

Fairfield County Utilities Department



Site Evaluation, Design And Operation Requirements For Land Application Wastewater Treatment Systems

July 2002

SITE EVALUATION, DESIGN AND OPERATION REQUIREMENTS

FOR

**LAND APPLICATION
WASTEWATER
TREATMENT SYSTEMS**

FAIRFIELD COUNTY, OHIO

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SITE EVALUATION, DESIGN AND OPERATION REQUIREMENTS
FOR
LAND APPLICATION
WASTEWATER
TREATMENT SYSTEMS

1.0 BASIS OF APPROVAL

- 1.1 The applicant shall submit a Request for Approval to the office of the Fairfield County Sanitary Engineer to construct and operate any proposed wastewater treatment system, including those utilizing land application for the disposal of effluent wastewater.
- 1.2 As part of the Request for Approval, the applicant shall submit reasons why land application is the selected alternative along with a discussion of other alternatives considered and why those other alternatives were not selected.
- 1.3 All land application requests must show that the system will be a zero discharge system for the request to be considered.
- 1.4 All land application components (not limited to, treatment plant, effluent storage, land application area and irrigation system) must be designed and constructed to meet:
 - 1.4.1 The Fairfield County “*Water, Drainage and Sewer Regulations*” and the “*Construction and Material Specifications*”,
 - 1.4.2 The Fairfield County Developer’s Agreement,
 - 1.4.3 The Fairfield County “*Subdivision Regulations*”,
 - 1.4.4 The minimum requirements established by The Ohio State University (OSU) Extension Bulletin 860, “*Reuse of Reclaimed Wastewater through Irrigation for Ohio Communities*”,
 - 1.4.5 The minimum requirements of these criteria, and
 - 1.4.6 All Permit-to-Install (PTI) conditions and other rules/regulations as established by the Ohio Environmental Protection Agency (Ohio EPA).
- 1.5 If there is an apparent conflict between sections of this Land Application Document or between this document and the documents listed in 1.4, the most stringent information and interpretations shall prevail.

2.0 REQUIRED SITE INFORMATION

- 2.1 The applicant shall submit (to scale) two copies of plans showing the type and extent of the development, proposed to be served by the proposed land application system.

- 2.1.1 These plans shall present and quantify the total development area, the total potential number of single-family, multi-family, commercial, recreational and other habitable units, proposed open space areas, proposed road rights-of-way, proposed underground utilities, proposed waterways, proposed land application areas, proposed land application buffer areas, proposed treatment plant areas and proposed wastewater storage areas.
- 2.1.2 These plans must show all 10-year and 100-year floodplain areas and shall show all existing land uses, developments, water supply wells, soil types, underground utilities, surface/subsurface drainage systems and environmentally-sensitive areas within 1,000 feet of the proposed land application wastewater treatment system components. Ohio Department of Natural Resources (ODNR) well logs shall be submitted as a part of this information for the identified existing water supply wells. The location of these ODNR well logs shall also be shown on the plans.
- 2.2 The applicant shall submit interpretable copies of the Fairfield County Soil Survey (2001) information for the proposed development showing all existing surface soil types.
- 2.3 The applicant must submit the following information from the Fairfield County Soil Survey, excerpted for each of the proposed development and land application area soil types.
 - Table 1 – Temperature and Precipitation
 - Table 2 – Freeze Dates in Spring and Fall
 - Table 3 – Growing Season
 - Table H – Engineering Index Properties
 - Table J1 – Physical Properties of the Soils
 - Table J2 – Chemical Properties of the Soils
 - Table K1 – Water Features
 - Table L – Sanitary Facilities
 - Table M – Building Site Development
 - Table N – Construction Materials

3.0 LAND APPLICATION SITE CRITERIA

- 3.1 The applicant shall submit to Fairfield County two copies of the proposed land application area site plan (to scale) indicating, all proposed land application areas, all proposed buffer zones and all proposed developments. This site plan must also show all surrounding existing and proposed land uses, waterways, slopes greater than 15%, wetland areas, areas with less than 1 foot to seasonal water tables, areas with less than 3 feet to bedrock, all surface and subsurface drainage systems, structures and outlets and all 10-year and 100-year floodplain limits. In the event subsurface drainage tile systems exist, the submittal shall also include the layout and extent of the subsurface system.
- 3.2 In the event any proposed land application areas will be modified by grading, the applicant shall provide both pre-and post-development site plan versions.
- 3.3 The applicant shall submit a discussion addressing each of the following subjects pertaining to the proposed land application area.

