NAPA COUNTY
ONSITE WASTEWATER
TREATMENT SYSTEMS (OWTS)
TECHNICAL STANDARDS

PART I

SITE EVALUATION, SEWER LINE AND WASTEWATER TANK REQUIREMENTS

SECTION **PAGE**

SECTION 1 SITE EVALUATION REQUIREMENTS

(A) PROFESSIONAL QUALIFICATIONS

1. Persons performing site evaluations shall possess one of the following licenses and shall demonstrate to the administrative authority that the licensed or registered person has reasonable knowledge and experience with onsite sewage treatment systems and site evaluation procedures.

   The following professions are authorized to perform site evaluations:

   Civil Engineer
   Geologist
   REHS
   Soil Scientists, certified by the Soil Science Society of America

   Civil Engineers, Registered Environmental
   Health Specialists and Geologists must show proof of registration or licensing in the State of California. Soil Scientists must show proof of registration in any State in the U.S.

(B) SITE EVALUATION PROCEDURES

1. Site evaluations shall be performed when the soil conditions are dry. Soil shall be considered dry when visual identification of the soil structure in the test pit sidewall is observed. If the soil moisture is too high, a site evaluation cannot be performed. Site evaluators shall be responsible for assuring soil conditions are dry enough to perform the site evaluation prior to inspection by staff of the Division of Environmental Health.
2. Test pits shall be dug by a backhoe or excavator. The test pits shall be constructed in accordance with California Occupational Health and Safety Standards (OSHA). Test pits shall be excavated to a depth of five (5) feet, bedrock, or groundwater whichever occurs first. Test pits shall be gently sloped or stepped and shall not be excavated so as to require the use of a ladder for entry. Test pits shall not be less than twenty-four (24) inches wide. The test pits shall be sufficient in number and adequately spaced to encompass and represent the soil conditions of the entire area of the proposed primary and replacement areas.
3. The excavated sidewall shall be picked away with a sharp instrument to expose the natural soil structure.
4. The qualified professional shall identify each soil horizon and record all of its characteristics on the site evaluation form using the abbreviations provided with the instructions.
5. A U.S.D.A. soil texture classification must be identified for each horizon from ground surface to a depth of three (3) feet below the effective infiltrative area by using the following field texture method. In addition to the field texture analysis, a hydrometer test and bulk density test performed by a laboratory approved by the administrative authority is recommended to confirm the field results and in some cases may be required.

(C) HYDROMETER TESTING

Hydrometer and bulk density testing may be required by the administrative authority to verify field textural analysis results. A laboratory approved by the Administrative Authority shall perform hydrometer and bulk density testing. Hydrometer testing shall be performed using the Bouyoucos Hydrometer method or equivalent. Hydrometer testing cannot be used in lieu of field texture analysis.

(D) DEPTH TO GROUNDWATER DETERMINATION

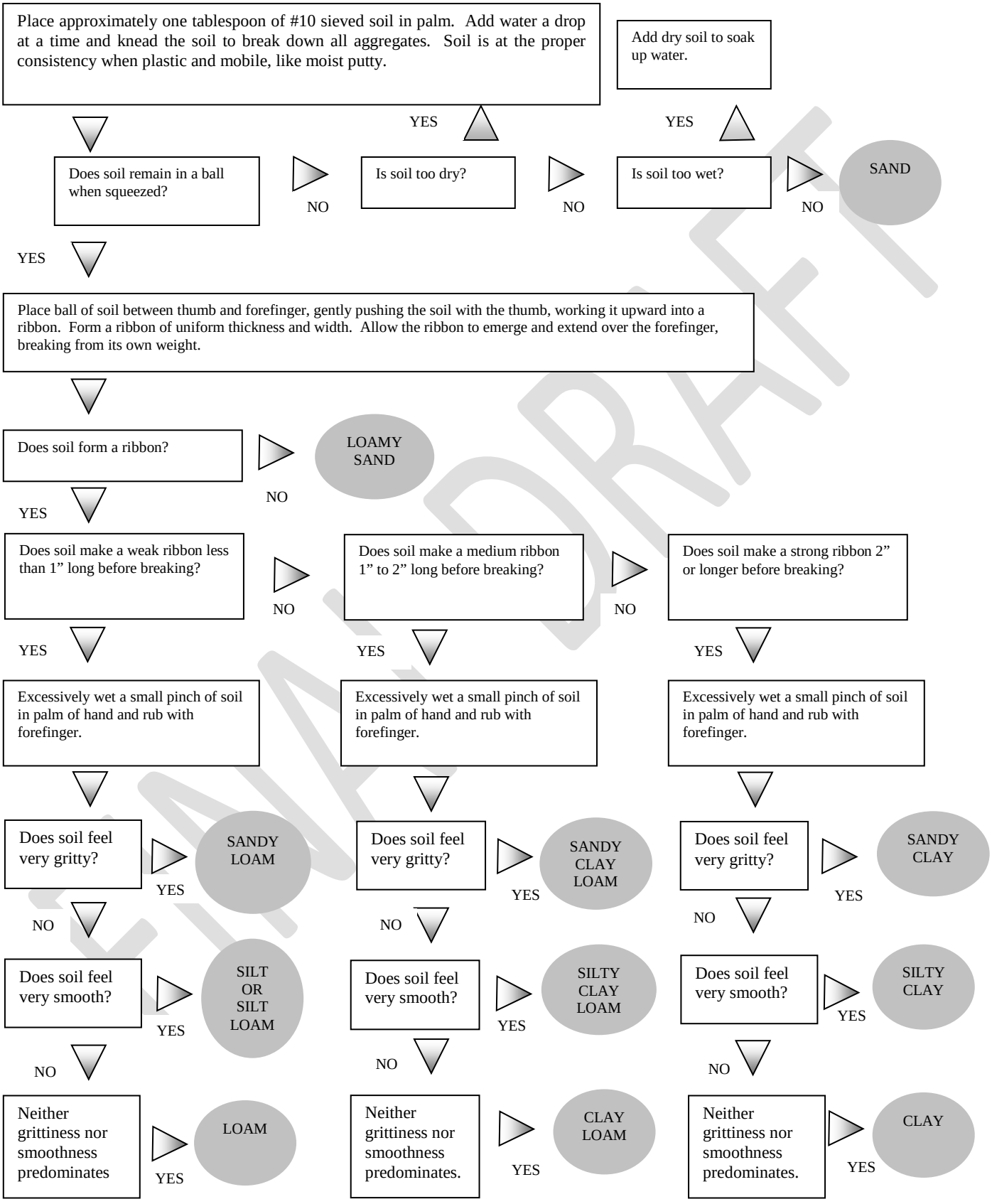
1. Groundwater shall be defined as the highest seasonal level of the water table in the soil. Groundwater levels shall be estimated by the extent of soil redoximorphic features observed in the soil profile or by direct observation of stabilized groundwater levels.
2. Direct observation of groundwater shall be done with monitoring wells at the time of year when the maximum groundwater elevation is expected to occur. Monitoring wells sufficient in number and adequately spaced to encompass and represent the entire primary area and replacement area shall be constructed to a minimum depth of three (3) feet below the proposed effective infiltrative area. The monitoring shall be performed during the water year (October 1 through September 30) and after fifty (50) percent of the expected average rainfall has occurred for that particular area of the county, as determined by rainfall data from an approved source. Three (3) separate sets of monitoring data shall be collected all within ten (10) days after separate rainfall events of one half (½) inch of rain or greater. In areas that experience high groundwater due to flood irrigation, monitoring shall be done when flooding is at its maximum. The qualified professional must notify this office a minimum of twenty-four hours prior to collecting the monitoring data. An Environmental Health Specialist may be present at the time the data is collected.

(E) SITE EVALUATION REPORT

1. A site evaluation report shall include specific information regarding soil conditions, characteristics, estimated permeability, depth of zones of saturation, depth to bedrock and be submitted on the form approved by the Administrative Authority. A plot map of adequate size (not greater than 24" x 36") to sufficiently show the locations of all test pits and/or monitoring wells triangulated from permanent landmarks or known property corners must be part of the site evaluation report. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to all drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities
2. Submit the completed site evaluation report, test pit log and test pit map to the Napa County Division of Environmental Health, in person, by mail or email (.pdf format only). Only complete submissions will be accepted.

(F) DETERMINING SOIL TEXTURE BY THE FEEL METHOD

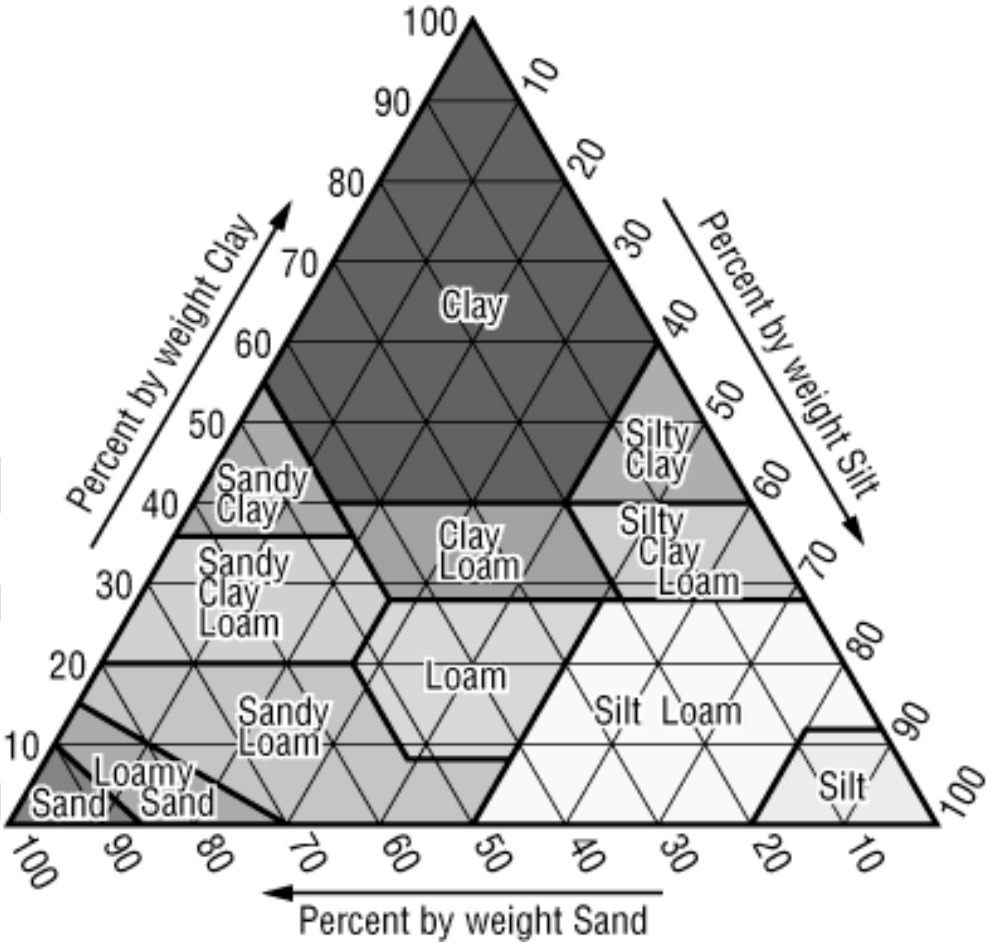
Take a sample of soil from the horizon you wish to texture and pass it through a #10 sieve (2mm mesh) by crushing the soil peds with your fingers and agitating the sieve. The soil should pass freely through the mesh. If clay balls develop in the sieve when agitated or the mesh clogs, the soil may be too wet and you may get incorrect results.



ABBREVIATIONS

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1” **C**=Clear 1”-2.5” **G**=Gradual 2.5”-5” **D**=Difuse >5”	**S**=Sand **LS**=Loamy Sand **SL**=Sandy Loam **SCL**=Sandy Clay Loam **SC**=Sandy Clay **CL**=Clay Loam **L**=Loam **C**=Clay **SiC**=Silty Clay **SiCL**=Silty Clay Loam **SiL**=Silt Loam **Si**=Silt	**W**=Weak **M**=Moderate **S**=Strong **G**=Granular **Pl**=Platy **Pr**=Prismatic **C**=Columnar **AB**=Angular Blocky **SB**=Subangular Blocky **M**=Massive **SG**=Single Grain **C**=Cemented	**L**=Loose **S**=Soft **SH**=Slightly Hard **H**=Hard **VH**=Very Hard **ExH**=Extremely Hard	**L**=Loose **VFRB**=Very Friable **FRB**=Friable **F**=Firm **VF**=Very Firm **ExF**=Extremely Firm	**NS**=NonSticky **SS**=Slightly Sticky **S**=Sticky **VS**=Very Sticky **NP**=NonPlastic **SP**=Slightly Plastic **P**=Plastic **VP**=Very Plastic	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **VF**=Very Fine **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Coarse	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Coarse **ExC**=Extremely Coarse	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **F**=Fine **M**=Medium **C**=Coarse **Contrast:** **Ft**=Faint **D**=Distinct **P**=Prominent

U.S.D.A. SOIL CLASSIFICATION TRIANGLE



IDENTIFYING SOIL STRUCTURE

The distinctness of the peds may be Weak, Moderate, or Strong.

Weak Structure:

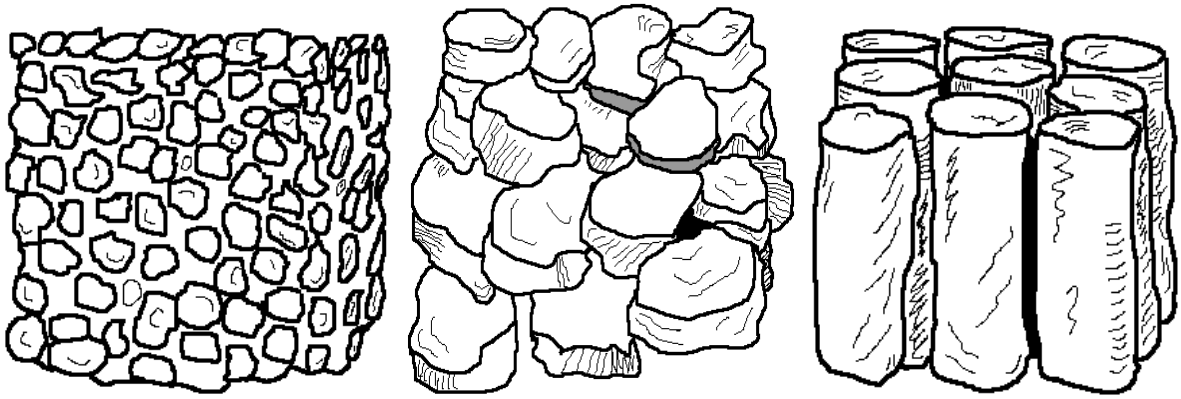
- Individual peds are barely observable in the test pit sidewall.
- When removed, the soil breaks easily into barely observable peds.

Moderate Structure:

- Individual peds are moderately well formed and can be seen in the sidewall.
- When removed, many well-formed peds are observable.

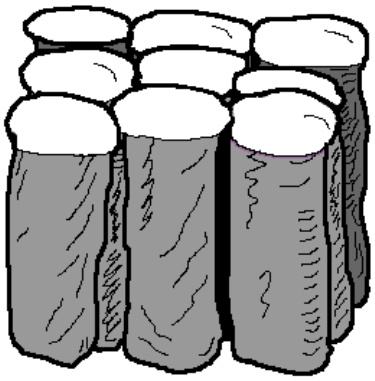
Strong Structure:

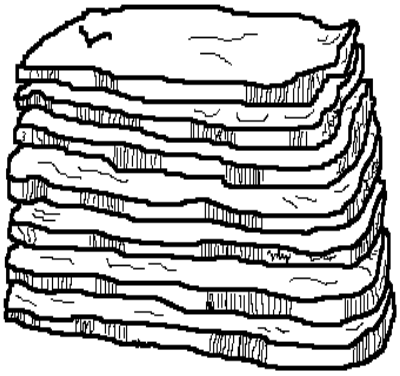
- Individual peds are well formed and very easily seen in the sidewall.
- When removed, the soil remains in very evident peds.



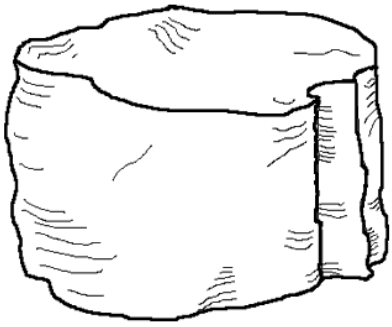
Granular: In granular structure, the structural units are approximately spherical or polyhedral and are bounded by curved or very irregular faces that are not casts of adjoining peds. In other words, they look like cookie crumbs. Granular structure is common in the surface soils of rich grasslands and highly amended garden soils with high organic matter content.	**Blocky**: In blocky structure, the structural units are block-like or polyhedral. They are bounded by flat or slightly rounded surfaces that are casts of the faces of surrounding peds. Typically, blocky structural units are nearly equidimensional. The structure is described as **angular blocky** if the faces intersect at relatively sharp angles; **as sub-angular blocky** if the faces are a mixture of rounded and plane faces and the corners are mostly rounded. Blocky structures are common in subsoil but also occur in surface soils that have high clay content. The strongest blocky structure is formed as a result of swelling and shrinking of the clay minerals, which produce cracks.	**Prismatic**: In prismatic structure, the individual units are bounded by flat to rounded vertical faces. Units are distinctly longer vertically, and the faces are typically casts or molds of adjoining units. Vertices are angular or sub rounded; the tops of the prisms are somewhat indistinct and normally flat. Prismatic structures are characteristic of the B horizons or subsurface soils. The vertical cracks result from freezing and thawing and wetting and drying as well as the downward movement of water and roots.

