Municipality, County & Sewer District

Address of Treatment Facility

Original Lot & Tract No.

Engineer

Date

Name & Address of Governmental Agency for Approval

<table>
<thead>
<tr>
<th>Design period:</th>
<th>First phase</th>
<th>Ultimate</th>
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<tbody>
<tr>
<td>Number of persons to be served:</td>
<td>First phase</td>
<td>Ultimate</td>
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| Average Daily Design Hydraulic Flow (ADDF): | gal/day |
| Design BOD₅ loading: | lbs. BOD₅/day |
| Significant Runoff Period (SRP): | hours |
| Peak Factor (PF): | unitless |

Peak Influent Flow Rate (PIR):

\[
\text{ADD} \times \text{PF} \div \text{SRP} = \text{gal./min}
\]

If an equalization basin is to be used, its volume will be gal.

Air to be supplied: cu. ft./min. (with largest blower out of service)

Plant influent pumping station: Yes No

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<tr>
<th>Number of pumps</th>
<th>Type of pumps</th>
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Influent Pumping Rate (IPR): gal/min. (with largest pump out of service)

NOTE: Influent pumping facilities shall be capable of pumping the Peak Influent Rate (PIR) with the largest pump out of service, unless a flow equalization basin is installed. Include here the wet well calculations for the pumping station - 7.601.
Pretreatment devices:
Trash trap: Yes _____________ No ____________ Capacity ___________ gal.
Comminutor with bar screen bypass: Yes _____________ No ____________
Other _________________________________________________________________________
Design capacity of comminutor _____________ gal/min.
Method of flow division where parallel aeration unit arrangements are planned. Describe:
_______________________________________________________________________________
_______________________________________________________________________________
Aeration chamber volume: (based on 80 cu. ft./lb. BOD₅)

___________ lb. BOD₅/day x 80 cu. ft. x 7.48 gal./cu. ft. = ___________ gal.

_____________________________ gallons supplied

Aeration detention time:

Chamber volume gal. x 24 hours

_____________________________ = ________________ hours

ADDF ___________ gal./day

Are the dimensions and proportions of the aeration tanks such as to maintain effective mixture and utilization of air, to prevent unaerated sections and noticeable channeling, and to maintain velocities sufficient to prevent deposition of solids?
Yes __________  No ___________

Are inlets and outlets for each aeration tank provided with valves, gates, stop-planks, weirs, or other devices to permit flexibility in controlling the flow to any unit to maintain a reasonable constant water level and to permit cleaning of individual units?
Yes __________  No ___________

Amount of air required: (based on 2600 cu. ft./lb. BOD₅/day)

lbs. BOD₅ /day x 2600 cu. ft.

_____________________________ = ________________ cu. ft/min.
1440 min./day

Amount of air supplied: ______________ cu. ft/min. (with largest blower out of service)

NOTE: Additional capacity should be provided to operate airlifts and skimmers.
Are the aeration plates, tubes, or jets used for the introduction of air to mixed liquor removable for inspection, maintenance, and replacement without de-watering the tank?

Yes ________ No __________ N/A __________

If mechanical aerators are to be used, the oxygen required will be:

___________ lbs.BOD$_5$/day x 2 = ______________ lbs. O$_2$/day

**NOTE:** Calculations and data should be included to verify the O$_2$ transfer rate used to compute the supplied amount of O$_2$/day.

Settling chamber volume: ____________ gallons

Settling chamber detention time:

\[
\frac{\text{Chamber volume \hspace{1em} gal. x 24 hours}}{\text{ADDF\hspace{1em}gal./day}} = \text{______________ hours}
\]

**NOTE:** Non-mechanical hoppered tanks only may include the upper 1/3 (by height) of the hopper(s) in computing detention time.