- 3.3.1 Current and intended land application area uses.
 - 3.3.2 Current and proposed land application area plantings.
 - 3.3.3 Reuse category (unrestricted, restricted or agricultural).
 - 3.3.4 Proposed buffer area, construction approaches and plantings.
 - 3.3.5 Existing or proposed land application area fencing and signage.
 - 3.3.6 Approaches to assure that applied effluent will not reach surface watercourses.
 - 3.3.7 Approaches to assuring that land-applied effluents will not be able to be captured by drain tile systems or other structures and discharged to nearby surface waters.
 - 3.3.8 Intended land application area modifications (earthmoving, fill, windbreaks, plantings, drainage, etc.).
- 3.4 The applicant shall utilize the services of a Registered Professional Engineer experienced in soil science and geotechnical engineering to confirm that the units presented on the Fairfield County Soil Survey maps are not underlain by materials differing from those presented in Tables J1 and J2 of the Fairfield County Soil Survey. In the event discrepancies are identified, the applicant shall submit a plan to re-evaluate the soil permeability values. As part of this effort, all soils identified as hydric by the Fairfield County Soil & Water Conservation District shall be identified. For those areas containing hydric soils, the Registered Professional Engineer shall report on the potential of those areas being jurisdictional wetlands.
- 3.5 A minimum of one shallow boring for each 4 acres of land application area must be installed by the Registered Professional Engineer to determine the thickness of topsoil, soil classifications of the uppermost 60 inches, and in-situ moisture contents.
- 3.6 To establish the soil permeability values to be used for determining the land application surface area required, the following shall apply:
- 3.6.1 For those portions of the proposed land application area that **WILL NOT BE REGRADED**, the applicant may either:
 - 3.6.1.1 Use the lowest soil permeability value for each soil type as presented in Table J1 – Physical Properties of the Soils of the Fairfield County Soil Survey. Based upon the relative percentages of each soil type occurring within the land application areas, a weighted soil permeability value can then be established for the land application site, or
 - 3.6.1.2 For each 5-acre area, provide in-situ (undisturbed) permeability test results on undisturbed samples obtained between 12 and 18 inches below the surface. These results must then be averaged to provide a single, overall soil permeability value (inches/hour) for the land application site.

- 3.6.2 For each 10-acre portion of the proposed land application area that **WILL BE REGRADED**, the applicant shall provide remolded permeability test results for samples obtained between 12 and 18 inches below the surface, remolded at 90% standard proctor density. These results must then be averaged to provide a single, overall soil permeability value (inches/hour) for the land application site.
- 3.7 For all proposed land application sites, the applicant shall install at least three permanent ground water monitoring wells. The location of these wells will be based upon the advice of a hydrogeologist subject to review by Fairfield County and the Ohio EPA. The monitoring wells shall be located such that groundwater flow shall be monitored upstream and downstream of the proposed land application site. The wells shall be capable of determining the following:
- 3.7.1 The uppermost groundwater aquifer elevations,
- 3.7.2 The groundwater gradients, and
- 3.7.3 The direction of groundwater flow for all areas within 1,000 feet of the proposed land application areas.
- 3.8 The USGS elevation of the top of each monitoring well casing shall be provided along with a detailed log of each monitoring well construction. All monitoring wells shall be capable of providing future water samples easily and accurately.
- 3.9 The applicant shall provide a report describing the geologic and hydrogeologic characteristics of all proposed land application areas. This report shall establish the nature, thicknesses and extents of the various types of subsurface materials, the depths to bedrock, the nature of and depths to water-producing aquifers and the potential for hydrologic connections between surface precipitation and the uppermost aquifer.
- 3.10 The hydrogeologic report shall also discuss the potential for effluent to reach individual existing wells within 1,000 feet of the land application area. Transmissivity/cone of depression calculations must be submitted for all existing wells producing more than 100 gpm. The report must establish that the potential for groundwater supplies to be contaminated will be negligible.
- 3.11 The hydrogeologic report may be based upon information from the Fairfield County Soil Survey, the ODNR Ground Water Resources Map and ODNR Division of Water Well Logs. However, conclusions drawn from these sources must be confirmed through the installation of a minimum of one soil boring/monitoring well for each 25 acres of proposed land application area.
- 3.12 The hydrogeologic report must also present a groundwater-monitoring program that will meet the requirements of Section 7, 8, and 9 of this document.
- 3.13 The applicant shall submit calculations performed in accordance with OSU Extension Bulletin 860 to establish the required number of land application acres, the required effluent storage volume, and a nitrogen balance for the land application area, to prove that groundwater nitrate levels will be less than 10 mg/l. The results must be able to meet the following conditions:

- 3.13.1 The maximum amount of effluent that may be applied to a land application area shall be conditioned on the amount of rainfall received during the previous 24-hour period. In no case shall the amount of rainfall plus effluent exceed 0.4 inches for any 24-hour period. The maximum daily amount of effluent that may be applied to a land application area shall be 0.3 inches for grassed areas and 0.15 inches for agriculturally tilled areas.
- 3.13.2 The maximum permissible daily rate of irrigation in inches/day must be based upon the assumption that irrigation will only be able to occur during 70% of the days between April 1 and November 30 because of poor weather conditions. Effluent may not be applied when the ground is frozen, within 100 feet of wells, surface waters or roadways, when wind velocities are greater than 25 mph, to barren soils, if groundwater is within 1 foot of the surface or if there is a potential for runoff. The calculations must assume that between December 1 and March 31, there will be no land application.
- 3.14 Information shall be submitted showing that the biochemical oxygen demand (BOD) maximum loading to the land application area will be less than 930 lbs/ac/wk (11,160 lbs/ac/yr). Information shall also be submitted showing that there will be no long-term accumulation of biotoxic levels of metals in the soils receiving the treated wastewater effluent.
- 3.15 The applicant shall perform a wastewater nitrogen balance to determine if the land application acreage determined above will be sufficient to provide the chemical assimilative capacity necessary to provide a percolated total N value less than 10 mg/l. The following information shall be included:

| <u>PARAMETER</u> | <u>UNITS</u> |
|--|---------------------------|
| Average Daily Flow | MGD |
| Land Application Wetted Area | Acres |
| Average Design Wastewater Loading | inches/week |
| Total Wastewater Loading | MG/acre/year |
| Nitrogen Input from Wastewater | lbs./acre/year |
| Nitrogen Input from Preceding Crop | lbs./acre/year |
| Total Nitrogen Input | lbs./acre/year |
| Ammonia Volatilization (% of applied NH ₄ -N anticipated – provide appropriate documentation) | lbs./acre/year |
| Denitrification (% of applied N anticipated – provide appropriate documentation) | lbs./acre/year |
| Net Plant Nitrogen Assimilation | lbs./acre/year |
| Net Nitrogen Available to Percolate | lbs./acre/year |
| Average Annual Precipitation | inches/year |
| Wastewater Applied | inches/year |
| Potential Evapotranspiration | inches/year |
| Percolate | inches/year |
| Estimated Percolate Total N | mg/L (should be < 10mg/l) |