IDENTIFYING SOIL STRUCTURE (CONT.)





Columnar: In columnar structure, the units are similar to prisms and are bounded by flat or slightly rounded vertical faces. The tops of columns, in contrast to those of prisms, are very distinct and normally rounded. Columnar structure is common in the subsoil of sodium-affected soils. Columnar structure is very dense and it is very difficult for plant roots to penetrate these layers.	**Platy**: In platy structure, the units are flat and plate like. They are generally oriented horizontally. A special form, lenticular platy structure, is recognized for plates that are thickest in the middle and thin toward the edges. Platy structure is usually found in subsurface soils that have been subject to leaching or compaction by animals or machinery. The plates can be separated with a little effort by prying the horizontal layers with a penknife. Platy structure tends to impede the downward movement of water and plant roots through the soil.



Structureless: Some soils lack structure and are referred to as structureless. In structureless layers or horizons, no peds are observable in the sidewall or after the soil has been removed. When structureless soils are ruptured, soil fragments, single grains, or both results. **Structureless soil material may be either SINGLE GRAIN or MASSIVE**. Soil material of single grains lacks structure. In addition, it is loose.

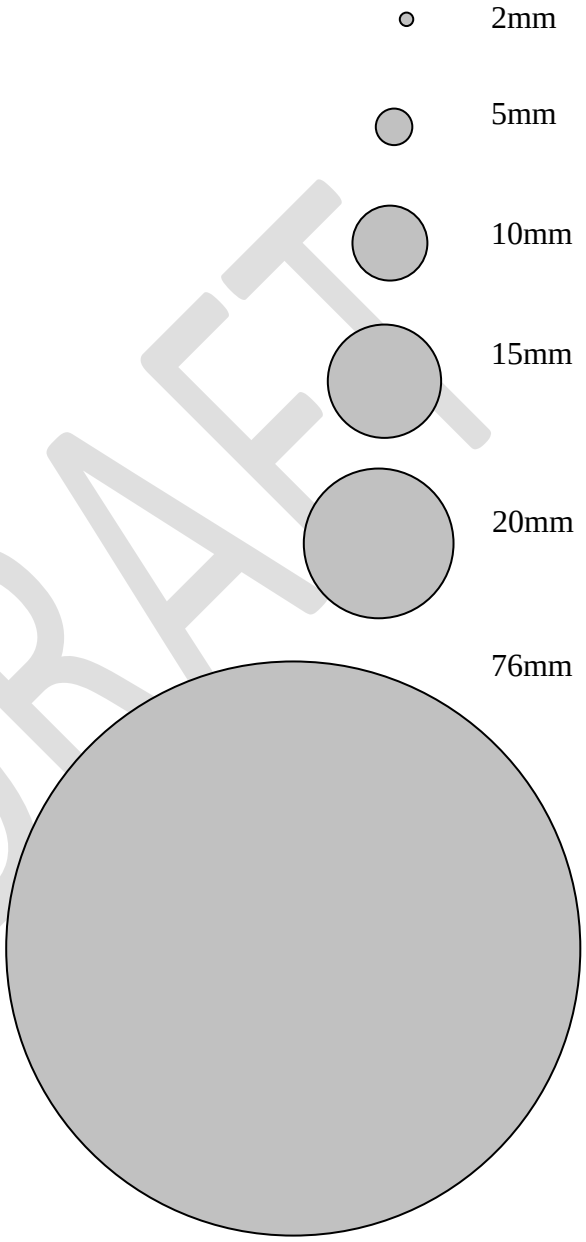
ROOTS, PORES AND MOTTLES

SIZE CLASSES OF ROOTS	DIAMETER IN MM
Fine	<2
Medium	2 to < 5
Coarse	5 to <20
Very Coarse	20 to < 76
Extremely Coarse	≥76

QUANTITY CLASSES OF ROOTS	QUANTITY PER UNIT AREA*
Few	1
Common	2 – 5
Many	> 5

SIZE CLASSES OF PORES	DIAMETER IN MM
Very Fine	< 1
Fine	1 to < 2
Medium	2 to < 5
Coarse	5 to < 10
Very Coarse	≥ 10

QUANTITY CLASSES OF PORES	QUANTITY PER UNIT AREA**
Few	<1
Common	1 to 5
Many	> 5



MOTTLES					
QUANTITY		**SIZE**		**CONTRAST**	
Few	<2%	**Fine**	<5mm	**Faint**	Hard to see
Common	2 to 20%	**Medium**	5 to 15mm	**Distinct**	Readily seen
Many	> 20%	**Coarse**	> 15mm	**Prominent**	Obvious, strong contrasting color

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For Fine, Use 1 square cm.

For Medium and Coarse, Use 10 square cm.

For Very Coarse and Extremely Coarse, Use 1 square meter.

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For Very Fine and Fine, Use 1 square cm.

For Medium and Coarse, Use 10 square cm.

For Very Coarse, Use 1 square meter.

SECTION 2 SEWER PIPE REQUIREMENTS

(A) APPROVED SEWER PIPE MATERIALS

1. Pipes and cleanouts for sewage systems shall conform to the standards of the most recent edition of the Uniform Plumbing Code.
2. Sewer pipe shall be ABS (schedule 40), PVC (schedule 40), cast-iron, galvanized steel, or any other piping generally accepted for use as sewer pipe as approved by the administrative authority.
3. No building sewer or other drainage piping or part thereof, which is constructed of materials other than those approved for use under or within a building, shall be installed under or within two feet (0.6m) of any building or structure, or part thereof, nor less than one foot (0.3m) below the surface of the ground. This applies to structures such as porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, walks, covered driveways, and similar structures or appurtenances.

(B) MINIMUM SEWER SIZES

The minimum size of any building sewer or private sewer may be determined on the basis of the total number of fixture units drained by such sewer, in accordance with Table 717.1 of that edition of the California Plumbing Code adopted by this code (CPC § 717.0, modified). No building sewer shall be smaller than the building drain.

(C) GRADE OF INSTALLATION

Building sewers shall be run in practical alignment and at a uniform slope of not less than one-fourth (1/4) of an inch per foot (20.8 mm/m) toward the point of disposal.

Exception: When approved by the administrative authority and where it is impractical due to the depth of the structural features or to the arrangement of any building or structure to obtain a slope of one-fourth (1/4) of an inch per foot (20.8 mm/m), such pipe or piping four (4) inches (100 mm) through six (6) inches (150 mm) shall be permitted to have a slope of not less than one-eighth (1/8) of an inch per foot (10.4 mm/m) and such piping eight (8) inches (200 mm) and larger shall be permitted to have a slope of not less than one-sixteenth (1/16) of an inch per foot (5.2 mm/m).

(D) JOINING METHODS

1. Joining methods for pipes and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 705.0 of the CPC (CPC § 715.2).
2. Where different sizes of pipes and fittings are to be connected, the proper size increasers or reducers or reducing fittings shall be used between two sizes (CPC 316).

(E) SEWER AND WATER PIPE LOCATION AND DEPTH

1. Gravity building sewers constructed of materials approved for use within a building may be located within the same trench as a private water line as long as the water line is installed above all sewer lines. Existing sewer lines constructed of materials not approved for use within a building must maintain one (1) foot vertical and one (1) foot horizontal separation to all water lines.
2. Pressure sewer lines shall be installed in a separate trench at least twelve (12) inches horizontally from the water line trench.

3. The separation distance between public water lines and sewer lines shall be as prescribed by California Code of Regulations, Title 22 Waterworks Standards.

(F) SUPPORT FOR SEWER PIPE

Building sewer and effluent piping shall be laid on a firm bed throughout the entire length, and any such piping laid in made or filled-in ground shall be laid on a bed of approved materials and shall be adequately supported to the satisfaction of the administrative authority. (CPC § 718.2).

(G) CLEANOUT REQUIREMENTS

1. Cleanouts shall be placed outside the building at the lower end of the building drain and extend to grade. Additional building sewer cleanouts shall be installed at intervals not to exceed one hundred (100) feet (30.4m) in straight runs and for each aggregate horizontal change in direction exceeding one hundred thirty five (135) degrees. All required building sewer cleanouts shall be extended to grade. When building sewers are located under buildings, the cleanout requirements shall comply with the standards established by the local building department. (CPC § 719.1,719.3).
2. When a building sewer or branch thereof does not exceed ten (10) feet (0.3m) in length and is a straight line projection from a building drain which is provided with a cleanout, no cleanout will be required at its point of connection to the building drain. (CPC § 719.2).
3. Each cleanout for building sewers shall be installed so that it opens to allow cleaning in the direction of flow or at right angles thereto and, except in the case of a wye branch and at the end-of-line cleanouts, shall be installed vertically above the flow line of the pipe (CPC § 707.6, CPC § 719.4).
4. Cleanouts installed under concrete or asphalt paving shall be made accessible by yard boxes or extending flush with the paving with approved materials and shall be adequately protected. Yard boxes or equivalent shall be marked "sewer" (CPC § 719.5).

(H) BUILDING SEWER TEST

When required, building sewers shall be tested by plugging the end of the sewer at the point of connection to the septic tank and completely filing the building sewer with water from lowest to the highest point thereof, or by such other test as may be prescribed by the administrative authority. The building sewer shall be watertight at all points (CPC 712.0).

SECTION 3 SEPTIC TANKS, SUMP TANKS, DOSING TANKS and GREASE INTERCEPTORS (Refer to Figures 1 and 2)

(A) APPROVED TANKS

All septic tanks and dosing tanks must have a current International Association of Plumbing and Mechanical Officials (IAPMO) approval listing. Each tank shall be permanently marked with the manufacturer's name and/or trademark, and the nominal working volume. Permanent markings shall be adequately protected from corrosion so as to remain permanent and readable over the life of the tank. The product shall also bear the Uniform Plumbing Code certification mark (UPC®). Heavy cement-based sealants are approved for sealing concrete tanks and may be required.

(B) SEPTIC TANK COMPARTMENTS

All septic tanks shall have two (2) compartments. The inlet compartment shall be a minimum of two-thirds (2/3) the total liquid capacity of the tank. Septic tank compartments shall be separated by a baffle that is permanently affixed, constructed of a solid durable material, and extends a minimum of four (4) inches above the working liquid level. The septic tank baffle shall provide an air vent that connects the two compartments above the working liquid level. A baffle fitting specified by the septic tank manufacturer, or other method approved by the administrative authority, to prevent the transfer of solids from the first compartment to the second, must be in place. For high flow systems that incorporate multiple tanks, single compartment septic tanks may be used with prior approval by the administrative authority.

(C) INSTALLATION REQUIREMENTS

1. Excavations for all residential, commercial and traffic rated septic tanks, dosing tanks and grease interceptors shall be made according to the manufacturer's requirements. Such excavations shall provide a level, uniform load-bearing surface free of imbedded rock formations or large boulders. All residential, commercial and traffic rated septic tanks, dosing tanks and grease interceptors shall be set on a level and compacted bed according to the manufacturer's requirements. Wet and/or unstable beds shall be over-excavated, backfilled and compacted with an approved material suitable to stabilize and support the tank.
2. Backfilling and compaction shall be performed according to the manufacturer's requirements. Backfill material shall be friable, not contain stones larger than three (3) inches in diameter or debris of any type.
3. Installation depth for all residential, commercial and traffic rated septic tanks, dosing tanks and grease interceptors shall be no greater than the manufacturer's specification.
4. The manufacturer's specification sheet, installation instructions and warranty information must be on file with the administrative authority.
5. When multiple septic tanks are proposed, they shall be placed in series.
6. The separation between any two septic tanks shall be at least two (2) feet unless a closer distance is approved by the tank manufacturer.

(D) SPECIAL REQUIREMENTS FOR HIGH SEASONAL GROUNDWATER AREAS

All residential, commercial and traffic rated septic tanks, dosing tanks and grease interceptors installed in areas where the administrative authority determines the seasonal groundwater level to be six (6) feet or less from original grade shall be made non-buoyant according to the manufacturer's recommendations or other methods approved by the administrative authority

(E) TANK ACCESS

Access to each compartment of all septic tanks, dosing tanks, sump tanks and grease interceptors shall be provided by a minimum twenty (20) inch diameter opening or equivalent. Access openings shall be located to provide visual inspection, maintenance and/or repair of sanitary tees, effluent filters, baffles, and pump assemblies. Septic tanks and grease interceptors with influent compartments twelve (12) feet in length or greater shall have an additional access opening located over the baffle.

(F) SEPTIC TANK AND DOSING TANK RISERS

1. All access openings on septic tanks, dosing tanks and grease interceptors shall have risers extended a minimum of two (2) inches above the finished grade. Except for concrete grade rings, risers shall be installed in one continuous piece without seams.
2. All traffic rated septic tanks, dosing tanks, and grease interceptors shall have traffic rated risers and lids installed flush with the finished grade.

3. All risers shall be securely attached by means of a watertight collar and/or other sealant material applied according to the manufacturer's instructions and approved by the administrative authority.
4. All risers shall be fitted with gastight, watertight, vermin proof, securely fastened covers that are removable with standard hand tools.
5. All covers shall be of durable construction, manufactured specifically for their intended use, and approved by the administrative authority.

(G) INLETS, OUTLETS and SANITARY TEES

1. The invert of the inlet of all septic tanks shall be a minimum of two (2) inches higher than the invert of the outlet.
2. In no case shall the inlet and outlet openings be less in diameter than the connecting influent and effluent lines.
3. All inlets of septic tanks and dosing tanks shall be fitted with sanitary tees, which have an internal diameter equivalent to the inlet piping. The upper end of all inlet sanitary tees shall extend a minimum of four (4) inches above the working liquid level and a minimum of two (2) inches below the underside of the tank top. The lower end of all sanitary tees shall extend a minimum of twelve (12) inches below the working liquid level. For multiple septic tanks in series, outlet sanitary tees may be used in lieu of an effluent filter except for the last septic tank where an effluent filter is required.

(H) EFFLUENT FILTER

1. All effluent discharged from any new septic tank(s) directly to any dispersal area or dosing tank must pass through an effluent filter sized based upon type of facility either residential or commercial and the estimated peak daily flow.
2. All effluent filters shall be located in the outlet compartment of the septic tank, be easily inspected, cleaned and maintained. For multiple tank configurations, only the last septic tank shall be required to be equipped with an effluent filter.
3. All effluent filters shall be appropriately sized, manufactured for their specific use, and approved by the administrative authority.
4. A hose bib shall be provided within 50 feet of tanks for cleaning of effluent filters.

(I) WATERTIGHT TEST

1. All septic tanks, dosing tanks, sump tanks, grease interceptors, inlet and outlet connections, risers and riser covers shall be completely watertight. The administrative authority may require a watertight test be performed on any new tank and/or any existing tank being repaired.
2. When required, septic tanks, dosing tanks, sump tanks and grease interceptors shall be filled with water to two (2) inches above the tank and riser connection and left for twenty-four (24) hours. After twenty-four (24) hours the tank(s) shall be refilled to two (2) inches above the tank and riser connection. If there is no measurable loss for one (1) hour, the tank is considered watertight. Whenever possible, risers shall be installed as one continuous piece. When multiple connections are made or concrete grade rings are used, the design engineer shall be responsible for providing certification that the entire riser is watertight.
3. When required the watertight test will be conducted by the qualified professional that designed the wastewater system. A watertight test certification form shall be submitted by the qualified professional prior to the administrative authority granting final approval of the wastewater system.
4. In cases where there is no qualified professional the administrative authority will inspect the tank(s) for water tightness.

(J) CAPACITY OF SEPTIC TANKS

Minimum septic tank capacity shall be in accordance with the following table or three (3) times the daily flow from all connected fixtures for commercial systems. The minimum septic tank size shall be twelve hundred (1200) gallons.

Table I-1
Capacity of Septic Tanks

Number of Bedrooms	Liquid Capacity in Gallons
1 to 4	1,200
5 or 6	1,500
7 or 8	2,000
9 or 10	2,500

(K) DOSING AND SUMP TANK SIZING

1. Dosing tanks with pumps shall be sized to provide emergency reserve storage capacity of one-day's peak daily flow measured in gallons per day above the high level alarm. Emergency reserve storage is the capacity of the tank as measured between the high level alarm and invert of the inlet.
2. The minimum dosing tank size shall be 500 gallons.
3. The minimum liquid level in all dosing tanks shall be set no lower than what is necessary to provide the minimum required emergency storage plus dosing volume. Dosing tanks and pump systems shall be selected which will optimize the use of the tank volume during operation and not compress the clear liquid zone. The minimum liquid level shall be kept as high as practical to minimize the exposed interior surface of the tank to corrosive gases and stress from exterior hydrostatic and earth pressures.
4. Sump tanks may only be installed to serve non-dwelling units (bathrooms in barns or garages for example) and shall have a minimum capacity of 70 gallons.

(L) PUMP SYSTEMS

1. Pumps shall be rated for wastewater use.
2. Pumps shall be appropriately sized so that the pump does not operate near its shut-off head.
3. When appropriate, pumps shall be fitted with anti-siphon and check valves.
4. Mechanical floats or timers shall control each pump.
5. All pump systems shall be equipped with a high level alarm float. Setting the "off" float arbitrarily low to maximize emergency storage capacity is discouraged. The off float shall not be set as to expose any portion of the pump.
6. In lieu of providing reserve storage capacity equal to one day's peak flow, a dual pump system may be installed where the alternate pump becomes operational automatically if the primary pump fails. Dual pump systems may be required for commercial systems.
7. Pumps may be seated on a level and stable platform of poured concrete or cement block or placed in suspended pump assemblies. The pump intake port shall be placed in the clear liquid zone.
8. The pump or suspended pump assembly shall be installed in accordance with the manufacturer's requirements and shall be located no less than eight (8) inches above the tank bottom.

