

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

Cloud 9 Ranch
2810 Cloud 9 Dr.
Caulifield, MO 65626

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).

As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

May 24, 2018
Effective Date


Edward B. Galbraith, Director, Division of Environmental Quality

May 23, 2020
Expiration Date


Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The construction will include a 30,000 gallon flow equalization tank, a concrete lined recirculating media filter split into five equal zones, with a surface area of 3,800 ft² which gives a total hydraulic loading of 4.4 gpd/ft² at design average flow, and a 150,000 gallon effluent storage tank. The water will be surface land applied on 11.9 acres with a maximum application rates are 0.15 inches/hour, 1.0 inch/day, 3 inches/week, and 24 inches/year. Land application will be completed by 13 sprinklers per zone with 3 zones, for a total of 39 sprinklers. The existing lagoons will provide additional emergency or peak flow storage of 184,913 gallons. The design average flow is 16,716 gpd. This project will also include general site work appropriate to the scope and purpose of the project and all necessary appurtenances to make a complete and usable wastewater treatment facility.

A closure plan will need to be submitted to the Southwest Regional Office for review and approval prior to and closure activities on Cell #4 of the lagoon.

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a “finding of affordability” on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The Department is not required to complete a cost analysis for compliance because the facility is not a combined or separate sanitary sewer system for a publically-owned treatment works.

III. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.

2. All construction shall be in accordance with the plans and specifications submitted by Horner and Shifrin on February 27, 2018 and updated on April 30, 2018.
3. The Department must be contacted in writing prior to making any changes to the approved plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(8).
4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's Southwest Regional Office per 10 CSR 20-7.015(9)(E)2.
5. The wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment.
6. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
7. Wastewater treatment facility shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any water well or water supply structure.
8. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department's ePermitting system available online at dnr.mo.gov/env/wpp/epermit/help.htm. See dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.
9. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the Department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the Department's Water Protection Program at 573-751-1300 for more information. See dnr.mo.gov/env/wpp/401/ for more information.

10. A full closure plan for lagoon cell #004 shall be submitted to the Department's Southwest Regional Office for review and approval of any permitted wastewater treatment system being replaced. In accordance with 10 CSR 20-6.010(12), the closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MOG823. Closure shall not commence until the submitted closure plan is approved by the Department.
11. Upon completion of construction:
 - A. Cloud 9 Ranch will become the continuing authority for operation, maintenance, and modernization of these facilities;
 - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications;
 - C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D); and
 - D. Form B - Application for an Operating Permit for Domestic or Municipal Wastewater ($\leq 100,000$ gallons per day) along with the modification fee of \$250 to the Department.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

Cloud 9 Ranch is replacing the existing lagoon cell #004 with a recirculating media filter and flow equalization. Lagoon cell #004 is being removed from the treatment process due to the location of a sinkhole on the toe of the berm. The facility will continue to apply wastewater with surface irrigation.

2. FACILITY DESCRIPTION

The Cloud 9 Ranch WWTF is located at 2810 Cloud 9 Dr., Caulifield, in Ozark County, Missouri. The facility has a design average flow of 16,716 gpd and serves a hydraulic population equivalent of approximately 167 people.

The existing facility is a four cell lagoon with land application. This construction permit is to add a recirculating media filter system. Construction will include closure of lagoon cell #4, along with construction of the filter bed and the sprinkler land application system on Cloud 9's property.

3. COMPLIANCE PARAMETERS

The existing facility and the proposed project is required to meet the requirements of MOG823013 Table A with an expiration date of August 24, 2022.

PARAMETER(S)	UNITS	DAILY MAXIMUM	MONTHLY TOTAL	SAMPLING FREQUENCY	SAMPLE TYPE
Irrigation Period	hours	*	*	daily	total
Volume Irrigated	gallons	*	*	daily	total
Application Area	acres	*	*	daily	total
Application Rate	inches	*	*	daily	total

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

The current design guides, 10 CSR 20-8, do not contain design parameters for recirculating media filters.

Existing major components which will remain in use include the following:

- Lagoon Cell Nos. 1, 2 and 3 – The existing lagoons will provide additional storage during peak flow times. The influent is pumped into Lagoon Cell No. 1 by an existing pump station on the treatment plant site. The total volume of storage between the three existing cells is 184, 913 gallons and provides 11.1 days of storage at average daily flow.
 - Lagoon Cell No. 1 has a surface area of 0.92 acres and a wastewater volume of 103,733 gallons.
 - This cell has 0.5 ft of freeboard from the maximum operating level to the emergency spillway, 2.5 ft of operating depth, and a clay liner.
 - This provides approximately 6.2 days of retention at the proposed design flow.
 - Lagoon Cell No. 2 has a surface area of 0.48 acres and a wastewater volume of 63,852 gallons.
 - This cell has 0.5 ft of freeboard from the maximum operating level to the emergency spillway, 2.5 ft of operating depth, and a clay liner.
 - This provides approximately 3.8 days of retention at the proposed design flow.
 - Lagoon Cell No. 3 has a surface area of 0.18 acres and a wastewater volume of 20,823 gallons.
 - This cell has 0.5 ft of freeboard from the maximum operating level to the emergency spillway, 2.5 ft of operating depth, and a clay liner.
 - This provides approximately 1.2 days of retention at the proposed design flow.