4.0 WASTEWATER TREATMENT PLANT CRITERIA

- 4.1 The applicant shall submit information pertaining to all proposed wastewater pretreatment plant systems. This submittal shall provide all data needed to establish that the minimum pretreatment objectives of OSU Extension Bulletin 860 Tables 3 and 4 will be met. At a minimum, the following information pertaining to the proposed plant shall be submitted:

| | |
|----------------------|--|
| Design Flowrates | Tank Sizing Calculations |
| Influent Parameters | Clarifier Sizing Calculations |
| Operating Parameters | Nitrification/Denitrification Calculations |
| Effluent Parameters | Filter Sizing Calculations |
| Sludge Calculations | Sludge Storage & Disposal Information |

5.0 WASTEWATER STORAGE LAGOON CRITERIA

- 5.1 The applicant shall perform whatever investigations are deemed necessary by the Fairfield County Sanitary Engineer to establish that the proposed wastewater storage lagoon system will not contaminate the uppermost groundwater aquifer.
- 5.2 The applicant shall submit (to scale) preliminary drawings depicting the details of all proposed wastewater storage lagoons. Plan view drawings shall be submitted showing all lagoon limits, one foot existing and proposed contour intervals and the locations of all existing and proposed wells within 1,000 feet. Lagoon cross sections shall be shown depicting all proposed side slopes, top of dike widths, liner thicknesses, sedimentation zones, precipitation zones, pool zones and freeboard zones. Elevations of all cross section components must be shown.
- 5.3 The applicant shall install a minimum of one boring for each 2 acres of proposed lagoon storage area. The borings shall be a minimum depth of 5 feet below the proposed bottom of lagoon elevation. A minimum of one in-situ (undisturbed) permeability test shall be performed for each boring below the proposed bottom elevation of the lagoon. Additionally, if the excavated soils are intended to be utilized for the construction of a clay liner, a minimum of one remolded permeability test shall be performed on that material to establish the minimum required liner compaction percentage. Boring logs shall be submitted depicting the permeability test results.
- 5.4 Each boring installed under Item 5.3 above shall be converted to a monitoring well and these wells shall be utilized to establish the elevation, groundwater flow direction and gradient of the uppermost aquifer in the vicinity of the proposed lagoon.
- 5.5 The applicant shall then utilize the product of the highest in-situ permeability rate from Item 5.3 and the depth to the uppermost aquifer from Item 5.4 to determine the travel time between the proposed bottom of lagoon elevation and the uppermost aquifer elevation.
- 5.5.1 In no case may a lagoon bottom elevation be within five feet of the uppermost aquifer and in all cases, the minimum vertical travel time between the lagoon bottom and the uppermost aquifer must be 100 years. The same requirement shall apply for the lagoon side slopes.

- 5.5.2 In the event the vertical travel time to the uppermost aquifer is less than 100 years, an additional thickness of recompacted clay liner must be installed with a minimum permeability of 1×10^{-7} cm/sec to meet the 100 year requirement. All lagoon bottom clay liners must possess a minimum thickness of 18 inches. All lagoon side slope clay liners must possess a minimum thickness of 12 inches.
- 5.6 The storage lagoon shall have a minimum 3 feet of freeboard over and above the following capacities:
 - 5.6.1 130 days of effluent storage.
 - 5.6.2 1 foot of sedimentation storage.
 - 5.6.3 1 foot of yearly precipitation minus evaporation storage.
 - 5.6.4 Accommodation of a 24-hour, 25-year storm event under any storage conditions.
 - 5.6.5 30 days of additional storage for system shutdowns for repairs.
- 5.7 A permanent gauge shall be installed in the effluent storage lagoon to permit recording water surface elevations on a monthly basis. The gauge shall be large enough so it can be read from the effluent storage lagoon bank. Readings shall be taken on the first, last and middle days of each month. The gauge shall be referenced to USGS elevation.
- 5.8 The design of all effluent storage lagoons shall include measures to proactively control odors, nuisance algae, mosquitoes and rodents.
- 5.9 The design of all effluent storage lagoons shall include measures to minimize the ability of algae and other solids to enter the irrigation spray systems.
- 5.10 The design of all effluent storage lagoons shall include an alarm system that will immediately notify the operator when the level in the lagoon reaches the bottom of the freeboard zone.