9. Suspended pump assemblies shall be held in place with PVC or other non-corrosive brackets inside the tank riser.
10. Package assemblies need not rest on the tank bottom or platform unless specified by the manufacturer.
11. The pump discharge should not exceed a rate that causes the pump to stir the liquid or solids in the tank.
12. Pumps installed to serve non-dwelling units (bathrooms in barns/garages) shall be rated as a solids handling pump and be able to pass 2" solids. Pump and alarm shall be hardwired.

(M) PUMP CONTROLS AND ALARMS

1. All pumps shall be connected to, and operated from, control panel assemblies manufactured specifically for their intended use and approved by the administrative authority.
2. All pump controls and alarms shall be contained in an exterior rated, water proof, non-corrosive, tamper proof control panel box that can be opened with standard hand tools. Control panels in areas accessible to the public shall be locked to prevent unauthorized access.
3. All control panels shall be equipped with a visible and audible alarm. The control panel with visible and audible alarm shall be mounted no greater than fifty (50) feet away from the residence served by the onsite system or the common area of a commercial building and be easily accessible for service and inspection. In cases where there are multiple residential buildings, the alarm shall be located at the residence that is most often occupied as approved by the administrative authority. A remote visible and audible alarm shall be required if the primary alarm is not located as required above.
4. Each pump shall be controlled either by a mechanical float or timer assembly.
5. Each pump shall have a non-resettable dose counter and/or elapsed time meter included in the control panel. For systems in the monitoring program a flow meter must be installed in the system in addition to a dose counter.
6. The conduits entering pump control and service panels shall be sealed against gas vapor and moisture with silicone or other method or material approved by the National Electrical Manufacturers Association (NEMA). Control panels located where electrical conduits are installed on a slope must have a pull box located near the electrical panel.
7. Separate electrical circuits shall be provided for the pump controls and the alarm float.

(N) GREASE INTERCEPTORS

1. Grease interceptors are required at all facilities connected to an onsite sewage treatment system that provide foodservice and/or food preparation and produce wastewater containing floatable oil, wax, fats or a grease concentration as determined by the administrative authority
2. Grease interceptors must have a current International Association of Plumbing and Mechanical Officials (IAPMO) approval listing. Each tank shall be permanently marked with the manufacturer's name and/or trademark, and the nominal working volume. Permanent markings shall be adequately protected from corrosion so as to remain permanent and readable over the life of the tank. The product shall also bear the Uniform Plumbing Code certification mark (UPC®).
3. Grease interceptors shall be sized according to the following formula:

   (Peak number of meals per hour)(Wastewater flow rate [(a)])(Retention Time [(b)])(Storage Factor [(c)]) = Required Grease Interceptor Capacity in gallons (minimum capacity of 750 gallons)

   (a) See Commercial Wastewater Flow Chart (Table II-1)

(b) **RETENTION TIME**
Multi-service utensils = **2.5**
Single-service utensils = **1.5**

Hours of Operation	(c) **STORAGE FACTOR**
≤ 8	**1**
9 to 16	**2**
17 to 24	**3**

4. The following plumbing fixtures shall be connected to a grease interceptor:
   Dishwashers;
   Three-compartment sinks;
   Floor sinks;
   Mop sinks;
   Other fixtures as determined by the administrative authority
5. Grease interceptors shall be cleaned regularly so as to ensure efficient operation. Only licensed septic and/or grease-pumping companies currently permitted by the administrative authority may pump grease interceptors.
6. Written receipts of all grease interceptor and grease trap pumping and maintenance events shall be kept onsite and made available upon request by the administrative authority. The receipt shall indicate: the name and address of the company performing the work, the date the work was performed, and the volume of grease removed. Receipts shall be retained onsite for a period of three (3) years.

(O) GREASE INTERCEPTOR EXCEPTIONS

1. A food facility or other commercial operation which demonstrates that the discharge of grease, floatable oil, wax or fats, is less than one hundred (100) milligrams per liter, may be exempt from the minimum grease interceptor sizing, installation or maintenance requirements. The sampling and testing, if required by the administrative authority, must be performed, at the owner's expense and by an independent certified testing organization using accepted testing methods.
2. If it is determined by the administrative authority that the food facility is not exempt from the minimum grease interceptor sizing, installation or maintenance requirements, but, due to the proposed menu, Use Permit limitations and/or size constraints, an under counter type grease trap may be used in lieu of a grease interceptor provided the property owner signs the Grease Trap Agreement.
3. This exemption is allowed at the discretion of the administrative authority and only when installed in conjunction with an onsite sewage treatment system.

(P) SEPTIC TANK, SUMP TANK, DOSING TANK AND GREASE INTERCEPTOR DESTRUCTION

1. A permit must be obtained prior to causing any septic tank, sump tank, dosing tank or grease interceptor to be destroyed.
2. All inlet and outlet plumbing must be disconnected from the tank and capped or reconnected to an approved sewage dispersal system or public sewage system if applicable.
3. The tank must be pumped empty by a permitted septic tank cleaning company and a copy of the receipt submitted to the administrative authority.
4. The tank lid shall be completely broken and several holes made in the tank bottom.
5. Hydrated lime or chlorine shall be spread over the entire area.
6. After inspection by the administrative authority, the tank shall be completely filled with soil, sand, gravel, concrete or other material approved by the administrative authority.

(Q) SEPTIC TANK, SUMP TANKS, DOSING TANK, AND GREASE INTERCEPTOR REMOVAL

1. A permit must be obtained prior to causing any septic tank, sump tank, dosing tank or grease interceptor to be removed.
2. All inlet and outlet plumbing must be disconnected from the tank and capped or reconnected to an approved sewage dispersal system or public sewage system if applicable.
3. The tank must be pumped empty by a permitted septic tank cleaning company and a copy of the receipt submitted to the administrative authority.
4. The tank shall be completely removed from the excavation.
5. Hydrated lime or chlorine shall be spread over the tank and the excavation.
6. After inspection by the administrative authority, the excavation shall be completely filled with soil, sand, gravel, concrete or other material approved by the administrative authority.
7. The tank pieces shall be taken to a sanitary landfill or appropriate facility for recycling. A copy of the disposal receipt shall be made available upon request.

PART II

DESIGN, CONSTRUCTION AND INSTALLATION OF CONVENTIONAL SEWAGE TREATMENT SYSTEMS

SECTION **PAGE**

SECTION 1 CONVENTIONAL SEWAGE TREATMENT SYSTEMS

A conventional sewage treatment system is a sewage treatment system suitable for sites with adequate soil depth, satisfactory soil structure and exceptional site conditions that uses a septic tank and gravity to disperse effluent throughout the dispersal leach field, and in which no advanced treatment is utilized nor requires design by a qualified professional. Conventional sewage treatment systems may use a pump to transport effluent received from the septic tank uphill where the effluent is then distributed by gravity into an approved dispersal field placed in an area with surface and subsurface features complying with the standards in this part.

The design goals for all wastewater treatment systems are to prevent disease and preclude contamination of groundwater and other beneficial waters by dispersal of effluent below the surface of the ground and reducing discharges to the environment from wastewater treatment systems by adequately siting and designing all onsite wastewater treatment systems.

SECTION 2 GENERAL PROVISIONS

(A) SITE SUITABILITY

1. The soil hydraulic loading rate from ground surface to three (3) feet below the trench bottom shall conform to the rates as shown on Table II-2.
2. Groundwater, fractured rock, hardpan, bedrock or other limiting condition is not encountered from the natural ground surface to three (3) feet below the proposed trench bottom.
3. Conventional systems with wastewater flows in excess of one thousand five hundred (1500) gallons per day will require an annual operating permit. Monitoring shall be done in accordance with requirements in Part III as applicable to system type.
4. An existing system may be repaired where soil conditions do not comply with 1 and 2 above as specified in Napa County Code, Chapter 13.32.
5. Setbacks as specified in Napa County Code Chapter 13.28 and/or 13.32 must be satisfied.

(B) BASIS FOR DETERMINING SIZE AND TYPE OF SEWAGE SYSTEM

1. A site evaluation must be performed prior to design of the system. The size and type of sewage dispersal system shall be determined based on the projected wastewater flows to the sewage dispersal system and the site evaluation report as defined in these requirements.

a. RESIDENTIAL DESIGN FLOW: Design flow shall be sized based on the number of potential bedrooms proposed at one hundred twenty (120) gallons per potential bedroom.

b. COMMERCIAL DESIGN FLOW: Commercial systems shall be sized according to Table II-1. A qualified professional shall submit proposed flow for any occupancy not included in Table II-1 and the flows shall be substantiated by generally accepted published guidelines and approved by the administrative authority.

All commercial systems will require a design and layout from a qualified professional. Said plan must be reviewed and approved by the administrative authority prior to the issuance of the construction permit.

Wastewater flows from wine processing facilities are based on such factors as annual wine production, duration of the harvest period and anticipated peak flow during the harvest period. Sanitary flows from winery processing facilities shall be calculated using Table II-1. Winery

process and sanitary wastewater flows must be calculated separately and collected in separate septic tanks. See Part IV for winery process waste facility sizing.

Table II-1
Commercial design flow rates

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports	5 per passenger
Campgrounds:	
Campground with central comfort station	35 per person
Campground with flush toilet, no showers	25 per person
Day Camps (no meals)	15 per person
Luxury Camp, private bath	100 per person
Summer and seasonal	50 per person
Churches (sanctuary)	5 per seat
With kitchen wastes	7 per seat
Country Club	125 per person
Factories	35 per person per shift
Hospitals	250 per bed space
Kitchen waste only	25 per bed
Laundry waste only	40 per bed
Hotels/Motels with private bathroom (no kitchen waste)	60 per two person room
Hotels/Motels without private bathroom (no kitchen waste)	50 per two person room
Hotel/Motel with private bath and kitchen	75 gallons per person
Institutions other than hospitals	125 per bed space
Movie Theaters	5 per seat
Offices	20 per employee
Picnic parks with toilets and showers	10 per person
Picnic parks with toilet waste only	5 per person
Resort camps with limited plumbing	50 gallons per person
Restaurants/Winery Kitchens:	
Conventional sit down	15 per person
Short Order	13 per person
Bar and Cocktail	8 per person
Wine tasting (no meals served)	3 per person
School (non-boarding	20 per student
With gym and showers add	5 per student
With cafeteria using disposable utensils	3 per meal served
Self-service laundries	50 gallons per wash
Service station	10 gallons per vehicle served
Retail stores	20 per employee
For public restrooms add	1 per 10 square feet
Swimming pools and bathhouses	10 per person
Tourist camps or mobile home parks with individual bath units	100 per person
Tourist camps or trailer parks with central bathhouse	75 per person
Work or construction camps (semi-permanent)	50 per person
Employee	15 per employee

TABLE II-2

Soil Application Rates

CONVENTIONAL SEWAGE TREATMENT SYSTEM

SOIL APPLICATION RATES BASED ON SOIL PROFILE

Texture	Structure		Application Rate (Gal/ft^2/day)
	Shape	**Grade**	**STE**
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless	
	Massive	Structureless	
Sandy Loam, Loamy Sand	Platy	Weak, Mod, Strong	
	Prismatic, Blocky, Granular	Weak	0.33
		Moderate, Strong	0.5
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	Massive	Structureless	
	Platy	Weak, mod, strong	
	Prismatic, Blocky, Granular	Weak	0.25
		Moderate, Strong	0.33
Clay loam	Massive	Structureless	
	Platy	Weak, Mod, Strong	
	Prismatic, Blocky, Granular	Weak, Moderate	0.25
		Strong	0.33
Sandy Clay, Silty Clay Loam	Massive	Structureless	
	Platy	Weak, Moderate, Strong	
	Prismatic, Blocky, Granular	Weak, Moderate	
		Strong	0.25
Clay, Silty Clay	Massive	Structureless	
	Platy	Weak, Mod, Strong	
	Prismatic, Blocky, Granular	Weak	
		Moderate, Strong	

Conventional system prohibited

SECTION 3 PLAN SUBMISSION REQUIREMENTS

(A) PREPARATION OF PLANS

1. Any person proposing to install, modify, repair or otherwise perform work on an onsite wastewater treatment system must submit to the administrative authority two (2) copies of the general site layout, layout of the detailed dispersal system plan drawn to scale (1:20 or 1:30 scale), and, if applicable, a floor plan for the proposed building development. For commercial systems, these plans must be prepared by a qualified professional. The plans must be complete, and must clearly show the exact locations of the following whether existing or proposed:
   a. Parcel number and site address, if assigned;
   b. Name, address, and phone number of property owner, contact person, and person preparing plans;
   c. Vicinity map;
   d. Parcel boundary map;
   e. Scale;
   f. Lot dimensions, including all property lines;
   g. Setbacks complying with NCC Section 13.28.040 or Chapter 13.32;
   h. Areas (paved and unpaved) subject to vehicular traffic;
   i. Easements and rights-of-way, public and private;
   j. Structures, dwellings, swimming pools and auxiliary buildings;
   k. Animal enclosures;
   l. Fuel tanks, hazardous material storage;
   m. Plumbing stub-out;
   n. Water lines (public and private);
   o. Areas subject to flooding, inundation or storm water overflow;
   p. Existing and proposed wells, abandoned wells, springs, neighboring wells, streams, ditches, canals, culverts, ponds, lakes, swales, 10-year flood plains, or any body of water (intermittent or perennial) located within one hundred (100) feet of property lines;
   q. Existing and proposed onsite wastewater treatment systems (including replacement areas), septic tanks, supplemental treatment and storage devices, sewer lines, dispersal line location (including length), dispersal trench detail, and specifications of the materials (including size and type of rock, septic tank manufacturer, filter fabric, piping and/or chamber unit, etc.)
   r. Soil profile test holes, groundwater observation wells;
   s. Direction of slope in absorption system area and fifty (50) feet adjacent to it on all sides. A contour map is recommended and may be required depending on conditions observed at the site;
   t. Trees within ten (10) feet of sewage dispersal areas and replacement areas;
   u. Underground and overhead utilities within ten (10) feet of septic system and replacement area;
   v. Cut banks, unstable land forms, bluffs and ravines;
   w. Storm sewers, infiltration basins and other storm water management improvements located within 100’ of onsite sewage systems including tanks and replacement areas; and
   x. Floor plan of dwelling or other structure with rooms labeled, if applicable.

2. Any proposal for a conventional system must meet the regulations that are in effect at the time that the Department approves the septic system permit. All plans approved without an installation permit issued, or where an installation permit has expired are subject to Department review and shall comply with the regulations in place at the time the sewage permit is issued regardless of prior approval.

SECTION 4 CONVENTIONAL DISPERSAL FIELDS

(A) GENERAL PROVISIONS

1. The onsite wastewater treatment system design shall meet the requirements of Parts I and II.
2. The dispersal field shall consist of one (1) or more lines(s) consisting of drain rock, perforated pipe, or chamber systems. The dispersal field shall be preceded by a septic tank and if required, a dosing tank.
3. Dispersal lines, including perforated piping, shall be installed parallel to the surface contours with a tolerance of not more than three (3) inches per one hundred (100) feet. Perforated pipe shall be centered within the dispersal trench. The orifices in all perforated pipe shall face downward. Drain rock and perforated pipe or chamber components shall extend the entire length of the dispersal trench.
4. Prior to backfilling, drain rock or chamber component shall be covered with untreated building paper, geo-textile fabric or other similar approved material.
5. Installation of the sewage dispersal systems during wet conditions shall be prohibited. Excavation or backfill of the sewage dispersal system shall be prohibited when the soil is frozen or when the soil moisture content causes smearing of the soils.
6. All smeared or compacted soil surfaces in the sidewalls or bottom of dispersal trenches shall be scarified to the depth of smearing or compaction and the loose material removed prior to placement of the drain rock or chamber components.
7. Heavy equipment or vehicular traffic shall not be driven over the dispersal field during construction or after completion of the onsite sewage system. Failure to comply with this requirement may result in the system having to be relocated; possibly including additional soils testing and potentially construction of an alternative sewage treatment system.
8. Standard dispersal lines shall not branch or have tees, except for a single bend with a minimum inside angle of one hundred thirty-five (135) degrees.

(B) CONFIGURATION

1. Systems shall be designed to maximize the uniform application of wastewater over the entire infiltrative surface and evenly across the slope.
2. The maximum difference in length between any two (2) dispersal lines shall be no greater than ten (10) percent.
3. Distribution boxes or other methods of equal distribution as approved by the administrative authority shall be utilized. See Figure 3.
4. Each end of the dispersal line shall be capped.

(C) USE OF SOIL FILL COVER

The use of imported fill over the original grade of a system shall be permitted under the following conditions:

1. The natural slope of the ground does not exceed fifteen (15) percent. For slopes greater than fifteen (15) percent, a Civil Engineering report addressing the fill stability must be submitted and approved by the administrative authority prior to issuance of a sewage permit utilizing soil fill cover.
2. Fill soil shall be loam, sandy loam, sandy clay loam or soil equal in structure and texture to the native soil already on the site. Soil shall be free of any material that could damage the system, including, but no limited to, rocks, construction material, and wood.

