

# OSSF Challenges at Texas RV Parks

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Research Team



# Overview

- RV park types
- RV park usage
- RV park amenities
- RV park OSSF
- Waste stream unknowns
- Planned research







# Texas RV parks



- The number of **known** RV Parks in Texas is 1,900 (as of Oct 2020)
- Amenities include:
  - Bathrooms (984)
  - Showers (911)
  - Laundry facilities (730)
  - Group kitchen (226)
- Amenity combinations include:
  - Bathrooms/laundry (649),
  - Bathrooms/showers/laundry (615),
  - Bathrooms/laundry/showers/group kitchen (192).

# RV park categories



## **Short term** (generally < 4 months)

- Campgrounds with only basic services (1-2 weeks)
- Vacation / Resort parks (1-2 weeks)
- Seasonal (winter residents, 3-4 months)

## **Long term** (generally > 4 months)

- Full time RV parks
  - Newley retired, full-time RV living, downsizing
  - Stationary RV living – treating RV like a permanent home
  - Workamping - working remotely while traveling
  - Man/Construction camps
  - Military transitory
  - Economically driven
  - “Tiny Homes”



# Traditional Campgrounds – Short Term



- Typical state or national park format
- Short term – usually limited to stays of < 1 week
- Wilderness areas without many creature comforts
  - Accommodation may be very basic
    - gravel pad and fire pit
  - Offer varying levels of service hookups
    - Electricity, water, and sewer
- Water filling stations, sewage dump sites, and restroom facilities are usually available, but not at individual sites
- May have a general or convenience store





Photo from Texas Parks and Wildlife



# Happy Camper













**RV SITES  
& CABINS**



**Lake Side**  
Marina & RV Park  
[www.springcreekmarina-tx.com](http://www.springcreekmarina-tx.com)



**SNACKS  
GAS  
& BAIT**

2680

**SALE**





# Vacation/Resort Park – Short Term



- Typically cater to families with children
- Most stays with private RVs are < 1 week
- Offer many recreational attractions and activities
  - Theme park atmosphere
  - Organized activities
  - Water attractions – pools, splashpads, etc.
- Many have on-site restaurants and dining facilities (high strength ww)
- May offer RV rentals – permanent and stationary
- May offer alternative shelter accommodations
  - Cabins
  - Tents
  - Restroom and shower facilities nearby
- Community center
- Catered events (weddings, parties, etc.)







Photo courtesy of Woodall's



HUNT  
BROTHERS  
PIZZA



OPEN

Coors LIGHT



PROUDLY BREWED IN TEXAS  
SINCE 1975



10.99

10.99

10.99



KEYSTONE  
REEL IN  
A STONE  
\$15.99  
\$25.00

HUNT  
BROTHERS  
PIZZA

BUFFALO & CHICKEN  
PIZZA  
\$10.99  
LIMITED TIME



- RV SITE
- PREMIUM RV SITE
- SUPER PREMIUM RV SITE
- COMPACT RV SITES
- COVERED SITE

- TINY HOME SITE
- PRIVATE RESTROOMS
- LAUNDRY ROOM
- FITNESS CENTER
- BUSINESS CENTER

- DOG PARK
- DOG WASH STATION
- PARKING
- DUMPSTERS



# STONE OAK RANCH RV RESORT

25101 RONALD W REAGAN BLVD  
GEORGETOWN, TX 78633  
Ronald Reagan Blvd just North of Hwy 3405  
**(512) 641-1072**  
[www.stoneoakranchrv.com](http://www.stoneoakranchrv.com)







# Seasonal Parks – Short and Long Term



- Many cater to “Snowbirds” who migrate south for the winter
  - Most are private RVs and stay for 3-4 months
- Amenities are appropriate for extended stays
  - Laundry facilities
  - Bathroom and shower facilities
  - Clubhouse with warming kitchen
  - Convenience or general store
- Like resort parks, may offer organized events/activities
  - Social oriented