Construction will cover the following items:

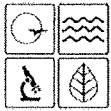
- Flow equalization tank- The flow equalization tank is a 30,000 gallon concrete tank with 11.7 hours retention time at peak design flow or 43.6 hours at design average flow. The flow equalization tank will receive flow that is hauled in and flow from the receiving station, which will include any flow from the emergency storage lagoons.
 - The flow equalization tank has the following dimensions: 8 ft sidewall x 26 ft x 26 ft with 2 feet freeboard
 - The flow equalization tank will have a polymeric plate cartridge filter that water will pass through before entering the dosing tank.
 - Recirculation/dosing tank has a volume of 20,000 gallons, with the following dimensions: 8 ft deep x 17.5 ft x 26 ft with 2 feet freeboard
- From the dosing tank, flows are pumped with a 50 gpm submersible pump operating at 40 ft TDH that is controlled by timer and floats. There will be two pumps to the recirculating media filter bed.
- Recirculating Media Filter – The concrete lined recirculating media filter is split into five equal zones.
 - The filter bed is approximately 50 ft x 76 ft x 3.5 ft deep for a total surface area of 3,800 ft² which gives a total hydraulic loading of 4.4 gpd/ft² at design average flow.
 - Each zone has 5-1¼inch S40 PVC laterals with 37 holes and a ⅛inch orifice shield, for a total of 925 holes.
 - The laterals are located in the center of the top 6-inch layer of ⅜-inch pea gravel.
 - The filter media layer is 2 ft deep containing coarse sand media with an effective size of ½ to 2 mm and a uniformity coefficient less than 3.5.
 - The underdrain layer has a 3-inch layer of ⅛-inch to ⅜-inch pea gravel on top of a 4-inch layer of ¾ -inch to 2 ½ -inch gravel.
 - The gravity recirculation valve is set for an 80/20 split with 40 gpm returning to the dosing tank.
 - Each zone contains one cleanout and an underdrain comprised of 4-inch SDR 35 perforated pipes with approximate 10-ft spacing between lines and 5 ft spacing from the outer lines to the edge of the filter bed.
- From the gravity recirculation valve, the effluent booster pumps will have an operating capacity of 20 gpm operating at 110 ft TDH to take water to the effluent storage tank.
- Effluent Storage Tank has a capacity of 150,000 gallons, which will provide almost 9 days of storage at design average flow.
 - The effluent storage tank has the following dimensions: 31 ft x 28 ft with a foot of freeboard

- Land Application Pump Station – Construction of 2 vertical canned turbine pumps to transfer treated wastewater from effluent storage tank to the land application site with each 7.5 HP driver capable of operating at 125 gpm with a minimum sprinkler head delivery pressure at 35 psi at the furthest sprinkler head.
- Land Application Site – This area is already covered in the operating permit as Outfall #001.
 - The land application site is on the Cloud 9 Ranch property in Caulfield, Ozark County. The land application site is approximately 11.9 acres with rotation of hay crop harvesting. This site is fenced with a 48 inch wire fence.
 - Irrigation will occur with solid set sprinklers
 - 13 sprinklers per zone with 3 zones, for a total of 39 sprinklers
 - Senniger Series 70 impact sprinklers
 - Sprinklers will be set with a height 1.5 ft riser and have a nozzle size of 0.34375 inch.
 - With one zone in operation, the system will discharge 19.3 gpm and have a spray diameter of 126 ft.
 - Maximum application rates are 0.15 inches/hour, 1.0 inch/day, 3 inches/week, and 24 inches/year.
- In construction of the system, there will be approximately
 - 2,010 ft of 6 inch PVC piping,
 - 1,025 ft of 4 inch PVC piping,
 - 385 ft of 2 inch PVC piping, and
 - 2,535 ft of 1.5 inch PVC piping.

5. OPERATING PERMIT

Operating permit MOG823013 will require a modification to reflect the construction activities. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D), an operating permit application, Form B, modification fee of \$250 and a request the operating permit modification be issued.