6.0 IRRIGATION SYSTEM CRITERIA

- 6.1 The applicant shall submit information pertaining to the type of irrigation system that will be utilized. This information shall include manufacturer's system information, type of irrigation system (sprinkler, surface, drip or combined), pumping system, control valving system, system protection from freezing and winterization, clog repair and maintenance procedures.
- 6.2 The applicant shall also submit information pertaining to the proposed layout of the irrigation system, including information about the approximate lengths of irrigation lines, line diameters, number of sprinkler heads, sprinkler head openings, etc.
- 6.3 Irrigation systems shall be designed to operate as efficiently as possible including the use of multiple zones.

7.0 LAND APPLICATION SITE MONITORING CRITERIA

- 7.1 Prior to the start of effluent land application, one soil sample per ten (10) acres from the land application area shall be tested to determine the background levels of the parameters listed below. During the operation of the land application system, annual soil samples from the same land application areas shall be tested for the same parameters.
- 7.2 For nutrient level determinations, a soil sample shall be obtained from a 0 to 8 inches depth for every soil type present. For contaminate level determinations, a composite sample shall be made of three equal portions of soils taken from 0 to 8 inches, 8 to 16 inches and 16 to 24 inches depth ranges for every soil type zone. For both nutrient and contaminant testing, no single sample may represent more than 15 acres of land application area.
- 7.3 On an annual basis, the applicant shall also submit land application area crop information including species planted, dates of harvest and ultimate use of harvested crops.
- 7.4 All monitoring parameters are to be reported on an extractable nutrient basis, and all testing shall be performed using a Mehlich III extract or equivalent. Units will be reported as PPM, meq/100 ml or standard units as appropriate. The following parameters shall be analyzed:

7.4.1 Soil Nutrient Level Test Parameters:

| <u>PARAMETER</u> | <u>UNITS</u> | <u>PARAMETER</u> | <u>UNITS</u> |
|------------------|---------------|---------------------|--------------|
| Actual Acidity | Meq/100ml | CEC | meq/100ml |
| Base Saturation | % of cations | NO ₃ -N | mg/kg |
| Acid Saturation | % of cations | Zinc | mg/kg |
| pH | SU | P adsorption maxima | mg/kg |
| Organic Matter | % of organics | Sodium | mg/kg |
| Potassium (K) | mg/kg | NH ₄ -N | mg/kg |
| Phosphorus | mg/kg | Sulfur | mg/kg |

7.4.2 Soil Contaminant Level Test Parameters:

| <u>PARAMETER</u> | <u>UNITS</u> | <u>PARAMETER</u> | <u>UNITS</u> |
|------------------|--------------|------------------|--------------|
| Calcium | mg/kg | Nickel | total, mg/kg |
| Magnesium | mg/kg | Chromium | total, mg/kg |
| Boron | mg/kg | Lead | total, mg/kg |
| Copper | mg/kg | Cadmium | total, mg/kg |
| Aluminum | mg/kg | Arsenic | total, mg/kg |
| Beryllium | mg/kg | Mercury | total, mg/kg |
| Vanadium | mg/kg | Molybdenum | total, ug/g |
| Cobalt | mg/kg | Selenium | mg/kg |
| Fluoride | total, mg/kg | Iron | mg/kg |
| Lithium | total, mg/kg | Manganese | mg/kg |
| Zinc | total, mg/kg | | |

7.5 Prior to the start of effluent land application, water samples shall be obtained from all surfaces and subsurface drainage outfalls and all samples shall be tested to determine the background levels of the following parameters. Quarterly (March, June, September and December) during the operation of the land application system, water samples from the same locations shall be tested for the same parameters.

| <u>PARAMETER</u> | <u>UNITS</u> |
|------------------------|--------------|
| Fecal Coliform | mg/l |
| NH ₄ – N | mg/l |
| NO ₃ – N | mg/l |
| CBOD ₅ | mg/l |
| Total Suspended Solids | mg/l |