(D) EFFECTIVE INFILTRATIVE SURFACE PARAMETERS

Table II-3
Dispersal system design parameters

EFFECTIVE INFILTRATIVE SURFACE DESIGN PARAMETERS	MINIMUM		MAXIMUM	
	ROCK/PIPE	CHAMBER	ROCK/PIPE	CHAMBER
Trench width	18 inches		24 inches	
Trench depth	15 inches	12 inches	48 inches	30 inches
Soil Cover	12 inches		18 inches	
Effective Infiltrative Surface Area	2 ft^2/LF	3 ft^2/LF	6 ft^2/LF	3 ft^2/LF
Effective Infiltrative Surface Area (total)	300 ft^2		None	

1. A Minimum depth of seven (7) inches shall be provided from invert of perforated pipe or chamber to the trench bottom.
2. Filter media shall extend two (2) inches above the top of the perforated pipe (for rock and pipe systems only).

(E) EFFECTIVE INFILTRATIVE SURFACE AREA CALCULATION

The effective infiltrative surface area shall be calculated as the sum of both the trench sidewalls from the top of the gravel, 2 (two) inches above the perforated pipe, to the trench bottom.

1. Dispersal Field Calculation

$$\frac{\text{Daily flow (gpd)}}{\text{Effective infiltrative surface } (ft^2) \text{ X Soil Hydraulic Loading Rate } (g/ft^2/d)} = \text{Linear feet of dispersal line}$$

2. Dispersal Field Parameters

All dispersal fields shall be constructed as to meet the following requirements:

Table II-4
Dispersal field parameters

Minimum number of dispersal lines	1
Maximum length of dispersal line	100 feet
Minimum length of dispersal line	50 feet

3. Trench spacing

Trench spacing shall be the measured as the unexcavated solid earth between trenches.

Table II-5
Trench Spacing

SLOPE	TRENCH SPACING (MINIMUM)
0-5%	5 feet
6-10%	8 feet
11-20%	12 feet
21-30%	16 feet

(F) APPROVED MATERIALS

1. APPROVED FILTER MEDIA: Filter media shall consist of three-quarter (3/4) to one and one-half (1½) inch diameter river rock, crushed drain rock, lava rock or other hard rock as approved by the administrative authority. All filter media must have less than one (1) percent fines, dust, sand, and/or silts (passing the # 200 sieve).
2. APPROVED PERFORATED PIPING: Perforated piping shall be approved for use in sewage dispersal system. The following are approved perforated piping materials:
   Polyvinyl Chloride (PVC)
   Acrylonitrile-Butadiene-Styrene (ABS)
   Other piping as demonstrated to the administrative authority to be approved for sewage dispersal systems by IAPMO, UPC, NSF, or other nationally recognized certification organization.
3. PLASTIC DISPERSAL CHAMBER SYSTEM: All plastic dispersal chamber systems shall be accepted for use in sewage dispersal systems and shall be certified by IAPMO, UPC, NSF or other nationally recognized certification organization. No reduction in sizing of the dispersal field when using chamber systems will be approved.
4. APPROVED DISTRIBUTION BOX MATERIAL: Distribution boxes (D-boxes) and flow divider assemblies shall be made of concrete, ABS, PVC, PE plastic or fiberglass. Concrete assemblies shall have a corrosion resistant coating applied to interior surfaces. D-boxes and flow divider assemblies shall be installed outside of traffic and pedestrian areas with the lids and inspection ports set at or above grade for easy access and inspection. D-boxes shall be placed over undisturbed or compacted earth and set on a concrete pad of at least two (2) inches thick and extending a minimum of four (4) inches beyond the exterior side of the D-box. D-boxes shall be installed level so as to allow for equal distribution.

(G) WASTEWATER STRENGTH

Table II-6
Septic Tank Effluent (STE)

CONSTITUENT	CONCENTRATION (MG/L)
5-day Biochemical Oxygen Demand (BOD_5)	300
Total suspended solids (TSS)	300
Fats Oil and Grease (FOG)	100
Total Nitrogen (TN)	100

(H) MONITORING WELLS

1. A minimum of one monitoring well shall be placed within each dispersal trench to observe the standing liquid level.
2. Monitoring wells shall be three (3) or four (4) inches in diameter PVC or ABS pipe with slots or perforations within the trench zone only. See Figure 4B.
3. Monitoring wells shall extend to the bottom of the trench and be anchored sufficiently to prevent disturbance or removal.
4. The monitoring well(s) shall have removable caps and may either extend above grade or be enclosed in a service box set to grade with removable lids. The boxes shall be made of a non-degradable material such as PVC, fiberglass or concrete.

(I) INTERCEPTOR DRAIN

Interceptor drains are trenches filled with gravel and drainage pipe, or other drainage technique approved by the administrative authority, installed below ground up-slope from the dispersal field for the purpose of intercepting, diverting and/or discharging perched groundwater away from the dispersal field. The goal is to eliminate completely or significantly lower the perched groundwater in the area of the dispersal field to accommodate a specific design of onsite sewage treatment system.

Interceptor drains may be used to eliminate or lower perched water tables to allow a site to be used for sewage dispersal when all of the following conditions are met:

1. The native slope is such that the water can be diverted away from the area in accordance with these standards. Sites with slopes less than five (5) percent may not benefit from interceptor drains.
2. The water table is shallow and perched on an impermeable subsurface feature such as bedrock, hardpan or impermeable clay.
3. The bottom of the interceptor drain can be keyed into the impermeable feature.
4. No portion of the interceptor drain shall be located less than fifteen (15) feet up gradient, twenty-five (25) feet laterally, or less than twenty-five (25) feet down gradient from any septic tank, dispersal field, replacement area or any property line.

Monitoring wells may be required between the interceptor drain and the dispersal field to monitor groundwater levels.

SECTION 5 CONSTRUCTION INSPECTIONS

(A) GENERAL PROVISIONS

1. To ensure installation of a safe and effective sewage treatment system in conformance with these requirements and all terms and conditions of the construction permit, the administrative authority shall perform construction inspections.
2. No portion of the sewage treatment system shall be covered without inspection and approval by the administrative authority unless authorized to do so by said administrative authority.
3. Notification: Installers are required to contact the administrative authority at least forty-eight (48) hours in advance to request construction inspections. Notification must include the applicant's name, assessor's parcel number, site address, contractor's name, and contractor's phone number. Inspections requests with twenty-four (24) hour notification will be accepted if scheduling allows. Failure to provide sufficient notice may result in delay of construction or duplication of work.

(B) REQUIRED CONSTRUCTION INSPECTIONS

1. The required inspection stages for the installation of onsite sewage treatment systems will vary with the type and complexity of the sewage treatment system installed. The following inspections shall be required unless the applicant demonstrates good cause for not requiring a particular inspection:
   a. Inspection of the sewer line starting from the cleanout, two (2) feet outside the building, to the connection to the septic tank.
   b. Septic tank and all related connections and components (dosing tanks, pump and filter assembly, etc.).
   c. Inspection of transmission piping from the septic tank to the dispersal field.
   d. Inspection of the dispersal field including, but not limited to, rock and pipe material or chamber system, level of trench bottom and pipe or chamber system, monitoring wells, distribution box level and function, filter fabric and soil cover.
2. Final approval of the construction permit shall be granted only after the administrative authority has completed all necessary inspections, the onsite sewage treatment system has been installed in conformance with these requirements and all permit conditions and the installer has submitted an accurate "As-Built" drawing (Record Drawing) of the sewage treatment system and the electrical certification has been submitted if required.
3. All components of the sewage treatment system shall be inspected in two site visits. If additional site visits are required, an additional inspection fee(s) will be charged and said fee(s) shall be paid prior to performing additional inspections.

PART III

DESIGN, CONSTRUCTION AND INSTALLATION OF ALTERNATIVE SEWAGE TREATMENT SYSTEMS

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(B) SUBSURFACE DRIP DISPERSAL SYSTEM SITE REQUIREMENTS
(C) SUBSURFACE DRIP DISPERSAL SYSTEM DESIGN REQUIREMENTS
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~~(F) GENERAL FUNCTION AND SUITABILITY~~
~~(G) SAND FILTER SITE REQUIREMENTS~~
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~~8~~9. AEROBIC TREATMENT UNITS OR ALTERNATIVE FILER MEDIA UNITS
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(F) BASIC MAINTENANCE
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(H) COUNTY RESPONSIBILITIES
(I) NAPA COUNTY EVALUATION SYSTEM

SECTION 1 ALTERNATIVE SEWAGE TREATMENT SYSTEMS ~~DEFINITION~~

Alternative sewage treatment systems (ASTS's) are ~~defined as~~ any wastewater treatment and dispersal system other than a conventional wastewater treatment ~~sewage disposal~~ system. ASTS's are designed to overcome one or more adverse site or soil conditions such as high groundwater, slowly permeable soils, or other limiting condition or where increased wastewater treatment is needed. Unlike conventional ~~sewage disposal~~wastewater treatment systems, ASTS's vary in design and concept depending on the site and soil conditions.

The design goals ~~of~~for all ~~sewage~~wastewater treatment and dispersal systems, including ASTS's, are to prevent ~~the prevention of~~ disease and preclude contamination of groundwater and other beneficial waters~~, treatment and~~by dispersal of ~~sewage~~ effluent below the surface of the ground~~,~~ and ~~the prevention of contamination of groundwater and other beneficial waters by~~ reducing discharges to the environment from sewage treatment ~~dispersal~~ systems by adequately siting and designing all onsite wastewater treatment systems.

SECTION 2 ADMINISTRATIVE REQUIREMENTS FOR ALTERNATIVE SEWAGE TREATMENT SYSTEMS

(A) REQUIREMENTS SUBJECT TO CHANGE~~:~~

The technology of ASTS's is constantly evolving and changing. Technical data is gathered about ASTS's through the Napa County Department of Planning, Building, and Environmental Services (the Department) Alternative Sewage Treatment System Monitoring Program as well as through research studies by other agencies and organizations. Because of the evolving technology and information gathered through the monitoring program, the regulations for ASTS's may change.

(B) CURRENT REGULATIONS AND CONSTRUCTION PERMITS~~:~~

Property owners, designers, and contractors are cautioned that regulations for ASTS's may change by legislative action, action of the Regional Water Quality Control Boards, or the Department. ~~Therefore, despite previously performed and accepted work by the Department; any~~ All~~ny~~ proposals for an ASTS must meet the regulations that are in effect at the time that the Department approves the septic system permit. Any plans approved without an installation permit issued, or where an installation permit has expired~~,~~ are subject to Department review and shall comply with the ASTS regulations in place at the time the sewage permit is issued regardless of prior approval.

(C) ALTERNATIVE SEWAGE TREATMENT SYSTEM MONITORING PROGRAM~~:~~

All newly constructed ASTS's, pretreatment systems, or any ASTS that is modified are required to enter into the ASTS monitoring program. See: Section 1~~3~~32 Alternative Sewage Treatment System Monitoring Program ~~regulations~~requirements.

SECTION 3 GENERAL REQUIREMENTS FOR ALTERNATIVE SEWAGE TREATMENT SYSTEMS

(A) SOIL AND SITE CONDITIONS~~:~~

1. A site evaluation must be performed prior to design of the system.

2. All ASTS's must have a minimum of three (3) feet of acceptable soil above a limiting condition. Up to one (1) foot of the required three (3) feet of soil may be satisfied by including sand within the system (such as a ~~Wisconsin~~ Mound system) or other approved pretreatment device. In all cases, a minimum of two (2) feet of suitable permeable soil shall be available.
3. Suitable permeable soil as listed in Table III-2 is determined by field soil texture and structure analysis, shows no signs of present or previous high groundwater levels, has less than fifty (50) percent rock content by volume, and is not fractured rock, bedrock, hardpan, or clay pan.
4. Imported fill soil may be added above the infiltrative trench area and shall be equal to or better than the existing soil below. Means for integrating the imported soil with existing soil shall completed prior to digging of trenches.
5. Fill soil may be imported to a site which at the time does not have sufficient soil depth as described in this section. The fill soil shall be allowed to "weather" in place for a minimum of 1 year before being tested for suitable use for a wastewater system. The soil type and methods shall be specified by a ~~Q~~qualified professional. P~~ermits for the p~~lacement of such fill may require a permit from this Department.

(B) PERFORMANCE STANDARDS FOR ALTERNATIVE SEWAGE TREATMENT SYSTEMS

1. Monitoring wells shall be provided to verify performance of ASTS's. Monitoring wells shall be protected and encased within plastic, concrete, or other approved ~~type~~ box to provide easy access. Monitoring wells shall be constructed to a depth that will allow verification that the system is functioning properly and not contaminating groundwater. Please refer to Figures~~.~~ 4A and 4B~~1~~ for specific monitoring well design criteria.
2. Owners of ASTS's may be directed to sample from m~~M~~onitoring wells and have the samples analyzed at an approved laboratory~~may be sampled~~ for ~~coliform bacteria,~~ fecal ~~bacteria~~coliform or E. coli, pH, Nitrate (as N)~~nitrate~~, or other chemical or physical constituent that acts as an indicator of sewage contamination. The sampling will have to be conducted by someone with experience sampling monitoring wells and approved by the administrative authority. Alternatively, the administrative authority may conduct the sampling noted above.

~~a. An alternative system with sample results exceeding 240,000/100 ml most probable number (MPN) total coliform bacteria and/or greater than 2.2 MPN fecal coliform bacteria from purged wells located twenty-five (25) feet or further down gradient shall be deemed to be in a state of failure. Exception: if the up-gradient monitoring well(s) have similar contamination levels as down gradient wells, then the contamination shall be deemed to be background in the area and shall not cause a determination of a state of failure on this criterion alone.~~

~~b. An alternative system with sample results exceeding 3,000/100 ml MPN but less than 240,000/100 ml MPN total coliform bacteria and/or 2.2 MPN fecal coliform bacteria from purged wells located twenty-five (25) feet or further down gradient shall be deemed in a state of marginal operation. Exception: if the up-gradient monitoring well(s) have similar contamination levels as down gradient wells, then the contamination shall be deemed background in the area.~~

3. Any ASTS or component that causes sewage to surface or discharge at ground level is deemed to have an adverse effect on ~~the~~ surface water and is considered a public health hazard and ~~–~~is considered to be in failure ~~defined as a failing onsite sewage wastewater treatment system~~. The owner of ~~S~~such a system shall be directed to immediately correct and abate the violation(s). ~~corrected repaired so as to prevent further public health hazard.or abated.~~
4. See Section 12~~3~~ for additional information regarding the ASTS monitoring program.

(C) DESIGN AND INSTALLATION REQUIREMENTS~~:~~

1. Plans for construction of an ASTS must be drawn by ~~A~~a California Registered Civil Engineer

or a California Registered Environmental Health Specialist ~~must prepare designs for ASTS's~~. Designers must file proof of current registration with the Department. ~~The designer must be knowledgeable in onsite wastewater treatment systems; in particular the rules and regulations specified herein, possess adequate drafting skills and adequate verifiable experience in the design and construction of ASTS's.~~

2. All ASTS designs for ~~that are to serve~~ existing residential or commercial ~~use~~development shall include ~~require all water fixtures be~~ verificationed ~~as~~that all water fixtures will be or have ~~or retrofitted~~been retrofitted to low-flow per current California Plumbing Code standards.
3. Designs for ASTS's shall include such technical data as necessary to support and demonstrate that the system will function as designed, will not adversely ~~e~~affect surface and/or groundwater quality, and will not create a public health hazard.
4. Installers of ASTS's must have an active California Type A, C-42 or C-36 contractor's license and must have current verification of ~~Workmen's~~ Worker's Compensation Insurance on file with the Department if ~~any employee will work on the system construction~~applicable. ~~Property owners may apply for sewage disposal system installation permits but may not install ASTS's unless they have an appropriate and current contractor's license as stated above. Installation permits will not be issued until a qualified licensed contractor is designated on the application.~~
5. Prior to issuance of the sewage ~~disposal~~treatment system ~~installation~~construction permit, the owner of the property shall submit the Supplemental Application to Construct and Operate an ASTS and a Record Request and Update Form to the Department.
6. ~~All meetings and inspections shall be scheduled with the Department at least twenty-four (24) hours in advance and shall occur during normal business hours.~~
7. ~~6.~~ The ASTS designer and the Department must inspect the construction of the ASTS during the stages of its installation for ~~its~~ conformance with the approved plans. Upon completion of the system, and prior to final, the designer shall (1) submit ~~a~~ written certification verifying that the system has been constructed in conformance with the approved plans, including an ~~A~~as-~~B~~built or record drawing ~~(only required if the installation varied from the approved plan) and certify that it is functioning properly~~ and (2) provide the Department and homeowner with an electronic copy of the Operations and Maintenance manual for the ASTS ~~in an unbound hard copy format or an electronic format if available~~.