150

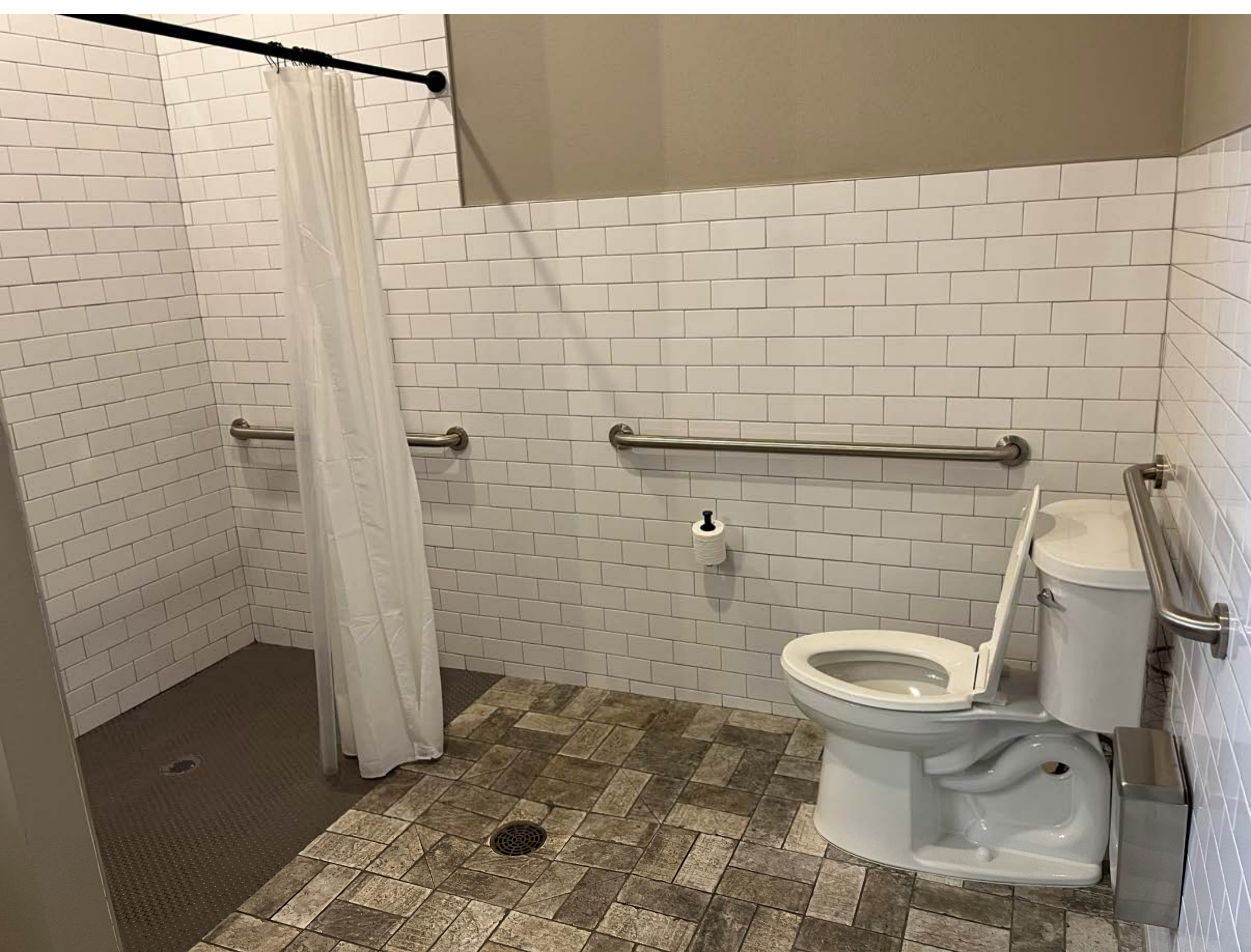
COMFORT STATION  
LAUNDRY & PRIVATE BATHS