7.6 Prior to the start of effluent land application, groundwater samples from the groundwater monitoring wells shall be tested to determine the background levels of the following parameters. During the operation of the land application system, groundwater samples from the same monitoring wells shall be tested for the same parameters.

| <u>PARAMETER</u> | <u>FREQUENCY</u> | <u>PARAMETER</u> | <u>FREQUENCY</u> |
|---------------------------|------------------|------------------|------------------|
| Depth to Groundwater | Monthly | Cobalt | Annually |
| pH | Monthly | Copper | Annually |
| Ammonia-Nitrogen | Monthly | Fluoride | Annually |
| Biochemical Oxygen Demand | Monthly | Iron | Annually |
| Fecal Coliform Bacteria | Monthly | Lead | Annually |
| Nitrate-Nitrogen | Monthly | Lithium | Annually |
| Nitrite-Nitrogen | Monthly | Magnesium | Annually |
| Total Dissolved Solids | Monthly | Manganese | Annually |
| Total Suspended Solids | Monthly | Molybdenum | Annually |
| Total Kjeldahl Nitrogen | Monthly | Nickel | Annually |
| Aluminum | Annually | Phosphorus | Annually |
| Arsenic | Annually | Potassium | Annually |
| Beryllium | Annually | Selenium | Annually |
| Boron | Annually | Sodium | Annually |
| Cadmium | Annually | Sulfate | Annually |
| Calcium | Annually | Vanadium | Annually |
| Chromium | Annually | Zinc | Annually |
| Chloride | Annually | | |

8.0 TREATMENT PLANT EFFLUENT MONITORING CRITERIA

8.1 The parameters and testing frequencies for the treated effluent wastewater are as follows:

| <u>PARAMETER</u> | <u>FREQUENCY</u> | <u>PARAMETER</u> | <u>FREQUENCY</u> |
|---------------------------|------------------|------------------|------------------|
| Flow | Daily | | |
| Depth to Groundwater | Monthly | Chloride | Quarterly |
| pH | Weekly | Cobalt | Quarterly |
| Ammonia-Nitrogen | Weekly | Copper | Quarterly |
| Biochemical Oxygen Demand | Weekly | Fluoride | Quarterly |
| CBOD ₅ | Weekly | Iron | Quarterly |
| Fecal Coliform Bacteria | Weekly | Lead | Quarterly |
| Total Coliform Bacteria | Weekly | Lithium | Quarterly |
| Nitrate-Nitrogen | Monthly | Magnesium | Quarterly |
| Nitrite-Nitrogen | Monthly | Manganese | Quarterly |
| Total Dissolved Solids | Monthly | Molybdenum | Quarterly |
| Total Suspended Solids | Monthly | Nickel | Quarterly |
| Total Kjeldahl Nitrogen | Monthly | Phosphorus | Quarterly |
| Aluminum | Quarterly | Potassium | Quarterly |
| Arsenic | Quarterly | Selenium | Quarterly |
| Beryllium | Quarterly | Sodium | Quarterly |
| Boron | Quarterly | Sulfate | Quarterly |
| Cadmium | Quarterly | Vanadium | Quarterly |
| Calcium | Quarterly | Zinc | Quarterly |
| Chromium | Quarterly | | |

8.2 The parameters and frequencies for the Irrigation System are as follows:

| <u>PARAMETER</u> | <u>FREQUENCY</u> |
|-----------------------|------------------|
| Precipitation | Daily |
| Wind Speed | Daily* |
| Wind Direction | Daily* |
| Air Temperature | Daily* |
| Irrigation Rate (gpd) | Daily* |

*To be monitored when irrigation occurs.