(D) SOIL HYDRAULIC LOADING RATES, See Part III ~~Appendix~~ Table III-2

(E) GROUND MOUNTED SOLAR (PHOTOVOLTAIC) ARRAYS

1. Ground mounted solar arrays that meet the established setback to all portions of a sewage dispersal system are not subject to any additional environmental health requirements. All standard permitting requirements (building permit, etc.) shall apply.
2. Persons requesting to install ground mounted solar arrays over a new sewage dispersal field shall meet the established setbacks to all parts of the wastewater treatment system. If the request is to install a ground mounted solar array over an existing dispersal field, a plan stamped by a licensed civil engineer shall be submitted to the administrative authority. If the solar array is proposed over an alternative sewage disposal system, the designer of record for that system must provide the plan (unless said designer is no longer in business in which case any civil engineer may stamp the plan). The following information shall be included on the photovoltaic layout plan:

   a. The location of the footings below grade and the extent to which they extend above grade. The maximum depth of the below grade portion shall be thirty (30) inches and the maximum diameter of the footing shall be twelve (12) inches;
   b. A cross section of the dispersal system showing the location of the proposed footing and the required minimum 4 (four) foot setback to the edge of the dispersal trench;
   c. A statement from the engineer that the proposed footings will not interfere with the

operation of the dispersal system;

d. A cross section of the photovoltaic array showing the minimum required four and one-half (4.5) feet height above grade at all points;

e. The above ground location of all intra-array electrical conduits. No below ground electrical conduit is allowed until located a minimum of twenty-five (25) feet from any dispersal trench;

f. An indication of the proposed cover crop to be maintained; and

g. A copy of the proposed operation and maintenance manual for the photovoltaic array which at a minimum shall include the cleaning and maintenance instructions. Sprinklers will not be allowed over any photovoltaic array;

3. The following additional considerations shall be included on the plans and provided for prior to installation of any photovoltaic array:

a. Field staking or marking of the exact dispersal system location;

b. Field staking or marking of proposed footings locations;

c. Installation of the photovoltaic array shall be accomplished without the use of any wheeled vehicles;

d. No photovoltaic modules shall be installed above test ports and distribution boxes that require acces; and

e. No photovoltaic modules shall be installed over a system that relies on evapotranspiration as part of the design or over existing drip dispersal systems.

SECTION 4 PLAN SUBMITTAL REQUIREMENTS FOR ALTERNATIVE SEWAGE TREATMENT SYSTEMS

(A) PLANS AND SPECIFICATIONS~~:~~

1. Three copies of design plans and design calculations are required for approval. A single copy of the plans and design calculations may be submitted for the ~~intitial~~initial ~~comments~~review.
2. Plans must be drawn to an appropriate scale to show sufficient detail. The preferred scale is one (1) inch = twenty (20) feet ~~when possible~~.
3. The design plan shall include:

a. Lot dimensions with North ~~point.~~arrow;

b. Vicinity map;

~~b.~~c. ~~,o~~Owner's name with site address and assessor's parcel number;~~.~~

~~c.~~d. ~~Accurate t~~Topographic contours ~~shall be shown~~ in the area of the tanks and ~~sewage~~ treatment system, primary dispersal field and replacement area;~~. At a minimum, two (2) foot contour intervals shall be provided on slopes exceeding fifteen (15) percent. One (1) foot contour intervals shall be provided on slopes less than fifteen (15) percent;.~~

~~d.~~e. Location(s) of existing, proposed or abandoned wells, springs, lakes, ponds, marsh areas, streams, and drainage ditches or channels within two hundred (200) feet of any portion of the sewage treatment and dispersal field and replacement area;~~.~~

~~e.~~f. Location(s) of existing and/or proposed structures, driveways, swimming pools, patios, retaining walls, paved areas, large trees, and cut banks;~~.~~

~~f.~~g. Location(s) of existing sewage ~~disposal~~dispersal systems and existing and/or proposed easements, water lines, and underground utilities, including subsurface storm water or graywater infiltration systems~~.~~;

~~g.~~h. Location(s) of all site evaluation profile holes~~, percolation test holes~~ (including the holes that have failed) and soil sample locations;~~.~~

~~h.~~i. ~~Designated~~ Location of proposed replacement area with potential system design identified. Design criteria and drawings may be required. The replacement area shall be sized according to these standards based on the site and soil conditions ~~in the replacement area~~

location. A note shall be included on the plan indicating Rreplacement area(s) shall remain fully protected and unencumbered to prevent damage to soils and any adverse impact on the immediateto the surroundings that may effectaffect the installation of the replacement system or its function;.

i.j. Cross-section of proposed dispersal system distribution trench and/or Wisconsin Mound, At-grade Mound, sand filter, sumpdosing tank detail, recirculation tank detail, septic tank detail, pretreatment system detail, monitoring wells, manifolds, balancing valve and purge valve assembly, interceptor drain, surface water diversion, etc. SumpDosing tank detail shall include the dose counter, alarm system, dose volume, and float settings. See Figures Figures; in Appendix 2.

j.k. Project summary and calculations detailing system sizing and pump sizing; and,

(l) Designer's inspection schedule. shall be clearly specified on the plans.

SECTION 5 PRESSURE DISTRIBUTION (PD) SYSTEMS

(A) GENERAL FUNCTION AND SUITABILITY:

1. Pressure distribution systems means a wastewater system where effluent is applied apply effluent uniformly over the entire absorption area such that each square foot of bottom area receives approximately the same amount of effluent per dose at a rate less than the saturated hydraulic conductivity of the soil. This processPDs promotes soil treatment performance by maintaining vertical unsaturated flow at all times; and also reduces the degree of clogging in finer textured soils is also reduced. PDressure distribution system components include a septic tank, dosing tank, pump with associated controls, and small diameter low pressure piping with small diameter perforations laid in gravel or inside chambers placed in trenches. The system distributes septic tank effluent uniformly throughout the dispersal field under pressure through intermittent small volume doses. A timer may also be used to discharge the effluent to the dispersal field evenly over time as opposed to demand dosing. Pressure distribution systems can be utilized alone or after a pretreatment device if site conditions warrant.
2. PDs are These below ground wastewater systems suitable for sites allow wastewater disposal on sites with shallow soil, soil, slowly permeable soil over impermeable soil, fractured rock or bedrock, rapidly draining soils, sites with highshallow groundwater, and/or sites with slopes up to thirty (30) percent where conventional systems aren't expected to function or may contaminate shallow groundwater. PDs must be installed on sites with a minimum of Required minimum separation for pressure distribution systems to a limiting condition is thirty-six (36) inches acceptable soil below the trench bottom. If , unless an approved pretreatment device is provided, then it may be reduced to only twenty-four (24) inches of acceptable soil is required below the trench bottom.

(B) PRESSURE DISTRIBUTION SITE REQUIREMENTS:

3.1. Pressure distribution systems can be installed in acceptable soil types as listed in Table III-2. Supplemental Pretreatment may be required in some soil types.

4.2. No part of the pressure distribution dispersal field may be located where the site slope exceeds thirty (30) percent.

5.3. The minimum soil depth under the bottom of the trench shall be thirty-six (36) inches unless an approved pretreatment device is utilized, in which case the minimum soil depth under the bottom of the trench shall be twenty-four (24) inches.

6.4. To maximize evapotranspiration, pressure distribution systems shall not be installed below non-permeable type soils such as high shrink-swell clays, highly compacted soils, highly cemented soils, and/or massive or platy soil structures.

(C) PRESSURE DISTRIBUTION DESIGN REQUIREMENTS

7.1. Design Calculations:

a. Single and multiple family dwelling sewage flows shall be calculated based on one hundred and twenty (120) gallons per bedroom per day.
b. Commercial and other non-residential building sewage flows shall be calculated in accordance with the quantities listed in Table III-4.
c. Effective infiltrative surface area shall be calculated as the total sidewall from the top of the distribution lateral to the trench bottom (including chambers). The trench bottom area shall not be used in calculating the effective infiltrative surface area.
d. The maximum sidewall area allowed is three (3) ft^2/linear foot.
e. The soils application rate is based on the soil classification. See Table III-2 for soil infiltration rates based on soil classification.
f. Lineal footage calculation:

$$\text{Total PD system length, LF} = \frac{\text{Maximum daily wastewater flow, gallons}}{(\text{Effective Surface Area, } ft^2/LF)(\text{Soil Application Rate, g/day/}ft^2)}$$

g. Designers shall calculate the total dynamic head loss as feet of elevation in the entire distribution system. The calculations shall include:
   (i) Vertical differences.;
   (ii) Length of entire piping.;
   (iii) Head loss of all valves, tees, elbows, and appurtenances.;
   (iv) Hydraulic orifice discharge.; and
   (v) Other hydraulic head loss in the system.
h. Dose volume shall be designed to provide smaller more frequent doses. The maximum dose volume should not be less than five (5) times the lateral pipe volume and should not exceed twenty (20) percent of the daily design flow. Designer must consider both factors when determining the appropriate dose volume.

8.2. Dispersal Trench Requirements: See Figure 45.

a. The trench depth shall not exceed forty (40) inches.
b. Trench spacing shall comply with the required trench spacing for conventional sewage disposal systems. See Table II-5 6.
c. Minimum trench backfill shall be twelve (12) inches. Maximum trench backfill shall be eighteen (18) inches.
d. Distribution trenches shall follow the natural contour of the ground. The bottom of the trench shall remain level within a tolerance of one (1) inch per one hundred (100) feet. Trenches may be curved or angled to stay on contour.
e. Trench widths shall be a minimum of eighteen (18) inches and a maximum of thirty-six (36) inches.

9.3. Aggregate Specification:

The aggregate media placed within a pressure distribution trench shall consist of three-eighth (3/8) to two (2) inch diameter river rock, crushed drain rock, lava rock, pea gravel, or other hard rock as approved by the administrative authority. All absorption bed filter media must have less than one (1) percent fines, dust, sand, and/or silts (passing the # 200 sieve).

10.4. Distribution Piping:

a. Pressurized perforated distribution pipe shall be Schedule 40 PVC or greater of at least three quarters (3/4) of an inch diameter laid within rock or inside chamber components. The maximum distance between perforations is forty-eight (48) inches. The first and last orifice must start one-half (1/2) the distance used between orifices from the beginning and end of the

perforated distribution line.

b. The minimum orifice diameter shall be one-eighth (1/8) of an inch and provide a minimum of sixty (60) inches of hydraulic lift at all orifices. Three sixteenths (3/16) of an inch diameter orifices and larger must produce a minimum of twenty-four (24) inches of hydraulic lift at all orifices. Orifices shall face upward and shall be protected with an orifice shield, except in chamber systems where orifice shields are not required. If a chamber component is utilized, the pressure distribution lateral shall be suspended within the chamber from the top with the orifices facing upward or other method of distribution pipe installation as approved by the administrative authority.

c. The maximum length of run for pressurized perforated distribution piping shall be one hundred (100) feet. The minimum length of run for pressurized perforated distribution piping shall be twenty five (25) feet.

d. There shall be a minimum of two (2) feet of separation from the transmission line to the beginning of the dispersal trench. Transmission line(s) shall be laid on native soil. The cross section of the transmission line and the beginning of the distribution line shall be stepped so as to prevent seepage of effluent from trench to trench.

~~11.~~5. Balancing Valves and Purge Valves~~:~~

a. The beginning of the perforated distribution lateral shall have a balancing valve. See Figure~~.~~ 6~~2~~.

b. The end of the perforated distribution lateral shall have a purge valve. See Figure~~.~~7~~3~~.

c. All balancing and purge valves shall be encased in plastic or concrete boxes that extend to grade, have a secure cover and are marked ―sewer~~l~~. The boxes shall be a minimum of ten (10) inches across, round or square, and be of adequate size to allow for maintenance.

d. Balancing valves shall be gate or ball valves Schedule 80 PVC or greater.

e. Purge valves shall be gate or ball valves Schedule 80 PVC or greater.

f. Balancing valves shall be located at least twenty-four (24) inches from the dispersal trench. Purge valves and related boxes shall be located within the dispersal trench. All valve boxes shall be placed on screen blocks or equivalent.

g. Valve boxes shall be designed, installed, and maintained so as to prevent soil and rodent intrusion into the box over the life of the system.

~~12.~~6. Soil Cover Specification~~:~~

a. Soil cover shall be of the same structure and texture as the topsoil already existing at the site, except if clay or silty clay, then the soil cover shall be sandy loam or loam. A minimum depth of cover of twelve (12) inches or maximum of eighteen (18) inches is required over the gravel or chamber component.

b. Fill may be used when site slope does not exceed twenty (20) percent. When fill is used, the soil cover shall extend over the entire dispersal area. Soil cover shall extend uphill and laterally a minimum of five (5) feet beyond the trenches. Downhill soil cover shall conform to Table III-9. Placement of the fill material and digging of trenches through the fill shall be specified by the ASTS designer.

~~13.~~7. Monitoring Wells~~:~~

a. Monitoring well construction shall be in conformance with Figure~~.~~ 4A and 4B~~1~~ ~~A & 1B~~.

b. On sloping sites, greater than two (2) percent, two (2) monitoring wells shall be installed twenty-five (25) feet down slope of the lowest dispersal trench ~~line~~. One (1) or more monitoring well shall be installed ten (10) feet up slope of the highest dispersal trench. Monitoring wells installed within the subfield shall be installed in the ~~leach line~~dispersal trench. A minimum of one (1) monitoring well shall be installed for every two (2) ~~leach line~~dispersal trenches or portion thereof, per subfield.

c. On flat sites, zero to two (0-2) percent slope, at least one (1) monitoring well shall be installed twenty-five (25) feet on all sides of the dispersal field. Monitoring wells installed within the

subfield shall be installed in the ~~leach line~~dispersal trench. A minimum of one (1) monitoring well shall be installed for every two (2) ~~leach line~~dispersal trenches or portion thereof, per subfield.

d. Additional monitoring wells or alternate locations of monitoring wells may be required.

(D) PRESSURE DISTRIBUTION CONSTRUCTION REQUIREMENTS~~:~~

~~14.~~1. Construction shall only occur when soil moisture conditions will allow installation of the system without compaction or smearing of the soils, and weather conditions during the construction process will not cause unsuitable soil moisture conditions.

~~15.~~2. Placement of the transmission line from the dosing tank to the first manifold shall be a minimum of twenty-four (24) inches below ground. Alternative depth with proper backfill may be approved by the administrative authority.

~~16.~~3. Dispersal ~~T~~trenches shall be constructed with strict attention to the proper depth and contour.

~~17.~~4. Sidewall and bottom of the dispersal trenches shall be scarified to remove all smearing.

~~18.~~5. Distribution to and through all laterals shall be balanced so all laterals and orifices receive an equal volume. The difference in head between any two lines, and the beginning and end orifice of the same line shall not exceed ten (10) percent.

~~19.~~6. For shallow systems requiring the placement of fill above the natural ground surface, a track vehicle may be required.

~~(B)~~(E) PRESSURE DISTRIBUTION CONSTRUCTION INSPECTIONS~~:~~

1. Prior to beginning construction and/or covering any elements of the system, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during construction~~.~~;
      (ii) Soil moisture in the area of the proposed system is not so high as to cause smearing or compaction as a result of construction activities~~.~~;
      (iii) Construction staking or marking of all components of the system shall occur prior to commencement of construction so that configuration, location, and system details may be verified~~.~~ and
      (iv) Review and approval of the source of the materials to be used including gravel and soil cover. Samples may be required prior to placement.
   b. Interim inspection(s):
      (i) Function and setting of all control devices;~~.~~
      (ii) Hydraulic test (squirt test) of system~~.~~;
      (iii) Depth and location of gravel or chamber component in dispersal ~~trenches.~~trenches; and
      (iv) Water tightness test of septic tank and dosing tank.
   c. Final Inspection:
      (i) Depth and texture of final soil cover over the pressure distribution system is verified~~.~~;
      (ii) All construction elements are in general conformance with the approved plans and specifications~~.~~;
      (iii) All monitoring wells are installed and erosion control has been completed~~.~~;
      (iv) System controls are hardwired to permanent power and all floats, pumps and alarms tested;~~.~~
      (v) A letter from the designer that the pressure distribution system has been installed and is operating in conformance with the design specifications must be returned to the Department~~.~~; and
      (vi) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department.

SECTION 6 ~~WISCONSIN~~ MOUND SYSTEMS

(A) GENERAL FUNCTION AND SUITABILITY~~:~~

1. The ~~Wisconsin~~ mound wastewater treatment system (mound system) is a wastewater treatment system ~~was~~ developed to ~~treat and disperse wastewater in an environmentally acceptable manner. The Wisconsin mound dispersal system~~ distribute~~s~~ effluent evenly through ~~above ground~~ pressurized perforated pipes in a ~~soil covered~~ gravel bed overlaying a sand layer and covered with soil. Effluent flows through the gravel, sand and into the native soil under the mound system. ~~provides additional treatment when the effluent passes through a lower sand layer prior to final dispersal below the mound.~~
2. These above ground wastewater treatment systems ~~allow wastewater disposal~~are suitable for ~~on~~ sites with shallow or slowly permeable soil over impermeable soil, fractured rock or bedrock, high groundwater, or other limiting condition observed ~~within~~ not less than twenty-four (24) inches of the ground surface and on slopes up to twenty five (25) percent.
3. Wastewater from non-residential sources or high-strength wastewater from residential sources must receive pretreatment sufficient to lower the waste-strength to the level of septic tank effluent as listed in Table III-1 before discharge to a mound.

(B) ~~WISCONSIN~~ MOUND SITE REQUIREMENTS~~:~~

~~4.~~1. Mound wastewater treatment systems are best suited for ~~should be located in~~ sites with sun and wind ~~open areas for~~ exposure ~~to sun and wind~~ to maximize ~~where~~ evaporation and transpiration of the effluent ~~will be maximize~~d. The mound system designer must ~~Good design practice must~~ consider drainage constraints ~~for both~~ up gradient and down gradient of the proposed mound~~area drainage~~. Mound systems shall not be installed in concave landscape formations, areas of seasonal saturation such as flood plains, vernal pools, drainage areas, areas that have been filled to artificially raise the separation to ground water or other limiting condition, cut or fill sites, or hummocky terrain.

~~5.~~2. Placement of mound systems into areas that require the removal of large trees, boulders, or rock outcroppings is not permitted.

~~6.~~3. The minimum effective soil depth below the mound system shall be twenty-four (24) inches.

~~7.~~4. No part of the mound dispersal system may be located where the site slope exceeds twenty five (25) percent.

