

Basis of Wastewater Disposal System Design **Another Sky Campground System- Forestburgh NY**

Updated 9-14-17

Introduction and Project Description

The project consists of 100 tent only campsites and a 30 seat café and lodge. The sanitary sewer disposal system has been divided into 3 sub-parts:

- The Northern Campsite Facilities
- The Southern Campsite Facilities
- The Café and Lodge Facilities

The Northern Campsite Facilities consist of one restroom facilities that is broken into both male and female facilities. Each side of the facility is broken into 4 bathrooms and 4 showers for a total of 8 bathroom facilities and 8 shower facilities. Each bathroom facility will include one toilet and one sink. Based on the ADA requirements at least one bathroom and shower facility for each sex will be accessible.

The Southern Campsite Facilities consist of one restroom facilities that is broken into both male and female facilities. Each side of the facility is broken into 4 bathrooms and 4 showers for a total of 8 bathroom facilities and 8 shower facilities. Each bathroom facility will include one toilet and one sink. Based on the ADA requirements at least one bathroom and shower facility for each sex will be accessible.

The Café and Lodge will consist of a 30 seat restaurant facility that has 4 bathrooms and 2 shower facilities. Each bathroom will have a toilet and/or urinal and a sink. All bathroom facilities will be unisex and contain least one accessible bathroom.

Design Guidelines

1. NYS DEC Publication “New York State Design Standards for Intermediate Sized Wastewater Treatment Systems” – March 5, 2014
2. NYS DOH Publication “Individual Residential Wastewater Treatment Systems Design Handbook – 1996 (reprinted 2008)”

Design Flow

1. Per Table B-3, Typical Per-Unit Hydraulic Loading Rates, for Campgrounds:
 - i. Per Unsewered Site = 55 gallons per day (includes showers)
2. Apply a minimum design flow of 55 gallons per day per site.
3. Northern Campground Sites:
 - i. 50 sites x 55 GPD/site = 2750 GPD.
 - ii. 50 Tent Sites Total Daily Flow = 2750 GPD
4. Southern Campground Sites:
 - i. 50 sites x 55 GPD/site = 2750 GPD.

- ii. 50 Tent Sites Total Daily Flow = 2750 GPD
5. Café and Lodge Site:
- i. 30 Seats x 25 GPD/site = 750 GPD.
 - ii. Total Daily Flow = 750 GPD

Septic Tank

1. Per Table D-2, Septic Tank Sizing shall be a minimum of 1.5 x daily flow (if under 5,000 gallons per day) and no less than 1,000 gallons
2. Northern Campground:
 - i. Based on the large absorption bed requirements, the system will be broken in half so there will be two separate systems, one from the male and one from the female bathrooms which will evenly divide the 2750 GPD
 - ii. Male = $1.5 \times 1375 = 2,063$ GPD = One 5000 gallon septic tank and one effluent pumping chamber minimum.
 - iii. Female = $1.5 \times 1375 = 2,063$ GPD = One 5000 gallon septic tank and one effluent pumping chamber minimum.
3. Southern Campground:
 - i. Based on the large absorption bed requirements, the system will be broken in half so there will be two separate systems, one from the male and one from the female bathrooms which will evenly divide the 2750 GPD
 - ii. Male = $1.5 \times 1375 = 2,063$ GPD = One 5000 gallon septic tank and one effluent pumping chamber minimum.
 - iii. Female = $1.5 \times 1375 = 2,063$ GPD = One 5000 gallon septic tank and one effluent pumping chamber minimum.
4. Café and Lodge:
 - i. Café and Lodge = $1.5 \times 750 = 1,125$ GPD = One 2000 gallon septic tank and one effluent pump chamber minimum.

Absorption Field -

1. Use a Raised Trench System Trench System for Northern and Southern Campground
2. Use a Mound System for the Cafe and Lodge

Percolation Rate – Northern Campground- Field C

1. In situ percolation rate is 1” in 38 minutes at PT 18
2. Use a design percolation rate = 1 inch in 38 minutes.

Distribution System – Northern Campground- Field C

1. Application Rate = 0.50 gallons per day per square foot (based upon a 38 minute perc. rate)
2. Required Trench Area = 1,375 GPD / 0.50 GPD/SF = 2,750 square feet.
3. Minimum Required Absorption Field Length = 2,750 SF/2 foot wide trench = 1375 lineal feet.
4. Minimum Number of Laterals = 1,375 LF/ 60 LF/lateral = 23 laterals.
5. Provide 23 laterals at 60 lineal feet each = 1,380 lineal feet of distribution piping.
6. Reserve space for a 50 percent absorption facility expansion area.
7. Each lateral shall be 4 inch PVC perforated pipe conforming to ASTM D2729-89
8. Laterals shall be installed in 2 foot wide trenches spaced at 6 feet on center.
9. Laterals shall be capped on the ends.