COMFORT STATION  
PARKING ONLY

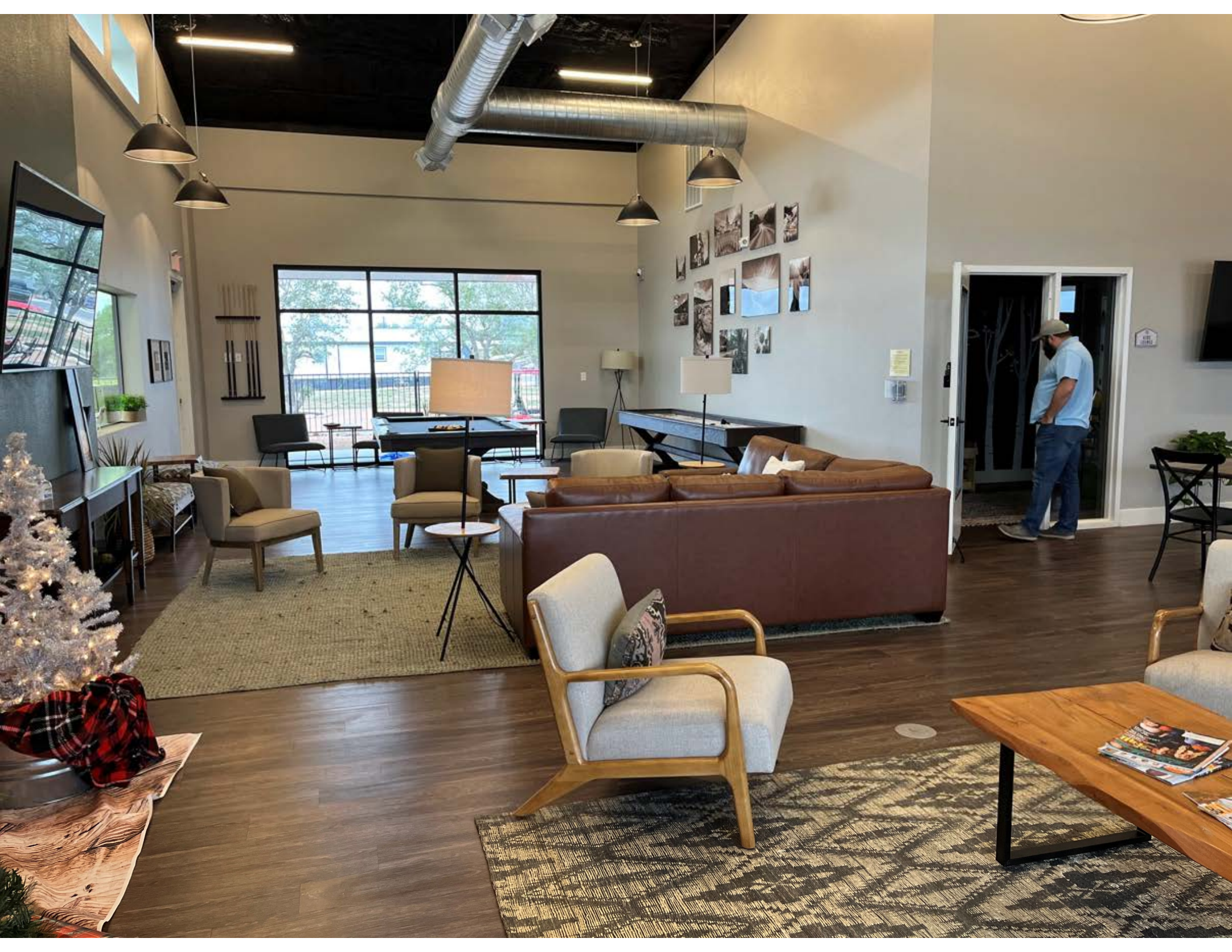
















Please remove food from daily.  
Any food left overnight will be discarded.  
Thank you  
Warming Kitchen

Warming kitchen



## Full time residential/permanent (long-term) park

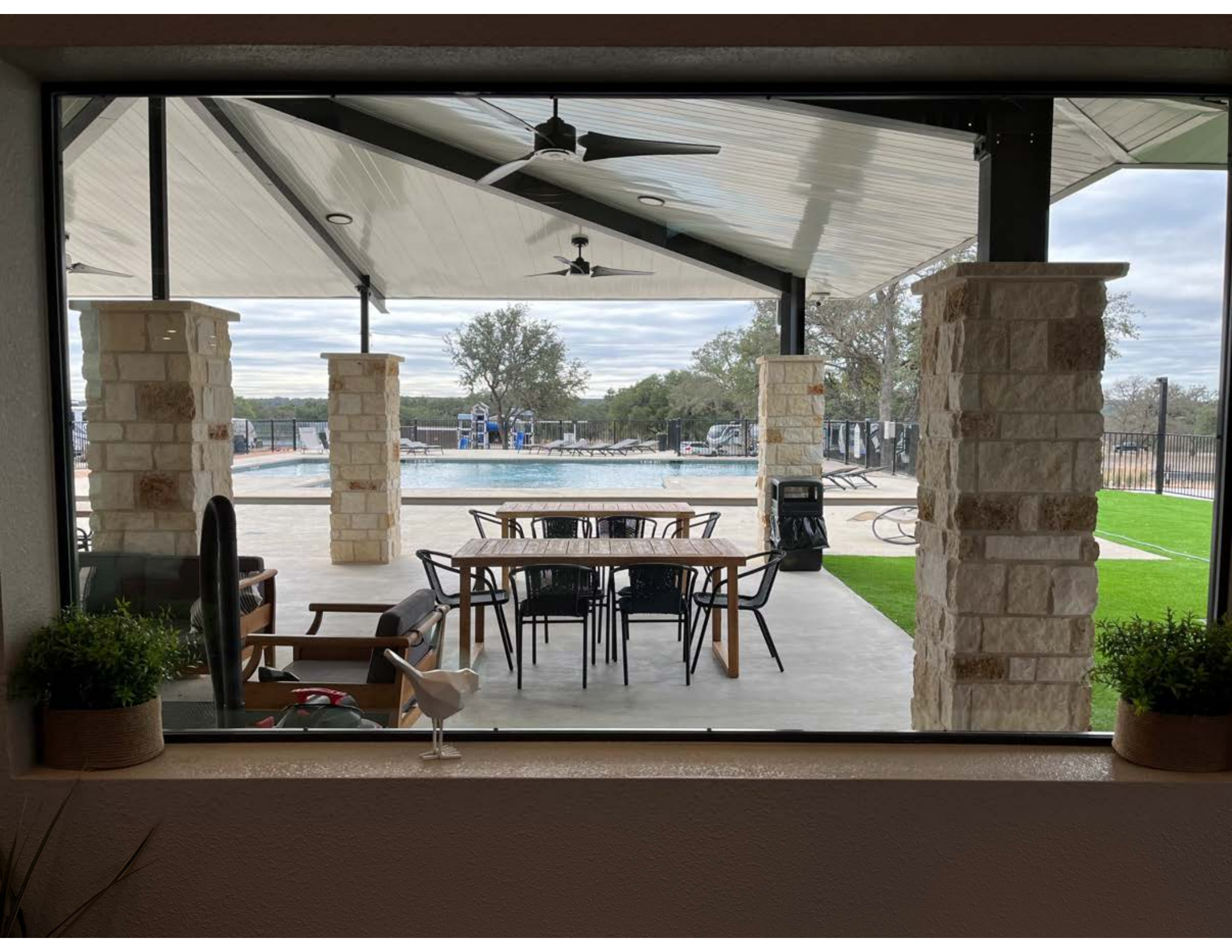
- Designed for full-time tenants staying months or years
- Typically require monthly, or longer, leases/contracts
- Most offer full bath and laundry facilities
- Many are designed for, sometimes restricted, to seniors
  - May offer social events, education, dinners, etc.
- Many cater to transient workers
  - Nursing
  - Construction
  - Oil/gas industry