~~8.~~5. Mound systems can be installed in acceptable soil types as listed in Table III-2.

~~9.~~6. In addition to the other setbacks required by these standards, mound systems shall also comply with the following setbacks measured between the perimeter of the basal area of the filter media and the respective features:

a. Buildings and Structures
   (i) Up gradient and laterally 10 feet
   (ii) Down gradient 25 feet
b. Property Lines or Underground Utility Easements
   (i) Up gradient and laterally 10 feet
   (ii) Down gradient 25 feet
c. Areas of Geologic Instability 100 feet

~~(B)~~(C) ~~WISCONSIN~~ MOUND DESIGN REQUIREMENTS: See Figure 8A and 8B~~5A & 5B~~

1. Design Calculations:
   a. Single and multiple family dwelling sewage flows shall be calculated based on one hundred and twenty (120) gallons per bedroom per day.
   b. Commercial and other non-residential building sewage flows shall be calculated in

accordance with the quantities listed in Table III-4.

c. The soils application rate is based on the soil classification. See Table III-2 for soil infiltration rates based on soil classification.
d. Sand fill media shall conform to the ASTM C-33 sand specifications with less than 5% fines less than 0.053 mm ~~specifications, (S~~see Table III-6~~)~~.
e. For residential systems, the design loading rate for the sand fill must not exceed 1.0 gallons/day/ft^2 .
f. For commercial systems, the design loading rate for the sand fill must not exceed 0.8 gallons/day/-ft^2.
g. Designers shall calculate the total dynamic head loss as feet of elevation in the entire distribution system. The calculations shall include:
   (i) Vertical differences~~.~~;
   (ii) Length of entire piping~~.~~;
   (iii) Head loss of all valves, tees, elbows, and appurtenances;~~.~~
   (iv) Hydraulic orifice discharge~~.~~; and
   (v) Other hydraulic head loss in the system.
h. Dose volume shall be designed to provide smaller more frequent doses. The maximum dose volume should not be less than five (5) times the lateral pipe volume and should not exceed twenty (20) percent of the daily design flow. Designer must consider both factors when determining the appropriate dose volume.

2. Infiltration Area (dispersal bed) - The size of the infiltration area (the bottom infiltrative surface area of the bed) is determined by applying the following formula:

   a. Infiltrative Surface Area, ft^2 = $\frac{\text{Daily Design Flow, gal/day}}{\text{Sand Fill Loading Rate, gal/day/ft}^2 \text{ (See Section 6(C)1 e \&f)}}$

3. Dispersal Bed Width - The dispersal bed width is determined by the linear loading rate of certain soil type and depth. Linear ~~L~~loading ~~R~~rates are shown in Table III-7. Maximum bed width shall be ten (10) feet.

   a. Bed width, ft (A) = $\frac{\text{Linear Loading Rate, gal/day/ft}}{\text{Sand Fill Loading Rate, gal/day/ ft}^2 \text{ (See Section 6 (C)1e \& f)}}$

4. Dispersal Bed Length - The length of the infiltration area (the infiltrative surface area of the dispersal bed) is determined by applying the following formula:

   a. Dispersal Bed length, ft (B) = $\frac{\text{Required Infiltrative Surface Area, ft}^2}{\text{Dispersal Bed Width, ft (A)}}$

5. Dispersal Bed Depth - A minimum of six (6) inches of aggregate is placed beneath the distribution pipe and two (2) inches of aggregate is placed above the pipe.

   a. Dispersal Bed depth (F) = nine (9) inches (twelve (12) inches for commercial systems)

6. Dispersal Bed Grade - The bottom of the dispersal bed must be level.

7. Filter Media Depth - The depth of filter media shall be at least twelve (12) inches under all parts of the dispersal bed. The depth of filter media below the dispersal bed varies with ground slope according to the following formulas:
   a. Filter media depth below upslope edge of dispersal bed (D) = one (1) foot.
   b. Filter media depth below downslope edge of dispersal bed (E) = one (1) foot + [% natural slope as a decimal x width of dispersal bed (A)]

8. Filter Media Length and Width - The length and width of the filter media are dependent upon the length and width of the dispersal bed, filter media depth and side slopes of the filter media.
   a. Side slopes must be no steeper than three-to-1 (3:1) (i.e. three (3) feet of run to every one (1) foot of rise)
   b. The filter media length consists of the end slopes (K) and the dispersal bed length (B).
   c. The filter media width consists of the up slope width (J), the dispersal bed width (A), and the down slope width (I). On sloping sites, the down slope width (I) will be greater than on a level site if a three-to-one (3:1) side slope is maintained. Table III-8 gives the slope correction factor (multiplier) for slopes from zero (0) up to twenty (25) percent with a three-to-one (3:1) side slope.
   d. The sand fill shall be level and extend a minimum of twenty-four (24) inches horizontally beyond the dispersal bed on all sides, and then uniformly slope as determined by the mound dimensions. On slopes greater than two (2) percent, the twenty-four (24) inch dimension may be reduced to twelve (12) inches on the uphill side of the distribution bed.

9. Slope Width and Length of the Mound System:
   a. For sloping sites the down slope width (I) and up slope width (J) are a function of the depth of the sand fill below the respective downhill or uphill side of the dispersal bed, the desired side slope, normally three-to-one (3:1), and the slope correction factor. See Table III-8.
   b. For level sites and end slope length (K), no slope correction factor is used.
   c. Up slope width (J) =3 (D, in+ F, in+16 in)(3) (slope correction factor)
   d. Down slope width (I) =3 (E, in+ F, in+16 in)(3) (slope correction factor)
   e. EndslopeEnd slope length (K) = 3((D, in+E, in)/2+F, in+H)(3) (H=12.5in, depth of fill soil over media)

10. Basal Area Calculation - The amount of sand basal area required is dependent upon the permeability of the original soil.
   a. For level sites the total basal area [length of filter media (L) x width of filter media (W)] beneath the filter media is available for effluent absorption into the soil.
   b. For sloping sites the only available basal area is the area beneath the dispersal bed (A x B) and the area immediately downslope from the dispersal bed [bed length (B) x downslope width (I)]. It includes the area enclosed by [B x (A + I)]. The upslope and end slopes will transmit very little of the effluent on sloping sites, and are therefore disregarded.
   c. The available basal area must equal or exceed the required basal area:

   (i) The Basal area required = $\frac{\text{Daily flow, gallons}}{\text{Soil Infiltration rate, gal/day/ft}^2}$

   (ii) Basal area available = B x (A + I) on sloping sites **OR** L x W on level sites

11. Dispersal Bed - The dispersal bed shall consist of a gravel bed placed upon a portion of a sand bed (filter media).
   a. The dispersal bed shall follow the natural contour of the ground. The dispersal bed must be installed within a tolerance of one (1) inch vertically per one hundred (100) feet horizontally.
   b. Only single dispersal beds are allowed.
   c. Dispersal bed filter media shall consist of three-quarter (¾) to one and one-half (1½) inch diameter river rock, crushed drain rock, lava rock or other hard rock as approved by the administrative authority. All dispersal bed filter media must have less than one (1) percent fines, dust, sand, and/or silts (passing the # 200 sieve). The dispersal bed shall be covered with an approved geo-textile filter fabric.

12. Distribution Piping:

a. Pressure manifolds shall enter only from the uphill side or end of the mound system.
b. The distribution piping shall be Schedule 40 PVC or greater of at least three-quarter (¾) inch diameter.
c. The maximum distance between orifices shall be thirty-six (36) inches.
d. Distribution laterals shall be located at least eighteen (18) inches from the ends and sides of the dispersal bed.
e. Where two or more laterals are laid in the dispersal bed, the laterals shall be spaced at least twenty-four (24) inches apart.
f. Orifices shall face upward and shall be protected with orifice shields.
g. The minimum orifice diameter shall be one-eighth (1/8) of an inch and provide a minimum of sixty (60) inches of hydraulic lift at all orifices. Three sixteenths (3/16) of an inch diameter orifices and larger must produce a minimum of twenty-four (24) inches of hydraulic lift at all orifices.
h. The maximum length of run for pressurized perforated distribution piping shall be one hundred (100) feet.

13. Balancing Valves and Purge Valves~~:~~
a. The beginning of the perforated distribution lateral shall have a balancing valve. See Figure~~.~~ 6~~2~~.
b. The end of the perforated distribution lateral shall have a purge valve. See Figure~~.~~ 7~~–3~~.
c. All balancing and purge valves shall be encased in plastic or concrete boxes that extend to grade, have a secure cover and are marked, ~~—~~"sewer"~~.~~. The boxes shall be a minimum of ten (10) inches across, round or square, and be of adequate size to allow for maintenance.
d. Balancing valves shall be gate or ball valves Schedule 80 PVC or greater.
e. Purge valves shall be gate or ball valves Schedule 80 PVC or greater.
f. All valve boxes shall be placed on screen blocks or equivalent.
g. Valve boxes shall be designed, installed, and maintained so as to prevent soil and rodent intrusion into the box over the life of the system.

14. Cap and Topsoil Specifications~~:~~
a. The soil placed over the entire mound system must be selected and placed to promote aeration of the mound, rainwater movement off and away from the mound, and establishment and maintenance of a vegetative cover.
b. The soil cover shall be of equal or better texture and structure than the soil existing on the site. Sandy loam, loamy sands and silt loams are recommended.
c. The final settled depth of the topsoil cap (H) should be no less than twelve (12) inches above the center and six (6) inches above the outer edge of the dispersal bed (G). Additional depth of topsoil must be placed during final construction activities to assure that the minimum depths are achieved following natural settling of the soil.
d. Soil cover shall extend beyond the mound system a minimum of four (4) feet uphill and on both ends. The downhill soil cover distances shall comply with Table III-9.
e. The mound system must not be left without a vegetative cover or to go to weed. Vegetation shall be shallow-rooted, drought tolerant plants, shrubs, or grasses.

15. Monitoring Wells~~:~~
a. Monitoring well construction shall be in conformance with Figure~~.~~ 4A and 4B ~~1~~A.
b. On sloping sites, greater than two (2) percent, a minimum of seven (7) monitoring wells shall be installed. Two (2) monitoring wells shall be installed at the center of the dispersal bed during construction. Two (2) monitoring wells shall be placed at the down slope toe of the sand, two (2) monitoring wells shall be placed twenty-five (25) feet down gradient from the down slope sand toe, and one (1) monitoring wells shall be placed ten (10) feet up gradient from the up slope sand toe.
c. On flat sites, zero to two (0-2) percent slope, a minimum of ten (10) monitoring wells

shall be installed. Two (2) monitoring wells shall be installed at the center of the dispersal bed during construction. ~~One (~~(One (1) monitoring well shall be placed at each sand toe. One (1) monitoring well shall be placed twenty-five (25) feet from each sand toe. For dispersal beds greater than seventy-five (75) feet in length, two (2) monitoring wells shall be placed at the long side of each sand toe and two (2) monitoring wells shall be placed twenty-five (25) feet from the long side of the sand toe.

d. Additional monitoring wells or alternate locations of monitoring wells may be required.

~~(C)~~(D) ~~WISCONSIN~~ MOUND CONSTRUCTION REQUIREMENTS~~:~~

1. The use of wheeled vehicles is prohibited for the ripping or chisel plowing, driving on areas that have been ripped or chisel plowed, driving on the sand fill, placing or moving the soil cover, or anytime the soil conditions are wet, moist or saturated.
2. Surface vegetation shall be mowed to native ground and the clippings removed.
3. Construction stakes or marking shall be provided for all components of the system prior to construction. The Department shall conduct a pre-construction inspection of the staking or marking to confirm the system will be constructed as designed.
4. The soil surface shall be ripped or chisel plowed to a depth of eight (8) inches to ten (10) inches, with rippers set eight (8) inches to ten (10) inches apart. Initial ripping shall be performed in a path parallel to the contour of the land and only within the limits of the sand base. The interface of the native soil and the mound soil shall be ripped after the sand has been placed and just prior to mound soil cover placement. On steeper sloping sites, soil cover may be keyed into the native soil in lieu of ripping the soil, at the designers' discretion.
5. The sand fill shall be uniformly placed and compressed by track rolling to a neat line and to a grade of three-to-one (3:1), or as specified on the plans with a horizontal tolerance not exceeding one quarter (1/4) foot horizontally.
6. No traffic is permitted on any ripped surface until after the soil cover has been placed.
7. Temporary form boards are required for placement of materials and shall be removed prior to placement of soil cover.
8. Distribution to and through all laterals shall be balanced so all laterals and orifices receive an equal volume. The difference in head between any two lines, and the beginning and end orifice of the same line shall not exceed ten (10) percent.
9. Finished grade of the mound system shall be established by track rolling and grooming by hand. Soil cover shall be conditioned with sufficient moisture to allow track rolling to a firm and cohesive surface. The placement of topsoil used must not adversely inhibit the free transfer of oxygen to the bed and filter media of the mound.
10. All drainage work and erosion control shall be completed prior to final construction inspection. Upslope runoff must be diverted around the mound.
11. The soil cover shall be landscaped or seeded.

~~(D)~~(E) ~~WISCONSIN~~ MOUND CONSTRUCTION INSPECTIONS~~:~~

1. Prior to beginning construction and/or covering any elements of the system, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during construction~~.~~;
      (ii) Soil moisture in the area of the proposed mound system is not so high as to cause smearing or compaction as a result of construction activities~~.~~;
      (iii) Layout and staking or marking of all components of the mound system~~.~~; and
      (iv) Review and approval of the source of the materials to be used including sand, gravel and soil cover. Samples may be required prior to placement.
   b. Ripping of the soil, sand quality, placement and depth.

c. Interim inspections(s):
(i) Sand bed prior to placement of gravel.;
(ii) Gravel placement and depth.;
(iii) Function and setting of all control devices.;
(iv) Hydraulic test (squirt test) of system.; and
(v) Water tightness test of septic tank and dosing tank.

d. Final Inspection:
(i) Depth and texture of final soil cover over the mound is verified.;
(ii) All construction elements are in general conformance with the approved plans and specifications.;
(iii) All monitoring wells are installed and erosion control has been completed.;
(iv) System controls are hardwired to permanent power and all floats, pumps and alarms tested.;
(v) A letter from the designer that the system has been installed and is operating in conformance with the design specifications must be returned to the Department.; and
(vi) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department.

SECTION 7 AT-GRADE ~~MOUND~~ SYSTEMS

(A) GENERAL FUNCTION AND SUITABILITY:

1. The ~~A~~at-~~G~~grade ~~Mound soil absorption~~ is a wastewater treatment system developed to distribute effluent evenly through pressurized perforated pipes in a gravel bed and covered with soil. Effluent flows through the gravel and into the native soil under the at-grade system. ~~system functions as an absorption trench system and mound dispersal unit.~~ These above ground systems are suitable for ~~allow wastewater disposal on~~ sites with shallow or slowly permeable soil over impermeable soil, fractured rock or bedrock, high groundwater, or other limiting condition observed not less than ~~within~~ thirty-six (36) inches of the ground surface and on slopes up to twenty-five (25) percent. If pretreatment is specified ~~used~~, a minimum of twenty-four (24) inches of native soil above the limiting condition is required.
2. At-~~G~~grade dispersal systems shall only receive septic tank effluent as per Table III-1.

(B) AT-GRADE SITE REQUIREMENTS

1. The a~~A~~t-~~G~~grade system shall be located in open areas for exposure to sun and wind where evaporation and transpiration will be maximized.
2. At-~~G~~grade systems shall not be installed in concave landscape formations, areas of seasonal saturation such as flood plains, vernal pools, drainage areas, areas that have been filled to artificially raise the separation to ground water or other limiting condition, cut or fill sites, or hummocky terrain. Upslope runoff must be diverted around the ~~A~~at-~~G~~grade system.
3. Placement of the a~~A~~t-~~G~~grade system in areas that require the removal of large trees, boulders, or rock outcroppings is not permitted.
4. The minimum effective soil depth below the ~~A~~at-~~G~~grade system is thirty-six (36) inches. If an approved pretreatment device is provided it may be reduced to twenty-~~-~~four (24) inches.
5. No part of the ~~A~~at-~~G~~grade dispersal system may be located where the site slope exceeds twenty (25) percent.
~~6. Commercial operations which generate high strength wastewater are required to utilize a pretreatment device that can meet the discharge standards of septic tank effluent as specified in Table 1 prior to dispersing into an At Grade system.~~
~~7.~~6. In addition to the other setbacks required by these standards, ~~A~~at-Grade systems shall also comply with the following setbacks measured between the perimeter of the basal area of the filter media and the respective features:

a. Buildings and Structures~~:~~

(i) Up gradient and laterally	10 feet
(ii) Down gradient	25 feet

b. Property Lines or Underground Utility Easements~~:~~

(i) Up gradient and laterally	10 feet
(ii) Down gradient	25 feet

c. Areas of Geologic Instability 100 feet

(C) AT-GRADE ~~MOUND~~ DESIGN REQUIREMENTS: See Figure~~s 6A & 6B~~9

1. Design Calculations~~:~~
   a. Single and multiple family dwelling sewage flows shall be calculated based on one hundred and twenty (120) gallons per bedroom per day.
   b. Commercial and other non-residential building sewage flows shall be calculated in accordance with the quantities listed in Table III-4.
   c. The soils application rate is based on the soil classification and/or percolation test. See Table III-2 for soil infiltration rates based on soil classification ~~or Table 3 for infiltration rates based on percolation rates~~.
   d. Designers shall calculate the total dynamic head loss as feet of elevation in the entire distribution system. The calculations shall include:
      (i) Vertical differences~~.~~;
      (ii) Length of entire piping~~.~~;
      (iii) Head loss of all valves, tees, elbows, and appurtenances~~.~~;
      (iv) Hydraulic orifice discharge~~.~~; and
      (v) Other hydraulic head loss in the system.
   e. Dose volume shall be designed to provide smaller more frequent doses. The maximum dose volume should not be less than five (5) times the lateral pipe volume and should not exceed twenty (20) percent of the daily design flow. Designer must consider both factors when determining appropriate dose volume.