9.0 EFFLUENT STORAGE LAGOON GROUND WATER MONITORING CRITERIA

- 9.1 During the operation of the land application system, samples of groundwater shall be obtained from at least one permanent down-gradient groundwater monitoring well identified by the Fairfield County Sanitary Engineer and these samples shall be tested at the minimum frequencies as follows:

| <u>PARAMETER</u> | <u>FREQUENCY</u> | <u>PARAMETER</u> | <u>FREQUENCY</u> |
|--------------------------------|---------------------|------------------|------------------|
| Lagoon Water Surface Elevation | Three times Monthly | Chloride | Annually |
| Depth to Groundwater | Monthly | Cobalt | Annually |
| pH | Monthly | Copper | Annually |
| Ammonia-Nitrogen | Monthly | Fluoride | Annually |
| Biochemical Oxygen Demand | Monthly | Iron | Annually |
| Fecal Coliform Bacteria | Monthly | Lead | Annually |
| Nitrate-Nitrogen | Monthly | Lithium | Annually |
| Nitrite-Nitrogen | Monthly | Magnesium | Annually |
| Total Dissolved Solids | Monthly | Manganese | Annually |
| Total Suspended Solids | Monthly | Molybdenum | Annually |
| Total Kjeldahl Nitrogen | Monthly | Nickel | Annually |
| Aluminum | Annually | Phosphorus | Annually |
| Arsenic | Annually | Potassium | Annually |
| Beryllium | Annually | Selenium | Annually |
| Boron | Annually | Sodium | Annually |
| Cadmium | Annually | Sulfate | Annually |
| Calcium | Annually | Vanadium | Annually |
| Chromium | Annually | Zinc | Annually |

10.0 REPORTING REQUIREMENTS

- 10.1. In addition to the Ohio EPA Permit-to-Install requirements, the applicant shall submit monthly monitoring test result summaries to the Fairfield County Utilities Department. These summaries shall be submitted in a format suitable to the Fairfield County Sanitary Engineer.
- 10.2. In the event concentration increases are noted for any of the testing programs (Section 7, 8, and 9), those increases shall be reported along with a plan of action to address the concentration increases.
- 10.3 A chain of custody to properly record sample history and insure the validity of the results must accompany all samples taken for monitoring purposes and must be included in each monthly summary submittal. All sampling locations must be made readily available to the Fairfield County Utilities Department for sampling.

11.0 CONSTRUCTION REQUIREMENTS

- 11.1 The construction of all proposed land application wastewater treatment components shall be in accordance with plans and specifications approved by the Fairfield County Sanitary Engineer. Following construction, certification by a registered professional engineer will be required stating that all components were constructed in accordance with the approved plans and specifications.

- 11.2 Clay liners shall be constructed of cohesive soils consisting of inorganic, natural soils with a plasticity index of at least 10% with at least 60% of the material (by weight) passing the No. 200 sieve and containing no cobbles larger than 4 inches.
- 11.3 All clay liners must be constructed to the minimum standard proctor densities established for the remolded permeability tests performed in accordance with Section 5 herein. Specifications for all proposed clay liners must include requirements that;
- 11.3.1 The clay liner be constructed in maximum loose lifts of 8 inches, and
- 11.3.2 That all clay liner material be compacted between -2% and +4% of standard proctor optimum moisture. The construction of all clay liners must be observed by a qualified independent quality control testing laboratory who shall provide certifications that all material and compaction requirements were met during construction.
- 11.4 All irrigation system components shall be required to pass a pressure test outlined in the approved plans and specifications. All electrical and power supply systems shall be provided with alarm systems that will result in the operator immediately knowing that a power failure has occurred. All construction shall be performed in accordance with the Ohio EPA Storm Water Management for Construction Activities guidelines.

12.0 REMEDIAL EFFORTS

- 12.1 If, at any time during the operation (up to 5 years after Fairfield County's acceptance of the system), the system does not meet the requirements of these criteria, it shall be the responsibility of the applicant to remedy the problem immediately with all the associated costs being borne by the applicant. In the event this occurs, the applicant shall not rule out the possibility of constructing other wastewater treatment and disposal alternatives as a solution to the problem.

13.0 COOPERATION

- 13.1 The applicant shall work with Fairfield County in order to obtain Ohio EPA approval of the Permit-to-Install application. All cost associated with any required data collection, analysis, etc. shall be borne by the applicant.