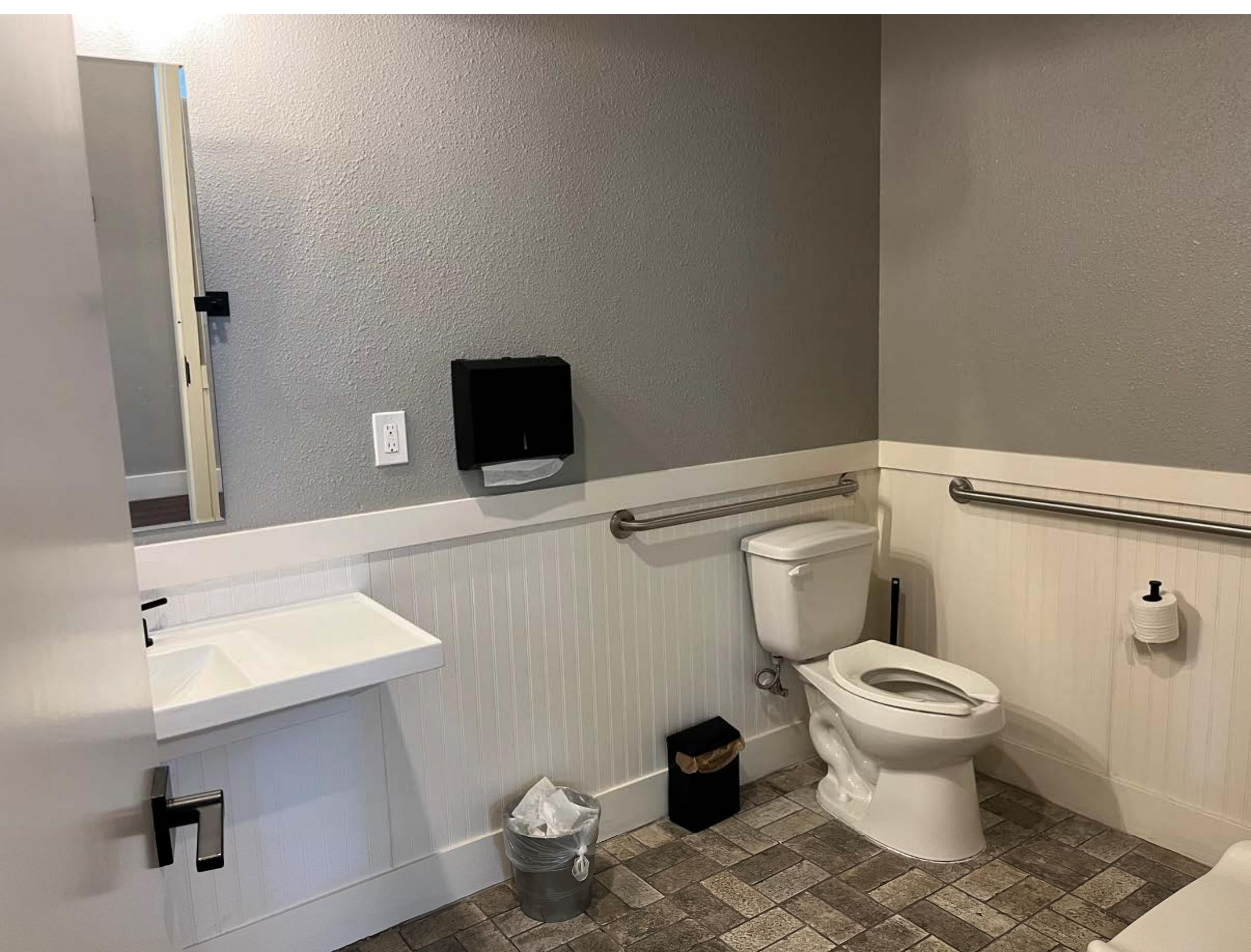




























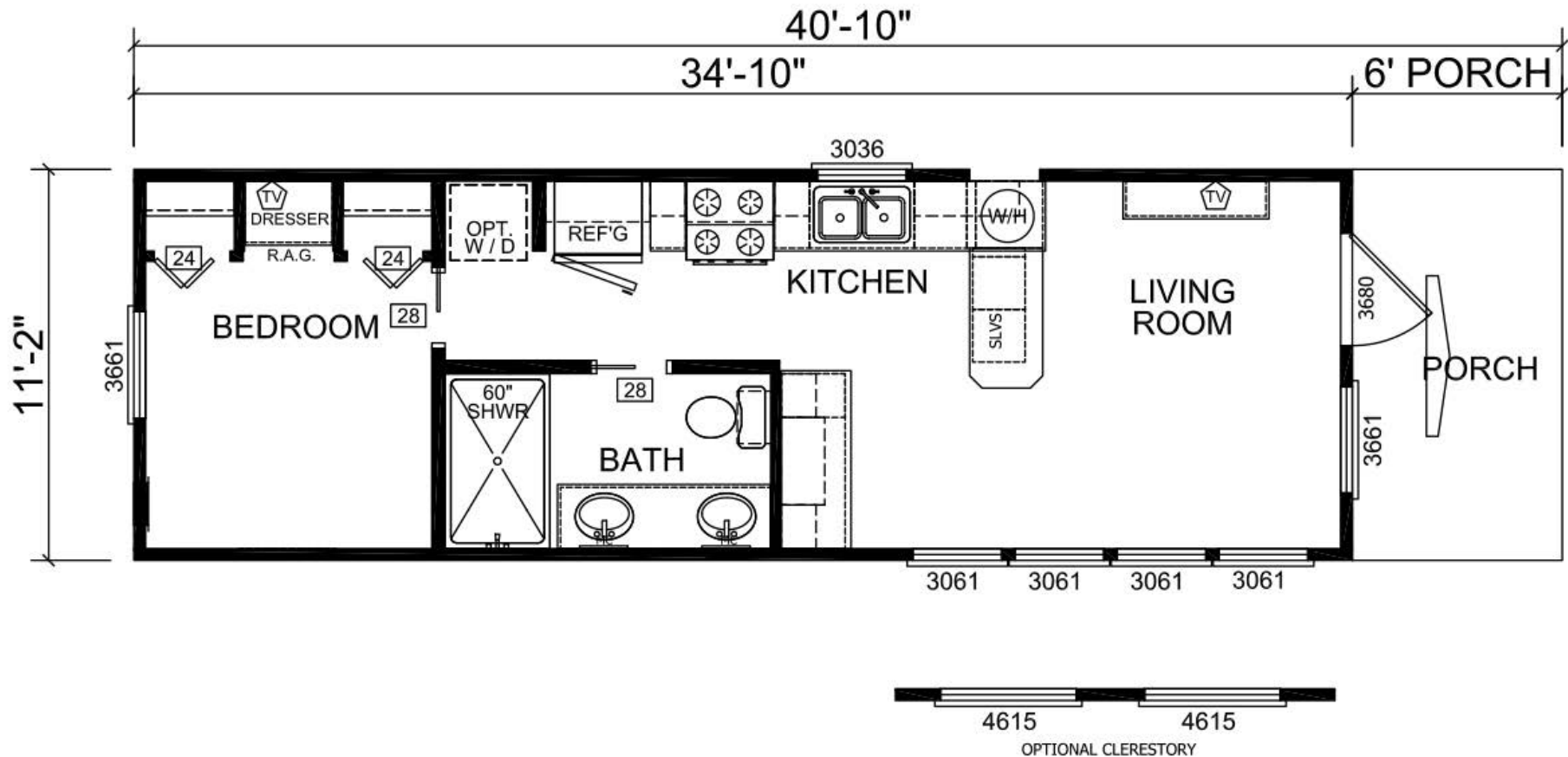


## Park Model RV

- Usually limited to short term stays of 1-2 weeks
- Cabin on a chassis with wheels and vehicle tag
- Up to 12 feet wide and 36 feet long
- <400 ft<sup>2</sup> interior space (many have porches)
- No laundry or dishwasher
- Regulated by TAC 217.3-43
- Designed to ANSI 119.5 and NFPA 1192 standards
- Many use traditional low flow fixtures while others utilize “ultra low flow fixtures”