2. Effective Absorption Area - The effective absorption area is that which is available to accept effluent. The size of the effective absorption area (aggregate and soil interface) is determined by applying the following formula:

$$\text{Effective Absorption Area, ft}^2 = \frac{\text{Maximum Daily Flow, gal/day}}{\text{Soil Infiltration Rate, gal/day/ft}^2}$$

3. Effective Absorption Width - The effective absorption width on a level site is the width of the aggregate. On a sloping site it is the distance from the uppermost distribution pipe to the toe of the aggregate.

$$\text{Effective Absorption Width, ft (A)} = \frac{\text{Linear Loading Rate, gal/day/ft (see Table III-7)*}}{\text{Soil Infiltration Rate, gal/day/ft}^2}$$

~~*(See Table 7)~~

   (i) The aggregate width shall not exceed ten (10) feet.
   (ii) Emphasis shall be placed on making the gravel bed long and narrow.

4. Effective Absorption Length - The effective absorption length is the length of the aggregate along the contour.

$$\text{Effective Absorption Length, ft (B)} = \text{Maximum Daily Flow, gal/day}$$

Linear Loading Rate, gal/day/ft (see Table III-7)

(i) The absorption bed shall extend a minimum of twenty-four (24) inches from the edge of the distribution pipes on all sides.

5. Absorption Bed Depth - The minimum depth of aggregate for residential systems shall be nine (9) inches and for commercial systems shall be twelve (12) inches.
   a. Absorption Bed Depth (residential)
      (i) Six (6) inches of aggregate below the distribution pipe, two (2) inches of aggregate above the distribution pipe.
   b. Absorption Bed Depth (commercial)
      (i) Nine (9) inches of aggregate below the distribution pipe, three (3) inches of aggregate above the distribution pipe.

6. Absorption Bed Installation - The absorption bed shall follow the natural contour of the ground.
   a. The absorption bed must be installed within a tolerance of one (1) inch vertically per one hundred (100) feet horizontally.
   b. Only single gravel beds are acceptable.
   c. The entire area of the aggregate shall be covered with an approved geo-textile filter fabric.

7. Aggregate Specification~~:~~
   a. Absorption bed filter media shall consist of three-eighth (3/8) to two (2) inch diameter river rock, crushed drain rock, lava rock, pea gravel, or other hard rock as approved by the administrative authority. All absorption bed filter media must have less than one (1) percent fines, dust, sand, and/or silts (passing the #200 sieve).

8. Distribution Piping~~:~~
   a. Pressure manifolds shall enter only from the uphill side or end of the a~~A~~t-~~G~~grade system.
   b. The distribution piping shall be Schedule 40 PVC or greater of at least three-~~–~~quarter (¾) inch diameter.
   c. The maximum distance between orifices shall be thirty-six (36) inches.
   d. Distribution laterals shall be located at least eighteen (18) inches from the end and sides of the dispersal bed.
   e. Where two or more laterals are laid in the dispersal bed, the laterals shall be spaced at least twenty-four (24) inches apart.
   f. Orifices shall face upward and shall be protected with orifice shields.
   g. The minimum orifice diameter shall be one-eighth (1/8) of an inch and provide a minimum of sixty (60) inches of hydraulic lift at all orifices. Three-~~–~~sixteenths (3/16) of an inch diameter orifices and larger must produce a minimum of twenty-four (24) inches of hydraulic lift at all orifices.
   h. The maximum length of run for pressurized perforated distribution piping shall be one hundred (100) feet.

9. Balancing Valves and Purge Valves~~:~~
   a. The beginning of the perforated distribution lateral shall have a balancing valve. See Figure~~.~~ ~~2~~6.
   b. The end of the perforated distribution lateral shall have a purge valve. See Figure~~.~~ 7~~–3~~.
   c. All balancing and purge valves shall be encased in plastic or concrete boxes that extend to grade, have a secure cover and are marked, "sewer"~~‖~~. The boxes shall be a minimum of ten (10) inches across, round or square, and be of adequate size to allow for maintenance.
   d. Balancing valves shall be gate or ball valves Schedule 80 PVC or greater.
   e. Purge valves shall be gate or ball valves Schedule 80 PVC or greater.
   f. All valve boxes shall be placed on screen blocks or equivalent.

g. Valve boxes shall be designed, installed, and maintained so as to prevent soil and rodent intrusion into the box over the life of the system.

10. Soil Cover Specification~~:~~
    a. The soil placed over the entire ~~A~~at-~~G~~grade must be selected and placed to promote aeration of the ~~A~~at-~~G~~grade, rainwater movement off and away from the ~~A~~at-~~G~~grade, and establishment and maintenance of a vegetative cover.
    b. The soil cover shall be of equal or better texture and structure than the soil existing on the site. Sandy loam, loamy sand~~s~~ and silt loam~~s~~ soil types are recommended.
    c. The final settled depth of the soil cover should be no less than twelve (12) inches above the center and six (6) inches above the outer edge of the aggregate. Additional depth of topsoil must be placed during final construction activities to assure that the minimum depths are achieved following natural settling of the soil.
    d. Soil cover shall extend a minimum of five (5) feet uphill and on both sides of the system. Downhill soil cover shall conform to Table III-9.
    e. The ~~A~~at-~~G~~grade must not be left without a vegetative cover or to go to weed. Vegetation shall be shallow-rooted, drought tolerant plants, shrubs, or grasses.

11. Monitoring Wells~~:~~
    a. Monitoring well construction shall be in conformance with Figures 4A and 4B~~, 1A~~.
    b. On sloping sites, greater than two (2) percent, a minimum of six (6) monitoring wells shall be installed. Three (3) monitoring wells shall be installed at the downhill toe of the aggregate bed. Two (2) monitoring wells shall be placed twenty-five (25) feet down gradient from the aggregate, and one (1) monitoring well~~s~~ shall be placed ten (10) feet up gradient from the aggregate.
    c. On flat sites, zero to two (0-2) percent slope, a minimum of eight (8) monitoring wells shall be installed. One (1) monitoring well~~s~~ shall be placed twenty-five (25) feet from each edge of each aggregate toe. Four (4) monitoring wells shall be installed at each aggregate toe. For aggregate beds greater than seventy-five (75) feet in length, two (2) monitoring wells shall be placed at the long side of each aggregate toe and two (2) monitoring wells shall be placed twenty-five (25) feet from the long side of each aggregate toe.
    d. Additional monitoring wells or alternate locations of monitoring wells may be required.

(D) AT-GRADE ~~MOUND~~ CONSTRUCTION REQUIREMENTS~~:~~

1. The use of wheeled vehicles is prohibited for the purpose of ripping or chisel plowing, driving on areas that have been ripped or chisel plowed, moving the soil cover, or anytime the soil conditions are wet, moist, or saturated.
2. Surface vegetation shall be mowed to native ground and the clippings removed.
3. Construction stakes or marking shall be provided for all components of the system prior to construction. The Department shall conduct a pre-construction inspection of the staking or marking to confirm the system will be constructed as designed.
4. The soil surface shall be ripped or chisel plowed to a depth of eight (8) inches to ten (10) inches, with rippers set eight (8) inches to ten (10) inches apart. Initial ripping shall be performed in a path parallel to the contour of the land and only within the limits of the gravel bed. The interface of the native soil and the ~~A~~at-~~G~~grade soil shall be ripped after the gravel has been placed and just prior to ~~A~~at-~~g~~ Grade soil cover placement. On steeper sloping sites, soil cover may be keyed into the native soil in lieu of ripping the soil, at the designers' discretion.
5. No traffic is permitted on any ripped surface until after the gravel or soil cover has been placed.
6. Temporary form boards required for the placement of material shall be removed prior to placement of the soil cover.

7. Distribution to and through all laterals shall be balanced so all laterals and orifices receive an equal volume. The difference in head between any two lines, and the beginning and end orifice of the same line shall not exceed ten (10) percent.
8. Finished grade of the ~~A~~at-~~G~~grade system shall be established by track rolling and grooming by hand. Soil cover shall be conditioned with sufficient moisture to allow track rolling to a firm and cohesive surface.
9. All drainage work and erosion control shall be completed prior to final construction inspection. Upslope runoff must be diverted around the system.
10. The soil cover shall be landscaped or seeded.

(E) AT-GRADE ~~MOUND~~ CONSTRUCTION INSPECTIONS~~:~~

1. Prior to beginning construction and/or covering any elements of the system, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during construction~~.~~;
      (ii) Soil moisture in the area of the proposed ~~A~~at-~~G~~grade system is not so high as to cause smearing or compaction as a result of construction activities~~.~~;
      (iii) Layout and staking or marking of all components of the ~~A~~at-g~~G~~rade system;~~.~~ and
      (iv) Review and approval of the source of the materials to be used including the gravel and soil cover. Samples may be required prior to placement.
   b. Ripping of the soil, gravel quality, placement and depth.
   c. Interim inspections:
      (i) Distribution piping, balancing valves ~~,~~ and purge valves~~.~~;
      (ii) Function and setting of all control devices~~.~~;
      (iii) Hydraulic test (squirt test) of system~~.~~; and
      (iv) Water tightness test of septic tank and dosing tank.
   d. Final Inspection:
      (i) Depth and texture of final soil cover over the ~~A~~at-~~G~~grade is verified~~.~~;
      (ii) All construction elements are in general conformance with the approved plans and specifications~~.~~;
      (iii) All monitoring wells are installed and erosion control has been completed~~.~~;
      (iv) System controls are hardwired to permanent power and all floats, pumps and alarms tested~~.~~;
      (v) A letter from the designer that the ~~A~~at-~~G~~grade system has been installed and is operating in conformance with the design specifications must be returned to the Department~~.~~; and
      (vi) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department.

SECTION ~~9~~8 SUBSURFACE DRIP DISPERSAL SYSTEMS

(A) GENERAL FUNCTION AND SUITABILITY~~:~~

1. A subsurface drip dispersal system is an efficient pressurized wastewater distribution system that can deliver small, precise doses of effluent to shallow subsurface disposal/reuse fields. Subsurface drip dispersal system distribution piping is small diameter, flexible polyethylene tubing (*dripline*) with small in-line *emitters* (orifices that can discharge effluent at slow, controlled rates, usually specified in gallons per hour).
2. A typical subsurface drip dispersal system installation includes a dosing chamber, pump(s), control panel, timed dosing and flow monitoring, particulate filter, filter backwashing and drip line flushing, driplines, and monitoring wells.

3. These below ground systems allow wastewater disposal on sites with shallow or slowly permeable soil over impermeable soil, fractured rock or bedrock, rapidly draining soils or sites with high groundwater on slopes up to and exceeding thirty (30) percent. An approved pretreatment device is required for a subsurface drip dispersal system. Effluent dispersed from these systems must be located at least twenty-four (24) inches above groundwater or other limiting condition.
4. Subsurface drip dispersal systems designed and installed in accordance with the manufacturer's recommendations and consistent with these standards are suitable for treatment and disposal of residential sewage. Where waste strength is characterized as higher than residential sewage, the designer must propose an approved pretreatment system and demonstrate to the satisfaction of the administrative authority that the proposed ~~pre~~treatment will reduce effluent strength to the required quality standards.
5. The level of ~~pre~~treatment must comply with the effluent quality parameters described in this code for pretreated effluent, as shown in Table III-1, or as specified by the manufacturer, whichever effluent quality is cleaner. Different subsurface drip dispersal products may require different levels of ~~pre~~treatment.

(B) SUBSURFACE DRIP DISPERSAL SYSTEM SITE REQUIREMENTS~~:~~

1. Subsurface drip dispersal systems can be installed in acceptable soil types as listed in Table III-2~~10~~, or the dripline manufacturer's requirements if specified, and on slopes ~~up to~~less than fifty (50) percent. Installation on slopes greater than thirty (30) percent will require a slope stability report approved by a registered professional.
2. No part of the subsurface drip dispersal field may be located where the site slope exceeds thirty (30) percent when fill will be used and the soil cover will be placed above existing grade.
3. The minimum acceptable soil depth under the bottom of the dripline shall be twenty~~-~~four (24) inches.
4. To maximize evapotranspiration, subsurface drip dispersal systems shall not be installed below non-permeable type soils such as high shrink swell clays, highly compacted soils, highly cemented soils, and/or massive or platy soil structures.

(C) SUBSURFACE DRIP DISPERSAL SYSTEM DESIGN REQUIREMENTS~~:~~

1. Design Calculations~~:~~
   a. Single and multiple family dwelling sewage flows shall be calculated based on one hundred and twenty (120) gallons per bedroom per day.
   b. Soil application rates shall be based on Table III-2, or the dripline manufacturer's requirements if specified.
   c. All subsurface drip dispersal system designs shall demonstrate that sufficient suitable area exists to construct two hundred (200) percent replacement area for commercial systems and one hundred fifty (150) percent for residential systems. The required replacement area listed above shall also apply when a subsurface drip dispersal system is proposed only for the~~as a~~ replacement ~~area~~system.

2. Distribution Piping~~:~~
   a. All subsurface drip dispersal system materials must be warranted by the manufacturer for use with wastewater and resistant to plugging from solids and bacterial slime.
   b. All materials shall meet applicable ASTM standards and be resistant to common household chemicals. The drip tubing must be color coded, by the manufacturer, to be easily identified as tubing designed for wastewater disposal.
   c. All subsurface drip dispersal systems must include a USDA-approved root growth inhibitor incorporated into the material during the manufacturing process to prevent root intrusion into emitters.

d. All transport piping; supply and return manifolds and fittings must be Schedule 40 PVC or greater.
e. Fittings used to join dripline to the distribution and flush manifolds must be in accordance with manufacturer's recommendations. Both compression and barb fittings may be specified, depending on the manufacturer recommendations and system operating pressure.
f. The length of each distribution line shall not exceed manufacturer's specifications to insure equal distribution to each emitter.
g. Vacuum breakers/air release valves shall be installed as per manufacturer's specification. A minimum of one (1) vacuum breaker/air release valve shall be provided for each drip field zone. One (1) air/vacuum relief valve shall be installed on the supply manifold and one (1) on the return line. All valves must be installed in a valve box with access to grade.
h. A subsurface drip disposal system shall contain, if necessary, pressure compensating devices or regulators to ensure equal distribution from all emitters at +/- ten (10) percent of the designed discharge rate.

3. Dosing Chambers~~:~~
   a. All dosing chambers must be IAPMO approved.
   b. The dosing chamber shall have a grade level access large enough to allow servicing and/or removal of the largest component in the chamber. Access ports shall be protected against unauthorized entrance or removal and be gas and watertight.
   c. The dosing chamber shall have a minimum capacity of one and one half (1½) times the estimated daily flow.
   d. The dosing chamber shall be equipped with an audible high water alarm.
   e. The high water alarm must be set so as to allow an emergency capacity equal to one (1) day's estimated flow~~.~~ (d~~D~~uplex pumping may be used in lieu of this requirement).

4. Pump Specifications~~:~~
   a. All subsurface drip disposal systems shall be time dosed. On-demand dosing will not be ~~considered~~approved.
   b. Means must be provided to track and verify dosing such as can be accomplished with a digital control panel, elapsed time meter (ETM) or event counter, etc.
   c. The pumping system shall be capable of dosing the drip field a minimum of six (6) equally spaced doses per twenty-four (24) hour period. Each dose volume shall not exceed the estimated maximum daily flow divided by the number of dosing cycles.
   d. The pumping system shall be designed to discharge the required volume of wastewater within the pressure range specified by the ~~tubing~~ dripline manufacturer.
   e. The pump shall be equipped with a low water shutoff to prevent damage to the pump during low water conditions in the dosing chamber.
   f. The pump shall be constructed of corrosion resistant materials suitable for effluent.
   g. The pump shall be sized per manufacturers' specifications to meet or exceed the hydraulic requirement of the system.
   h. The pump shall be installed in compliance with manufacturers' specifications so as not to violate pump warranty.
   i. The suction and pressure lines shall be Schedule 40 PVC or greater and be sized to meet or exceed the hydraulic requirements of the system.
   j. Flow meters must be installed in a readily accessible location for reading and servicing. The manufacturer must warrant flow meters for use with wastewater and be accurate within the expected flow range of the installed system.

5. Filter Specifications~~:~~
   a. The filter shall filter the effluent to the specifications of the dripline disposal-tubing manufacturer to prevent clogging of the emitters.
   b. The filter shall achieve the required filtration at a rate equal to or greater than the peak

discharge rate. This includes filter and/or system backwash from either the treatment facility or pump whichever is applicable.

c. The filter shall be made of material resistant to the corrosive effects of wastewater and common household chemicals.
d. The filters shall be readily accessible for inspection and/or service.
e. The filter flush volume and velocity shall be per manufacturer's specifications.
f. The filter residue shall be returned to the septic tank or recirculation tank with approval from the administrative authority.

6. Flushing System Specifications:
   a. A system must be provided for the flushing of distribution lines to prevent the build-up of solids in the distribution system, with its discharge returning to the septic tank or recirculation tank.
   b. The system shall be capable of achieving a flushing velocity of a minimum of two (2) feet per second or as specified by the dripline manufacturer. The return line must be permanently installed as a component of the system.
   c. Automated filter backwash and dripline flushing is required for all drip systems.
   d. Hose bibs are not allowed for use as a flushing component (to prevent cross contamination).