Leasue Meyers, EI
Engineering Section
leasue.meyers@dnr.mo.gov



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
**APPLICATION FOR CONSTRUCTION PERMIT –
WASTEWATER FACILITY**

RECEIVED

MAR 06 2018

CP00001975

AP29483

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED \$1,000.00	CHECK NO. 1810
DATE RECEIVED 3-6-18	813

APPLICATION OVERVIEW

The Application for Construction Permit – Wastewater Facility form is for construction pertaining to domestic wastewater treatment facilities, agrichemical facilities, and components thereof. This form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

PART A – BASIC INFORMATION

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

- 1.1 Is this a Federal/State funded project? ☐ YES ☒ N/A Funding Agency: _____ Project #: _____
- 1.2 Is this an application for an agrichemical? ☐ YES (See instructions.) ☒ N/A
- 1.3 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
☒ YES Date of Approval: 12/15/2016
- 1.4 Has the department approved the proposed project's facility plan*?
☒ YES Date of Approval: 04/13/2017 ☐ NO ☐ N/A (If Not Applicable, complete No. 1.5.)
- 1.5 [Complete only if answered Not Applicable on No. 1.4] Is a copy of the engineering report* for wastewater treatment facilities with a design flow less than 22,500 gpd included with this application?
☐ YES ☐ NO
- 1.6 Is a copy of the appropriate plans* and specifications* included with this application?
☐ YES Denote which form is submitted: ☐ Hard copy ☐ Electronic copy (See instructions.) ☒ NO
- 1.7 Is a summary of design* included with this application? ☒ YES ☐ NO
- 1.8 Is a general operating permit applicable?
☒ YES Submit the appropriate operating permit application to the Regional Office at least 60 days prior to operation.
☐ NO Enclose the appropriate operating permit application and fee submittal. Denote which form: ☐ B ☐ B2
- 1.9 Is the facility currently under enforcement with the department or the Environmental Protection Agency? ☒ YES ☐ NO
- 1.10 Is the appropriate fee included with this application? ☒ YES ☐ NO (See instructions for appropriate fee.)

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT

Cloud 9 WWTF

2.2 PROJECT DESCRIPTION

This project will consist of construction of a new sand filter pretreatment system with concrete tankage (including dosing and EQ tanks), a new bolted steel effluent storage tank, irrigation pumps, and a fixed sprinkler irrigation field.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

Sludge will be collected in the EQ tank, and continue to be land applied with previous lagoon based system. Due to decreased volume, application frequency will increase, but overall rates will remain.

2.4 DESIGN INFORMATION

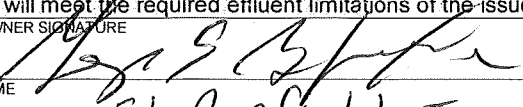
- A. Current population: 507-avg cap.; Design population: 1893-full cap.
- B. Actual Flow: _____ gpd; Design Average Flow: 16,716 gpd;
Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: 62,469 gpd;
Design Wet Weather Event: 6"

2.5 ADDITIONAL INFORMATION

- A. Is a topographic map attached? ☒ YES ☐ NO
- B. Is a process flow diagram attached? ☒ YES ☐ NO