# Park Model Floor Plan - Example



MODEL: **APH 536**

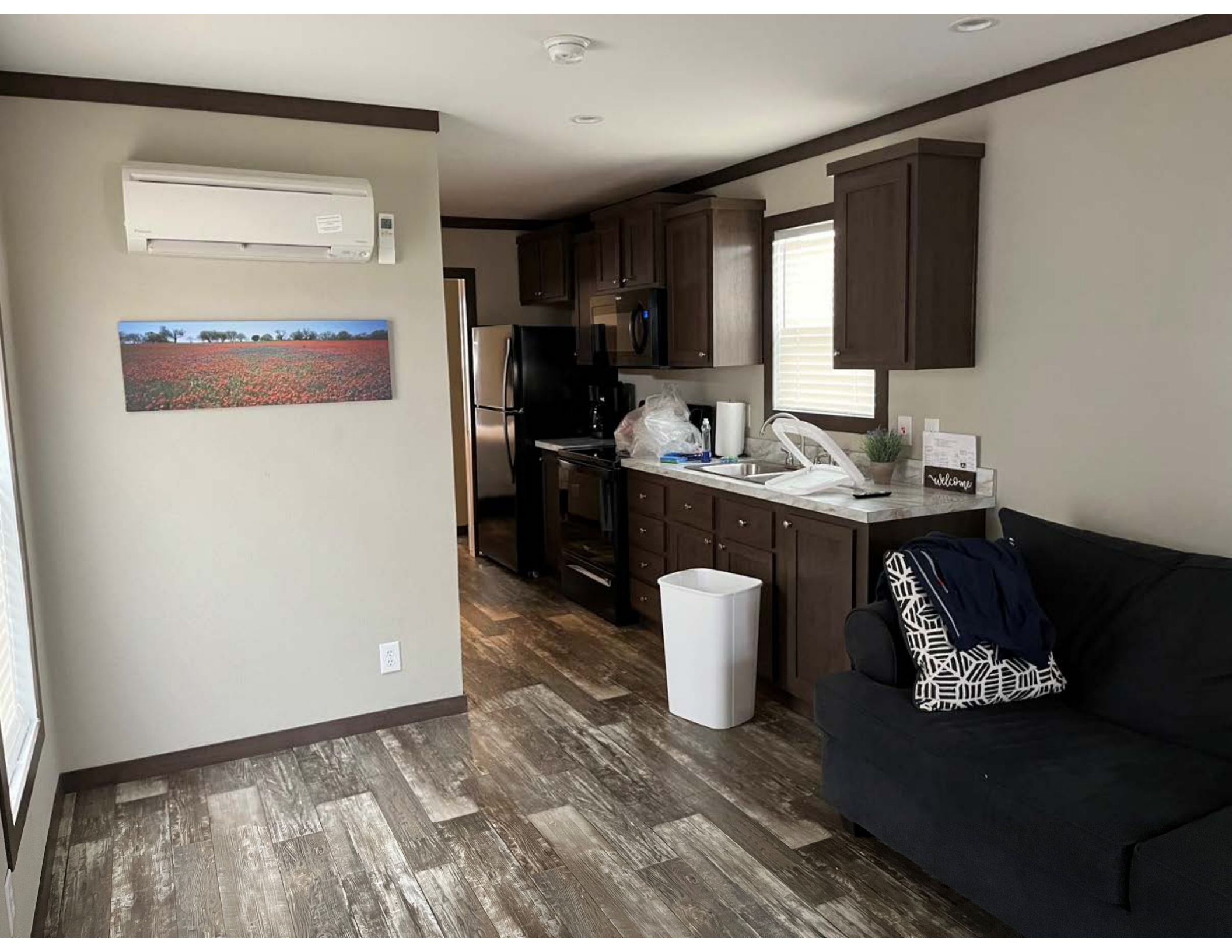
12 x 34 399 Sq.Ft

1 Bedroom 1 Bathroom

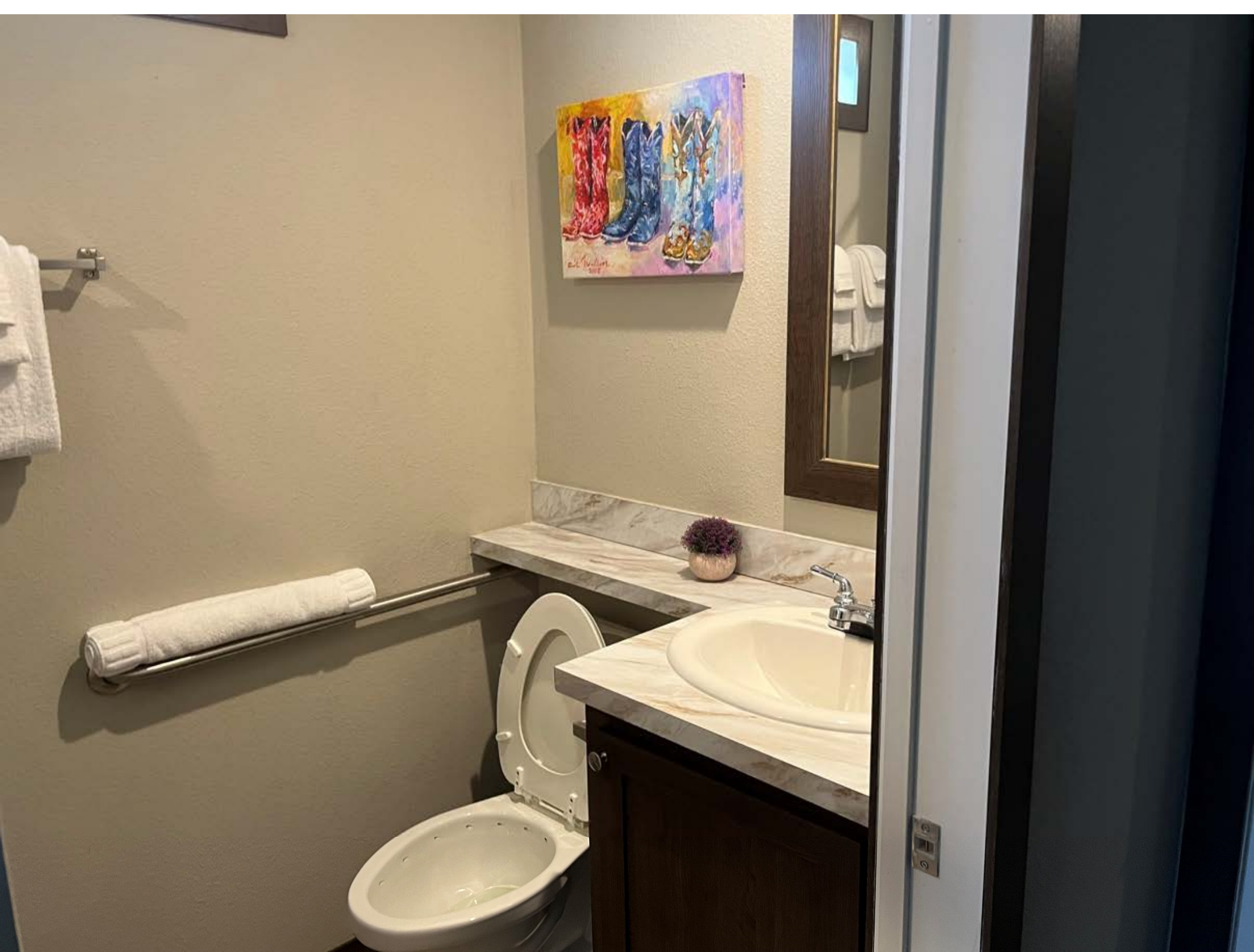






















## Ultra low flow

- There is no AWWA or ANSI definition of ultra low flow
- Shower heads are sometimes advertised to flow at 0.625 GPD
- Toilets using 1.6 GPF are considered ultra low (vs 3.5 for water conserving and 5-7 for standard)





