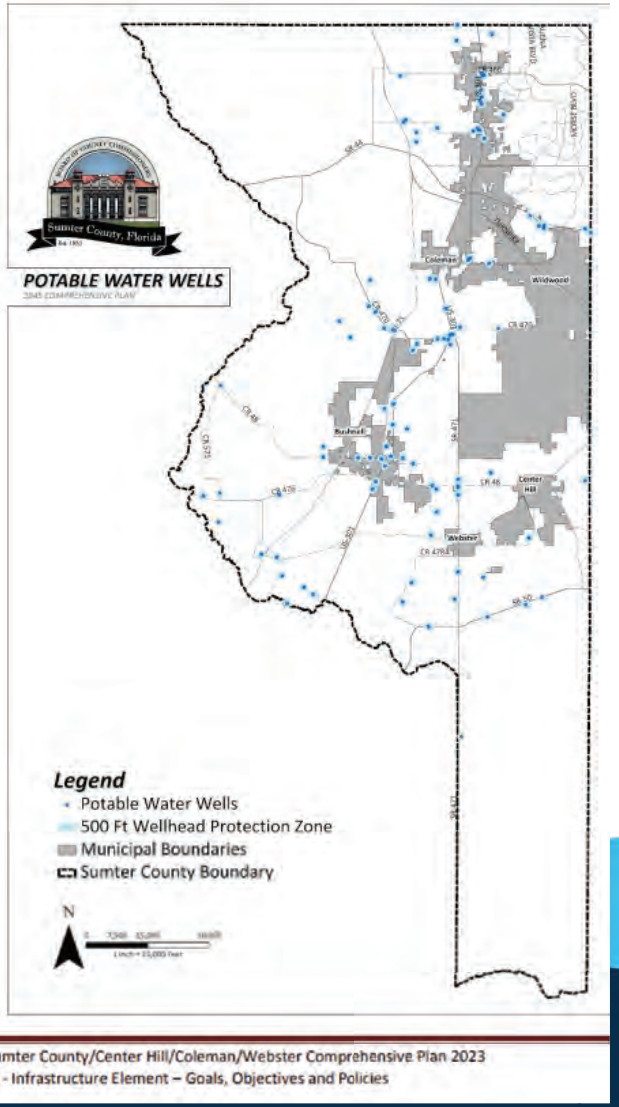
Two-pronged approach:

- Monitor and track progress of HOFL Class V → Class I DIW project
  - Due diligence tracking the Class V exploratory well construction
  - Tracking Class I permit application process

- Monitor and protect water supply wells
  - Install new and/or sample existing monitoring wells, between UIC and nearby production wells
  - Perform a well head protection study

Wellhead Protection Zones

- Florida DEP defines the **minimum** zone for public supply wells as 500 ft.
- Local governments could create greater zone restrictions.
- **EXAMPLE**: Hillsborough County Wellhead Protection Study



Unified Sumter County/Center Hill/Coleman/Webster Comprehensive Plan 2023
Chapter 3 - Infrastructure Element – Goals, Objectives and Policies

Wellhead Protection Zones

- Zones adopted by Hillsborough County to **regulate activities in the area of potable supply wells**
  - Utilizes MODFLOW and MODPATH
    - The Central Springs Model from the District can be the basis of the particle tracking model
    - The particle tracking model will refine the resolution of the grid to better represent the particle track
  - Simulates the local flow field
  - Simulate particles tracks representing the 5-year and 10-year capture zone for each well
  - Activities (including injection wells) are prohibited within the zones around the potable supply wells.

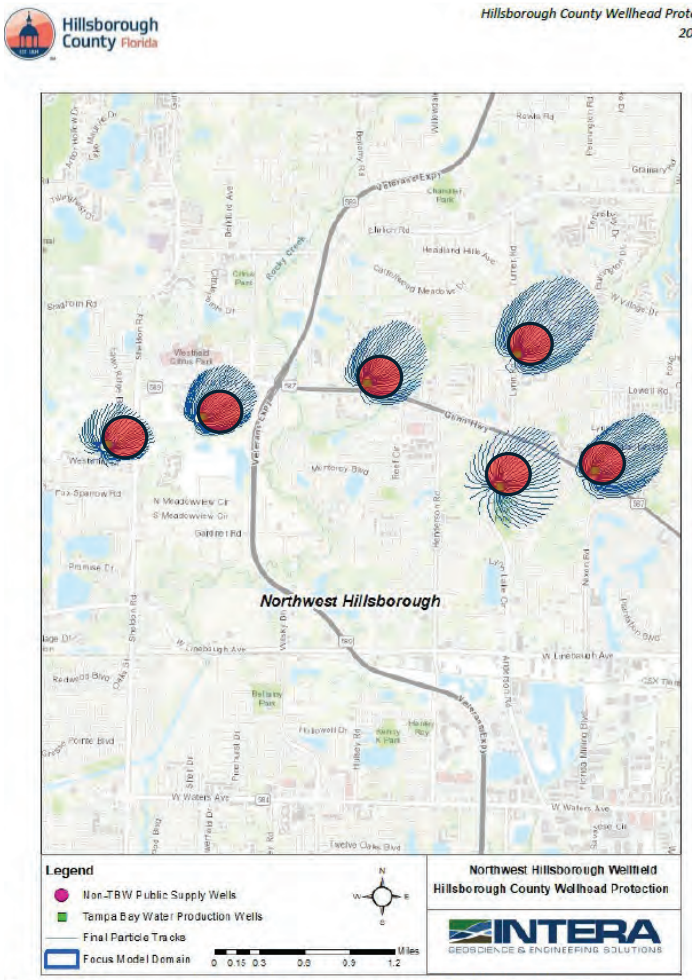


Figure 5-7. Northwest Hillsborough Regional Wellfield Particle Tracks, 10 year travel paths in UFA

Questions?