Surface settling rate:

\[
\frac{\text{ADDF \hspace{1em}gal./day}}{\text{Surface area \hspace{1em}sq. ft.}} = \text{___________ GPD/sq. ft.}
\]

At peak flow:

\[
\frac{\text{PIR \hspace{1em}gal./min/ x 1400}}{\text{Surface area \hspace{1em}sq. ft.}} = \text{___________ GPD/sq. ft.}
\]

**NOTE:** If the Influent Pumping Rate (IPR) exceeds the peak Influent Flow Rate (PIR), then it should be substituted in the above equation for (PIR).

Weir overflow rate:

a. At peak flow:

\[
\frac{\text{PIR \hspace{1em}gal./min/ x 1400}}{\text{Total weir length \hspace{1em}feet}} = \text{___________ GPD/lin. ft.}
\]

**NOTE:** If the Influent Pumping Rate (IPR) exceeds the Peak Influent Flow Rate (PIR), then it should be substituted in the above equation for (PIR).
b. Are the weirs adjustable? Yes ___________ No ___________

Describe method of scum removal and disposal: __________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Scum storage capacity _____________________________________________________________

Describe method and frequency of sludge removal and method and location of sludge disposal:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Amount of sludge to be removed ____________ lbs./day.

If a sludge storage tank is to be installed, the volume of the tank(s) will be: (based on at least 10% of design loading).

Design BOD₅ loading lbs./day x 100 x 10% 
0.167 lbs. BOD₅/poeration equivalent = _____________ gal. (minimum)

Aeration tank vol. x 10% _____________ gallons supplied

a. Air supply: ____________ cu. ft./min. (with largest blower out of service)

Note: A minimum storage volume of 1,000 gallons will be required for plants with a design flow of less than 10,000 gal. day.

If aerobic digestion of sludge is to be utilized, the volume of the tank(s) will be: (based on three cubic feet per population equivalent)

Design BOD₅ loading lbs./day x 3 x 7.48 
0.167 lbs. BOD₅/poeration equivalent = _____________ gallons supplied

a. Air supply: (based on 20 cu. ft./min. per 100 cu. ft. of volume)

gallons supplied x 20 cu. ft./min. 
7.48 gal./cu. ft. x 1,000 cu. ft. = _____________ cu. ft./min.

Air supplied: ____________ cu. ft./min. (with largest blower our of service)
If anaerobic digestion of sludge is to be utilized, the volume of the tank(s) will be:

______________ gal.

**NOTE:** Basis of design and calculations must be submitted for the above volume.

If sludge drying beds are to be installed, the area provided shall be: (based on one square foot per population equivalent)

\[
\text{Design BOD}_5 \text{ loading} \quad \frac{\text{lbs.}}{\text{day}} \quad \frac{\text{loading}}{0.167 \text{ lbs./population equivalent}} = \quad \text{square ft.}
\]

______________ square feet provided ______________ number of beds

**NOTE:** Where phosphate removal or other chemical treatment processes are to be utilized, design of sludge handling facilities must take into account possible increased sludge production.

Check which of the following modes of advanced treatment of effluent disposal are to be installed:

___________ Surface slow sand filter
___________ Rapid sand gravity filter
___________ Microstrainers
___________ Lagoons
___________ Other:

If surface slow sand filters are to be installed, the area provided shall be: (Based on 11.5 gallons per square foot per day)

\[
\text{ADDF} \quad \frac{\text{gal.}}{\text{day}} \quad \frac{\text{gal/day}}{11.5 \text{ gal/sq. ft./day}} = \quad \text{square ft.}
\]

______________ square feet provided ______________ number of beds

a. Capacity of dosing chamber shall be: ______________ gallons
b. Size of dosing pumps: ______________ gal/min. (with largest pump out of service)

**NOTE:** Dosing chamber and pumps must be sized to dose half of the total filter to depth of three (3) inches within 10 to 15 minutes.
c. Dosing siphon height above sand beds: ____________ feet

If rapid sand gravity filters are to be installed, the area provided shall be: (based on 3.33 gpm/sq. ft. at the peak flow rate)

\[
\text{Peak flow rate}\ast \quad \text{gal./min.} \\
\frac{\text{_________}}{3.3 \text{ gpm/sq. ft.}} = \text{___________ sq. ft}
\]

\[
\text{___________ square feet provided} \quad \text{___________ number of cells}
\]