# Tiny Home

- Privately owned
- Lease RV space by month/year
- Technically and legally classified as RVs
- Must maintain movable status
  - Wheels
  - License plate
- May have full size appliances and flows
  - Toilet
  - Shower/bath
  - Laundry and dishwasher

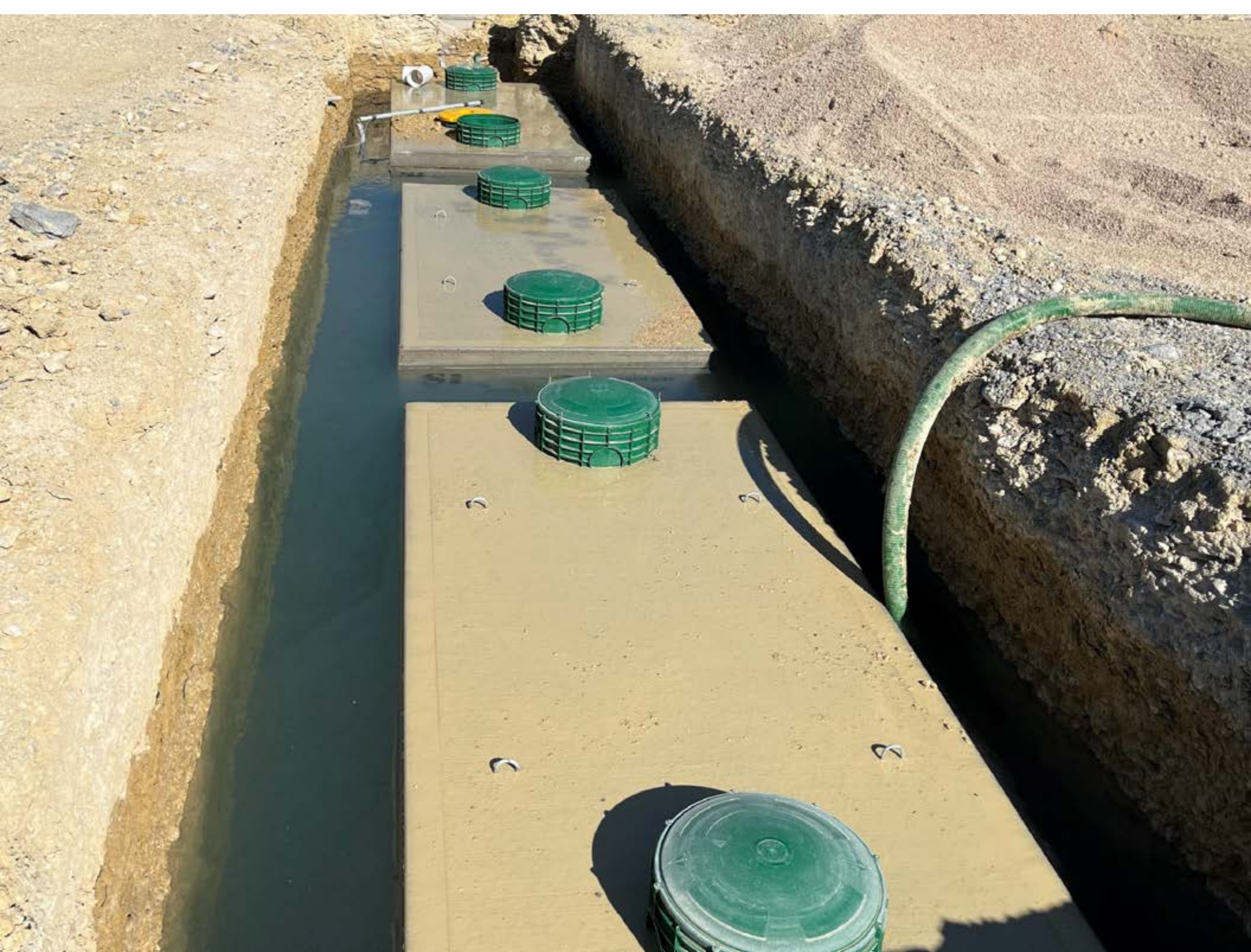






























# RV considerations:

## Wastewater quantity (flow)

- Often less than 2 persons per RV
- Limited dilution water supplied by showers and laundry

## Wastewater quality (concentration)

- Even when park 100% occupied, only 80-85% of people there at peak times
- People don't cook full meals but instead eat take out or convenience meals

## Short vs Long Term RV'ers

- Weekend camper rigs vs permanent RV living
- Shower and toilet facilities, stores, and other convenience structures may be used by the whole community.
- Usage not limited to single OSSF system. Person staying on Tract A may use the laundry, or other amenity, on Tract B.