Field Dimensions – Northern Campground Field C

1. Laterals in Both Directions:
 - i. Distribution System: 12 laterals at 60 feet each direction = 72 feet x 75 feet.
 - ii. 50% Expansion: 6 laterals at 60 feet each direction = 36 feet x 75 feet
 - iii. Total Absorption Field Dimension = 180 feet x 75 feet

Percolation Rate – Northern Campground- Field D

3. In situ percolation rate is 1” in 15 minutes at PT 21.
4. Use a design percolation rate = 1 inch in 15 minutes.

Distribution System – Northern Campground- Field D

10. Application Rate = 0.8 gallons per day per square foot (based upon a 15 minute perc. rate)
11. Required Trench Area = 1375 GPD / 0.80 GPD/SF = 1,719 square feet.
12. Minimum Required Absorption Field Length = 1719 SF/2 foot wide trench = 860 lineal feet.
13. Minimum Number of Laterals = 860 LF/ 60 LF/lateral = 14 laterals.
14. Provide 15 laterals at 60 lineal feet each = 900 lineal feet of distribution piping.
15. Reserve space for a 50 percent absorption facility expansion area.
16. Each lateral shall be 4 inch PVC perforated pipe conforming to ASTM D2729-89
17. Laterals shall be installed in 2 foot wide trenches spaced at 6 feet on center.
18. Laterals shall be capped on the ends.

Field Dimensions – Northern Campground Field D

2. Laterals in Both Directions:
 - i. Distribution System: 8 laterals at 60 feet each direction = 48 feet x 75 feet.
 - ii. 50% Expansion: 4 laterals at 60 feet each direction = 24 feet x 75 feet
 - iii. Total Absorption Field Dimension = 120 feet x 75 feet

Percolation Rate – Southern Campground

1. In situ percolation rate is 1” in 60 minutes at.
1. Use a design percolation rate = 1 inch in 60 minutes.

Distribution System – Southern Campground

1. Application Rate = 0.45 gallons per day per square foot (based upon a 45-60 minute perc. rate)
2. Required Trench Area (each Field):
 - i. $1375 \text{ GPD} / 0.45 \text{ GPD/SF} = 3,056$ square feet.
3. Minimum Required Absorption Field Length
 - i. Two Duplexes = $3,056 \text{ SF} / 2$ foot wide trench = 1528 lineal feet.
4. Minimum Number of Laterals:
 - i. $1528 \text{ LF} / 60 \text{ LF/lateral} = 26$ laterals.
5. Number of Laterals provided:
 - i. 26 laterals at 60 lineal feet each = 1560 LF distribution pipe
6. Reserve space for a 50 percent absorption facility expansion area.
7. Each lateral shall be 4 inch PVC perforated pipe conforming to ASTM D2729-89
8. Laterals shall be installed in 2 foot wide trenches spaced at 6 feet on center.
9. Laterals shall be capped on the ends.

Field Dimensions – Southern Campground

1. Laterals in Both Directions:
 - i. Distribution System: 13 laterals at 60 feet each direction = 78 feet x 75 feet.
 - ii. 50% Expansion: 7 laterals at 60 feet each direction = 42 feet x 75 feet
 - iii. Total Absorption Field Dimension = 198 feet x 75 feet

Percolation Rate – Café and Lodge

2. In situ percolation rate is 1” in 60 minutes at PT.
2. Use a design percolation rate = 1 inch in 60 minutes.

Distribution System – Café and Lodge

10. Application Rate = 0.45 gallons per day per square foot (based upon a 60 minute perc. rate)
11. Required Trench Area:
 - i. $750 \text{ GPD} / 0.45 \text{ GPD/SF} = 1667$ square feet.
12. Minimum Required Absorption Field Length
 - i. $1667 \text{ SF} / 2$ foot wide trench = 833 lineal feet.
13. Minimum Number of Laterals:
 - i. $833 \text{ LF} / 60 \text{ LF/lateral} = 14$ laterals.
14. Number of Laterals provided:
 - i. 14 laterals at 60 lineal feet each = 840 LF distribution pipe
15. Reserve space for a 50 percent absorption facility expansion area.
16. Each lateral shall be 4 inch PVC perforated pipe conforming to ASTM D2729-89
17. Laterals shall be installed in 2 foot wide trenches spaced at 6 feet on center.

18. Laterals shall be capped on the ends.

Field Dimensions – Café and Lodge

2. Laterals in One Direction:

- i. Distribution System: 14 laterals at 60 feet each = 84 feet x 75 feet.
- ii. 50% Expansion: 7 laterals at 60 feet each = 28 feet x 75 feet
- iii. Total Absorption Field Dimension = 112 feet x 75 feet