2.6 ESTIMATED PROJECT CONSTRUCTION COST

\$ 1,215,000.00

3.0 WASTEWATER TREATMENT FACILITY					
NAME Cloud 9 Ranch Club, Inc. WWTF		TELEPHONE NUMBER WITH AREA CODE (417) 284-7321		EMAIL ADDRESS financialmanager@cloud9ranch.com	
ADDRESS (PHYSICAL) 2810 Cloud 9 Dr		CITY Caulfield	STATE MO	ZIP CODE 65626	COUNTY Ozark
Wastewater Treatment Facility: Mo- G823013 (Outfall 001 Of 001)					
3.1 Legal Description: SE ¼, NW ¼, NW ¼, Sec. 24 , T 23N , R 11W (Use additional pages if construction of more than one outfall is proposed.)					
3.2 UTM Coordinates Easting (X): 577658 Northing (Y): 4057334 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)					
3.3 Name of receiving streams: Spring Creek					
4.0 PROJECT OWNER					
NAME Cloud 9 Ranch Club, Inc.		TELEPHONE NUMBER WITH AREA CODE (417) 284-7321		EMAIL ADDRESS financialmanager@cloud9ranch.com	
ADDRESS PO Box 50		CITY Caulfield	STATE MO	ZIP CODE 65626	
5.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.					
NAME Cloud 9 Ranch Club, Inc.		TELEPHONE NUMBER WITH AREA CODE (417) 284-7321		EMAIL ADDRESS financialmanager@cloud9ranch.com	
ADDRESS PO Box 50		CITY Caulfield	STATE MO	ZIP CODE 65626	
5.1 A letter from the continuing authority, if different than the owner, is included with this application. <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A					
5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A MISSOURI PUBLIC SERVICE COMMISSION REGULATED ENTITY.					
A. Is a copy of the certificate of convenience and necessity included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO					
5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A PROPERTY OWNERS ASSOCIATION.					
A. Is a copy of the as-filed restrictions and covenants included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO					
B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO					
C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO					
D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO					
6.0 ENGINEER					
ENGINEER NAME / COMPANY NAME James McCleish / Horner & Shifrin		TELEPHONE NUMBER WITH AREA CODE (314) 335-8640		EMAIL ADDRESS jemccleish@hornershifrin.com	
ADDRESS 401 S 18th St, Ste 400		CITY St Louis	STATE MO	ZIP CODE 63103	
7.0 PROJECT OWNER: I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law. I also understand the issuance of the construction permit does not guarantee the proposed wastewater treatment will meet the required effluent limitations of the issued Missouri State Operating Permit for this facility.					
PROJECT OWNER SIGNATURE 					
PRINTED NAME George Ed Barfield Jr.			DATE Feb. 28, 2018		
TITLE OR CORPORATE POSITION General Manager		TELEPHONE NUMBER WITH AREA CODE 417-284-7321		EMAIL ADDRESS cowboy@Cloud9ranch.com	
Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102-0176					
END OF PART A.					
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.					

PART B – LAND APPLICATION ONLY**(Submit only if the proposed construction project includes land application of wastewater.)****8.0 FACILITY INFORMATION**

8.1 Type of wastewater to be irrigated: ☒ Domestic ☐ State/National Park ☐ Seasonal business
☐ Municipal ☐ Municipal with a pretreatment program or significant industrial users
☐ Other (explain)

8.2 Months when the business or enterprise will operate or generate wastewater:
☒ 12 months per year ☐ Part of the year (list months):

8.3 This system is designed for:
☒ No-discharge ☐ Subsurface
☐ Partial irrigation when feasible and discharge rest of time
☐ Irrigation during recreational season, April – October, and discharge during November – March
☐ Other (explain)

9.0 STORAGE BASINS

9.1 Number of storage basins: 1 (Use additional pages if greater than two basins.)

9.2 Type of basins: ☒ Steel ☐ Concrete ☐ Fiberglass ☐ Earthen ☐ Earthen with membrane liner

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.

Basin #1: Length n/a Width Depth Freeboard Depth Safety % Slope
Basin #2: Length Width Depth Freeboard Depth Safety % Slope

9.4 Storage Basin operating levels (report as feet below emergency overflow level).
Basin #1: Maximum operating water level 27 ft Minimum operating water level 1.5 ft
Basin #2: Maximum operating water level ft Minimum operating water level ft

9.5 Design depth of sludge in storage basins.
Basin #1: n/a ft Basin #2: ft

9.6 Existing sludge depth, if the basins are currently in operation.
Basin #1: n/a ft Basin #2: ft

9.7 Total design sludge storage: dry tons and 1600 cubic feet

10.0 LAND APPLICATION SYSTEM

10.1 Type of land application: ☒ Fixed Head Sprinklers ☐ Center Pivot ☐ Traveling Gun ☐ Drip Dispersal
☐ Subsurface Low Pressure Pipe ☐ Other (describe)

10.2 Number of irrigation sites 1 Total Acres 11.2 Maximum % field slopes 8.4
Location: SE ¼, NW ¼, NW ¼, 24 Sec. 23N T 11W R Ozark County 11.2 Acres
Location: ¼, ¼, ¼, Sec. T R County Acres
Location: ¼, ¼, ¼, Sec. T R County Acres
(Use additional pages if greater than three irrigation sites.)

10.3 Type of vegetation: ☒ Grass hay ☐ Pasture ☐ Timber ☐ Row crops
☐ Other (describe)

10.4 Wastewater flow (dry weather) gallons per day: Average annual 16,716
Seasonal 62,469 Off-season 6,468

10.5 Land application rate (design flow including 1-in-10 year storm water flows):
Design: 20.1 inches/year 0.15 inches/hour 0.62 inches/day 1.16 inches/week
Actual: inches/year inches/hour inches/day inches/week

10.6 Total irrigation per year (gallons): Design: gal Actual: gal

10.7 Actual months used for irrigation (check all that apply):
☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec

10.8 Land application rate is based on:
☒ Hydraulic Loading ☐ Other (describe)
☐ Nutrient Management Plan (N and P) If N and P is selected, is the plan included? ☐ YES ☐ NO