# Texas On-Site Sewage Facility (OSSF) Research Grant Solicitation Number: 582-21-10767

Contract addressing:  
Wastewater Treatment Challenges at RV Parks  
And  
Aerobic Treatment Units in the Real World (Sampling and New Data)

Texas A&M OSSF Research Team

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Ryan Gerlich





# Texas Onsite Grant Program

## Request for proposals regarding challenges at RV parks

The number of RV Parks, both **Seasonal** (stays <4 months) and **Full Time** (extended stays > 4 months), is increasing.

The number of RV Parks that offer a public dump station for the RVs is unknown. The numbers of RV Parks that rely OSSFs to handle wastewater is unknown; however, both the regulated community and the regulators have been presented with an increasing number of design challenges, compliance issues, operational issues, and system malfunctions.

**Parks are offering an increasing number of amenities.**

**The lack of real data on which to base new designs and to understand malfunctions of existing designs has become clear.**



# Texas Onsite Grant Program

## Request for proposals regarding challenges at RV parks - continued

The research should focus on **Seasonal vs Full Time stays**, measured by the gallons per day (GPD), 5-day biochemical oxygen demand (BOD5), and total suspended solids (TSS).

**Comparisons** between the two types of RV Parks should have: similar types **of amenities**, and similar types of OSSFs.

The project must include comparisons of at least the following three amenity configurations:

- Parks with **public bathrooms**;

- Parks that includes group **kitchen facilities** (can include **restrooms and showers**);

- Parks that includes **laundry facilities** (can include bathrooms and showers).

The research should consider whether the systems meet the requirements of Title 30 Texas Administrative Code (TAC) Chapter 285.

The report should consider new regulations to specifically address any compliance and design issues that are found in the study.



# Overall project goals

- Determine RV organic loadings based on stay length and park amenities
- Understand RV waste streams to determine correct OSSF treatment unit sizing

**Load** (lb/day) = Flow (gpd) x Concentration (mg/L) x  $8.34 \times 10^{-6}$  (unit conversion)

## Unknowns

- RV park stay length may affect waste stream quantity and quality through cooking, bathing, and laundry behavior
- RV park amenities may affect waste stream quantity and quality through cooking, bathing, and laundry behavior







# RV park wastewater monitoring program

- **Influent**
  - Quantity (flow rate and volume)
  - Quality (concentration - BOD<sub>5</sub>, TSS)
- **Effluent**
  - Quality (concentration - BOD<sub>5</sub>, TSS)
- 30-day monitoring period
- Automated water samplers
- 24-hour **composite samples**
- 4 samples per week (16 per period)
- Park amenity configurations
  - RVs (short vs long term)
  - Bathroom facilities
  - Laundry facilities
  - Clubhouse/cooking facilities
  - Park models (rental), tiny homes (private)





# We need your input!

- 1) Do you deal with RV parks?
- 2) What kind of parks (short/long term)?
- 3) What kind of systems do you see?
- 4) Are you measuring anything?
  - Influent quantity/quality
  - Effluent quantity/quality
- 5) What kind of problems are you seeing?

Please contact:

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### 2.3.3 Aerobic Treatment Units in the Real World (Sampling and New Data)

Residential and non-residential locations utilize on-site sewage facilities to treat and dispose of wastewater throughout much of Texas. Permit records indicate aerobic treatment units (ATUs) are the most commonly used wastewater treatment method. A real-world field study is needed to determine if the minimum treatment requirements as found in 30 TAC § 285.91(4), are being achieved. Grab samples shall be taken from the pump tank. Samples shall be tested using standardized laboratory methods specific to wastewater. Results shall include those items specified in 30 TAC § 285.91(4) (chlorine residual, 5-day biochemical oxygen demand (BOD5), total suspended solids (TSS), Fecal coliform bacteria) and a wider screening for pathogens of public health significance. These results shall be presented in the units of measure as found in 30 TAC § 285.91(4). Samples may also be tested for fats, oil, and gas (FOG), metals, total nitrogen, phosphorus, and/or pH but these shall not be the focus of the study. Results shall include who maintains the on-site sewage facility (owner or maintenance provider).



# Aerobic Treatment System (ATU) sampling real-world data

- Representative systems selection
  - 50 Residential systems
  - 50 non-residential systems
    - Multiple family
    - Business
- One-time effluent grab samples
  - BOD<sub>5</sub>
  - TSS
  - Residual chlorine
- 10% of samples will include
  - Nitrate/Nitrite
  - Fats, oil, and grease
- Database development for collected data
  - Standardized measurements
  - Standardized reporting





# QUESTIONS? and Thank You!

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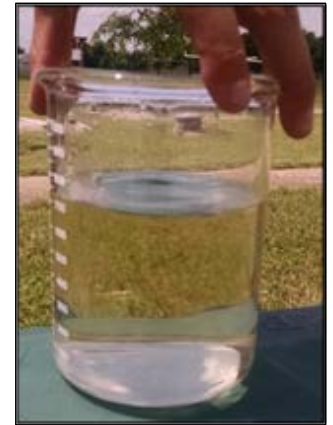
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