*NOTE: The peak flow rate shall be equal to the maximum rate of the pumping facilities preceding filtering.

a. Clearwell capacity: ____________ gallons
b. Rate of backwash: ____________ gpm/sq. ft.
c. Duration of backwash: ____________ minutes
d. Number of backwash pumps: ____________ @ ____________ gal./min.
e. Mudwell capacity: ____________ gallons

NOTE: Please refer to Part II of Ohio EPA's "Recommended Engineering Procedures and Design Guidelines Relative to Advanced Wastewater Treatment" in designing rapid sand gravity filters.

If microstrainers are to be installed, the net submerged effective area of the microstrainer fabric shall be: (based on 3.33 gpm/sq. ft. at the peak flow rate).

\[
\text{Peak flow rate}\ast \quad \text{gal./min.} \\
\frac{\text{_________}}{3.3 \text{ gpm/sq. ft.}} = \text{___________ sq. ft}
\]

\[
\text{___________ submerged square feet provided} \\
\text{___________ total square feet provided} \\
\text{___________ number of microstrainers}
\]

*NOTE: The peak flow rate shall be equal to the maximum rate of the pumping facilities preceding the microstrainers.
a. Continuous backwash rate: ____________ gal/min./ft. of microstrainer length.

b. Number of backwash pumps: ____________ @ ____________ gal/min.

**NOTE:** Please refer to Part II of Ohio EPA’s "Recommended Engineering Procedures and Design Guidelines Relative to Advanced Wastewater Treatment" in designing microstrainers.

If lagoons are to be utilized, their total volume will be: (based on five (5) days detention)

Design hydraulic flow ____________ gal./day x 5 = ________ gal.

__________ gallons supplied

Average design flow depth: ____________ feet

Number of cells: _______________

Minimum freeboard of ____________ feet will be provided.

The embankments of the lagoons shall have a minimum slope of _______________ vertical to _______________ horizontal.

Does the overflow structure provide flexible water depth control and operation of facilities?

Yes ____________ No ____________

**NOTE:** Prior to designing tertiary lagoons, contact the Division of Waste Management and Engineering in the appropriate District Office for information relative to the acceptability of the proposal.

What type of disinfection process will be employed?

Chlorination ____________ Ozone ____________ Other ____________

Describe: ______________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

If chlorination is to be used, in what form will it be?

Gas ____________ Powder ____________ Tablet ____________

Volume of contact tank(s): (based on 15 minutes retention at the peak flow rate)

Peak flow rate* ____________ gal/min. x 15 min. = ____________ gal.

__________ gallons supplied

*NOTE: The peak flow rate shall be equal to the maximum rate of the pumping facilities preceding the contact chamber.
Are the tank(s) baffled or so constructed as to reduce short circuiting of flow to a minimum?
Yes ____________ No ______________

Describe provisions for cleaning tank(s) and for maintaining adequate disinfection during cleaning operations:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Chlorine dosage rate: _____________ mg/l (at peak flow rate)

Will duplicate chlorinators be providers? Yes _____________ No ______________
Will the chlorinator be housed? Yes _____________ No ______________
Describe: _________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

What type of flow measurement device, if any, will be installed?
Describe: (indicating, recording, totalizing, etc.) ___________________________________________
______________________________________________________________________________
______________________________________________________________________________

What laboratory facilities or other types of monitoring equipment will be provided? Describe:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

What is the estimated cost of the above proposed wastewater treatment facility? $ ________________

Will a certified operator be employed to run the proposed treatment works?
Yes ____________ No ____________ If yes: full-time ________________
part-time ________________
Grade certification level ________________

Is the site for the proposed treatment works subject to flooding?
Yes ____________ No ____________ If yes, what measures will be taken to protect mechanical equipment?
What provisions, if any, will be made to provide standby power for electrical equipment?

Describe: ________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Should include capacity.