7. Monitoring Wells:
   a. Monitoring well construction shall be in conformance with Figure 4A1A.
   b. A minimum of six (6) monitoring wells shall be installed.
   c. On flat sites, zero to two (0-2) percent slope, two (2) monitoring wells shall be installed within the subsurface drip dispersal field and one (1) monitoring well shall be installed twenty five (25) feet away from all sides of the drip dispersal field. For multiple zones, two (2) monitoring wells are required for each zone.
   d. On sloping sites, greater than two (2) percent slope, two (2) monitoring wells shall be placed twenty-five (25) feet down gradient from the drip dispersal field, two (2) monitoring wells shall be installed within the drip dispersal field and two (2) monitoring wells shall be installed ten (10) feet up gradient of the drip dispersal field. For multiple zones, two (2) monitoring wells are required for each zone.

(D) SUBSURFACE DRIP DISPERSAL SYSTEM CONSTRUCTION REQUIREMENTS:

1. Installers are responsible for obtaining proper training before attempting to install a subsurface drip dispersal system.
2. Drip–lines should be installed in the "A" horizon (as defined by the National Resources Conservation Services) with six (6) to eight (8) inches of cover soil above the drip-line. The maximum cover soil may not exceed eighteen (18) inches above the drip–line. In all cases there shall be a minimum of twenty-four (24) inches separation between the drip-line and water table and/or restrictive horizon.
3. If fill will be used for soil cover, drip dispersal lines may be installed at original grade provided that the minimum of six (6) inches of acceptable fill soil is placed prior to installation of the lines. Existing ground surface shall be stripped of vegetation and scarified per designer and/or manufacturer specifications prior to the placement of fill soil.
4. The drip-lines may be installed using any of the following methods:
   a. Installed in a trench excavated by a trenching machine or by hand.
   b. Installed using an approved plowing method. The insertion tool must be of the type that does not pull or stretch the drip-line during insertion. The use of "cable plows" or any type insertion method that employs pulling the drip line through the plowed trench is prohibited.
5. Lines shall be on contour and shall not be installed perpendicular to the slope; elevation difference in a line or the entire grid shall not exceed the manufacturer's specifications.

6. Separation between emitter line laterals shall be a minimum of two (2) feet.
7. Minimum emitter spacing is twelve (12) inches for all soil types.
8. Lateral spacing of three (3) feet or more should be used for slopes of twenty (20) percent or greater.
9. Driplines ~~tubing~~ shall either be placed four (4) inches lower than the supply manifolds or water breaks shall be used to prevent effluent from flowing from drip trenches to the supply manifold trenches.
10. Equipment susceptible to freezing must be adequately protected to prevent freezing.

(E) SUBSURFACE DRIP DISPERSAL SYSTEM CONSTRUCTION INSPECTIONS~~:~~

1. Prior to beginning construction and/or covering any elements of the system, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during installation~~.~~;
      (ii) Layout and staking or marking of all components of the system; and~~.~~
      (iii) Review and approval of the source of the materials to be used.
   b. Interim inspections(s):
      (i) Installation of all pretreatment components;~~.~~
      (ii) Drip field installation and functioning of all drip components;~~.~~
      (iii) Function and setting of all control devices;~~.~~
      (iv) Connections of all piping and related components; and~~.~~
      (v) Water tightness test of all connections, septic tank and dosing tank.
   c. Final Inspection:
      (i) All construction elements are in general conformance with the approved plans and specifications;~~.~~
      (ii) Final soil cover over the subsurface drip dispersal field is verified;~~.~~
      (iii) System controls are hardwired to permanent power and all floats, pumps and alarms tested~~.~~;
      (iv) Letter from the designer that the system has been installed and is operating in conformance with the design specifications shall be provided~~.~~; and
      (v) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department.

~~TION 10 SAND FILTRATION SYSTEMS~~

~~(A) GENERAL FUNCTION AND SUITABILITY:~~

~~1. These systems are used as a supplemental technology to reduce wastewater strength prior to dispersal. Sand filter effluent discharged to a pressure distribution system or At-Grade system shall be located at least twenty-four (24) inches above groundwater or other limiting condition.~~

~~2. There are two (2) approved types of sand filter systems:~~

~~a. Intermittent Sand Filter (ISF) system: Wastewater passes through the filter once to achieve the desired treatment, including total and fecal coliform reductions.~~

~~b. Recirculating Sand Filter (RSF) System: Wastewater is recirculated through the filter media multiple times to achieve the desired treatment. In addition to coliform reduction, RSF's can be designed to reduce the nitrate concentration of the wastewater. Wastewater is typically recirculated up to four (4) times through the RSF. Each time the wastewater is circulated through the RSF, seventy-five (75) to eighty (80) percent is recirculated back to the septic tank and twenty-five (25) to twenty (20) percent is released to the dispersal field.~~

~~3. The components of a sand filter are a containment pit or structure with a waterproof liner, distribution piping, gravel, sand, collection drain system, and a pump. A sand filter is an approved pretreatment~~

device if built according to these standards.

4. The use of an approved sand filter or other approved pretreatment device may allow a reduction of up to one (1) foot of the three (3) foot minimum vertical separation distance above a limiting groundwater or soil condition otherwise required for a dispersal system. Increasing the sand depth of a sand filter beyond the two (2) feet does not allow a further decrease in the required depth of the minimum effective soil above a limiting condition.

(B) SAND FILTER SITE REQUIREMENTS:

1. The minimum setback requirements for sand filters are the same as required for septic tanks.

(C) SAND FILTER DESIGN REQUIREMENTS:

1. Design Calculations:
   a. The surface area of the sand filter bed must be determined by dividing the design flow estimate by the loading rate.
      (i) The loading rate to an ISF must not exceed 1.2 gallons/day/ft^2.
      (ii) The loading rate to a RSF must not exceed four (4) gallons/day/ft^2.
   b. Designers shall calculate the total dynamic head loss as feet of elevation in the entire distribution system. The calculations shall include:
      (i) Vertical differences.
      (ii) Length of entire piping.
      (iii) Head loss of all valves, tees, elbows, and appurtenances.
      (iv) Hydraulic orifice discharge.
      (v) Other hydraulic head loss in the system.
      (vi) Dose volume shall be designed to provide smaller more frequent doses. The maximum dose volume should not be less than five (5) times the lateral pipe volume and should not exceed twenty (20) percent of the daily design flow. Designer must consider both factors when determining appropriate dose volume.

2. Influent Characteristics:
   a. Intermittent and Recirculating sand filters are designed for treating residential strength wastewater.
   b. High-strength wastewater and wastewater from non-domestic sources (such as restaurants, hotels, bed and breakfast establishments, industrial and commercial wastewater sources) must be individually evaluated to determine the degree of pretreatment required, if any, prior to an intermittent or recirculating sand filter for final treatment and disposal.

3. Filter Media Specifications:
   a. Filter media must meet the particle size criteria detailed in Table 11. Media used in constructing a sand filter must be accompanied with a written certification from the supplier.
   b. The filter media depth must be a minimum of twenty (24) inches and be thoroughly washed and as free of fines as possible.

4. Distribution Piping:
   a. The pressure manifold and under drain shall pass through factory heat or solvent welded boots in the PVC liner and be sealed watertight. Appropriate stainless steel clamps (two (2) clamps are recommended) shall seal the PVC boot around the pressure manifold and under drain pipes.
   b. The distribution piping shall be Schedule 40 PVC pipe of at least three-quarter (¾) inch diameter.
   c. The maximum distance between orifices shall be thirty-six (36) inches.
   d. Distribution laterals shall be located at least twelve (12) inches from the end and sides of the filter bed.
   e. Where two (2) or more laterals are laid in the sand filter, the laterals shall be spaced at least twelve (12) inches apart.
   f. Orifices shall face upward and shall be protected with orifice shields.

g. The minimum orifice diameter shall be one-eighth (1/8) of an inch and provide a minimum of sixty (60) inches of hydraulic lift at all orifices. Three sixteenths (3/16) of an inch diameter orifices and larger must produce a minimum of twenty-four (24) inches of hydraulic lift at all orifices.
h. The maximum length of run for pressurized perforated distribution piping shall be one hundred (100) feet.

5. Balancing Valves and Purge Valves:
   a. The beginning of the perforated distribution lateral shall have a balancing valve. See Fig. 2.
   b. The end of the perforated distribution lateral shall have a purge valve. See Fig. 3.
   c. All balancing and purge valves shall be encased in plastic or concrete boxes that extend to grade, have a secure cover and are marked ―sewer‖. The boxes shall be a minimum of ten (10) inches across, round or square, and be of adequate size to allow for maintenance.
   d. Balancing valves shall be gate or ball valves Schedule 80 PVC or greater.
   e. Purge valves shall be gate or ball valves Schedule 80 PVC or greater.
   f. All valve boxes shall be placed on screen blocks or equivalent.
   g. Valve boxes shall be designed, installed, and maintained so as to prevent soil and rodent intrusion into the box over the life of the system.
6. Monitoring Wells:
   a. Monitoring well construction shall be in conformance with Fig. 1A.
   b. One (1) monitoring well shall be installed to the bottom of the drain rock/top of the media interface.
   c. A second monitoring well shall be installed to the bottom of the under drain.
   d. Additional monitoring wells or alternate locations of monitoring wells may be required.

(D) SAND FILTER CONSTRUCTION REQUIREMENTS:

1. A pit shall be excavated into the ground for installation of the sand filter.
2. Inside the pit, walls shall be constructed of at least one-half (½) inch plywood, pressure treated or redwood heart grade material. All fasteners shall be flush, counter sunk, or recessed.
3. The walls shall be constructed so that the top is at least six (6) inches above natural grade.
4. The bottom of the pit shall be covered with sand to "bed" liner, adequate in depth (minimum of three (3) inches) to protect liner from puncture.
5. The bottom of the pit (bedding layer of sand) shall be graded to provide a sloping liner surface, from the outer edge of the filter toward the point of under drain collection.
6. A geo-textile fabric in a thickness appropriate to protect the liner shall be placed over all wood surfaces.
7. At least a thirty (30) mil PVC liner shall be installed. All seams of the liner must be factory heat or solvent welded.
8. A four (4) inch diameter Schedule 40 PVC or greater slotted under drain collection pipe shall be placed directly on the bottom of the enclosure. Under drain slots should be one quarter (¼) of an inch wide, two and one half (2½) inches deep and spaced four (4) inches apart. To avoid the slots being pushed down into the liner and covered by liner material, the slots shall be faced upwards (vertical). The distal end of the pipe shall be brought to grade and covered with a removable cap. This shall serve as a vent and cleanout. In a sand filter with a pump basin located in the center where two (2) under drain pipes converge, only one (1) of the under drain pipes needs to be brought to the surfaced and capped. The under drain pipe can lay level or have no more than a one half (1/2) percent grade towards the outlet. In larger sand filters, under drain pipes shall be spaced apart a maximum of ten (10) feet on center.
9. A minimum of four (4) inches of double washed gravel with less than one (1) percent fines by weight and range in size from three quarter (3/4) to two (2) inches in diameter shall be placed over and immediately around the under drain pipe. Avoid angular and sharp gravel that could damage the PVC liner.
10. Eight (8) inches of three eighth (3/8) inch clean washed pea gravel shall be placed at the inside bottom of the enclosure. This should be mounded over the washed gravel covering the under drain. Care should be taken to make certain that the above-mentioned layers are installed properly. This layering sequence is meant to prevent sand filter media from washing into the under drain pipe of the filter.
11. It is recommended that the sand media be placed in level eight (8) inch lifts in the filter and wetted slightly during installation to promote even settling. It is important not to wet the sand too much because particle

stratification may occur.

12. As the liner is filled with sand, the edges of the filter media should be "walked down" by the installer to make sure the sand is tight along filter perimeter and no voids exist. The installer should watch that the liner is not stretched during the filling process.
13. After the required amount of filter sand has been added to the filter, place three (3) inches of three eighth (3/8) inch washed pea gravel over the filter sand. After the distribution laterals have been installed atop the pea gravel and a squirt test performed, install orifice shields over each orifice of the distribution laterals, add two (2) more inches of pea gravel to cover the distribution laterals. No filter fabric of any kind should be placed between the sand and overlying pea gravel layers.
14. A geo-textile filter fabric must be placed over the pea gravel prior to placement of the soil cover. Soil cover shall be sandy loam or loam soil and shall be a minimum of six (6) inches but not greater than twelve (12) inches in depth over the sand filter.
15. The cover soil must be capable of maintaining vegetative growth while not impeding the passage of air and be sloped to promote drainage off of and away from the sand filter.

(E) SAND FILTER CONSTRUCTION INSPECTIONS:

1. Prior to beginning construction and/or covering any elements of the sand filter, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during construction.
      (ii) Layout and staking or marking of all components of the sand filter system.
      (iii) Review and approval of the source of the materials to be used including sand, gravel and soil cover. Samples may be required prior to placement.
   b. Interim Inspections(s):
      (i) Inspection of rock, sand and soil to be used.
      (ii) Excavation of sand filter pit and wall construction.
      (iii) Placement of gravel, pea gravel, under drain and sand fill.
      (iv) Assembly and layout of sand filter distribution network.
   c. Final Inspection:
      (i) Depth and texture of final soil cover over the sand filter is verified.
      (ii) All construction elements are in general conformance with the approved plans and specifications.
      (iii) All monitoring wells are installed and erosion control has been completed.
      (iv) System controls are hardwired to permanent power and all floats, pumps and alarms tested.
      (v) A letter from the designer that the system has been installed and is operating in conformance with the design specifications must be returned to the Department.
      (vi) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department.

SECTION 911 AEROBIC TREATMENT UNITS (ATU) AND ALTERNATIVE FILTER MEDIA UNITS (AFMU)

(A) GENERAL FUNCTION AND SUITABILITY

1. These are proprietary devices used in lieu of sand filters to treat sewage effluent prior to dispersal. Disposal field distribution trench bottom receiving effluent from these pretreatment units must be located a minimum of twenty- four (24) inches above groundwater or other limiting conditions.

2. ATU's or AFMU's may only be approved provided all of the following conditions are met:
   1. An appropriately sized intermittent sand filter meeting all setback requirements on the parcel could be installed if necessary.
   2. Documentation acceptable to the Department is provided to demonstrate that the unit will provide

~~effluent quality equal to or better than that defined in Table 1 for pretreated effluent quality.~~

~~3. The owner may be required to maintain a maintenance agreement with the proprietor, the proprietor's distributor or other contractor knowledgeable in the repair and maintenance of the unit.~~

(B) AEROBIC TREATMENT UNIT (ATU) AND ALTERNATIVE FILTER MEDIA (AFMU) UNIT SITE REQUIREMENTS~~:~~

1. The minimum setback requirements for Aerobic Treatment Units and Alternative Filter Media Units are the same as required for septic tanks.

(C) AEROBIC TREATMENT UNIT (ATU) AND ALTERNATIVE FILTER MEDIA (AFMU) UNIT DESIGN REQUIREMENTS~~:~~

1. The ATU or AFMU shall be listed by NSF as meeting the NSF Standard 40, Class 1 performance evaluation, or have a certification by a third party agency as complying with NSF Standard 40. The ATU or AFMU shall be manufactured and installed in accordance with the design specifications used to determine compliance to NSF Standard 40. Alternative ~~pre~~treatment technologies for high-strength wastes may be considered for review and approval by the Department, and possibly the RWQCB. The manufacturer shall endorse the use, in writing, of the proposed ATU or AFMU for the anticipated wastewater quality and quantity. Such alternative ~~pre-~~treatment technologies are subject to additional or alternative monitoring requirements to verify system function according to design expectations. Documentation acceptable to the Department is provided to demonstrate that the unit will provide effluent quality equal to or better than that defined in Table III-1 for pretreated effluent quality.
2. All tanks housing an ATU or AFMU shall be structurally sound, water tight and capable of withstanding anticipated loads.
3. The designer and installer shall follow the manufacturer's design, installation, construction, and operations procedures.
4. The ATU or AFMU shall be preceded by a septic tank unless it can be demonstrated that such a requirement will adversely affect the performance of the ATU or AFMU.

(D) AEROBIC TREATMENT UNIT (ATU) AND ALTERNATIVE FILTER MEDIA (AFMU) UNIT CONSTRUCTION REQUIREMENTS~~:~~

1. See manufacturer's instructions and specifications.

(E) AEROBIC TREATMENT UNIT (ATU) AND ALTERNATIVE FILTER MEDIA (AFMU) UNIT CONSTRUCTION INSPECTIONS~~:~~

1. Prior to beginning construction and/or covering any elements of the system, the following inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during installatio~~;n~~.
      (ii.) Layout and staking or marking of all components of the system~~.~~; and
      (iii) Review and approval of the source of the materials to be used.
   b. Interim inspections(s):
      (i) Function and setting of all control devices~~.~~;
      (ii) Connections of all piping and related components~~.~~; and
      (iii) Water tightness test of all connections, septic tank and dosing tank (if used).
   c. Final Inspection:
      (i) All construction elements are in general conformance with the approved plans and specifications~~.~~;

(ii) System controls are hardwired to permanent power and all floats, pumps and alarms tested.;

(iii) The Septic System Sump Pump Electrical System Installation Conformance Certification must be completed, signed by the installing contractor and returned to the Department if a pump system is used;. and

(iv) Letter from the designer that the ATU or AFMU system has been installed and is operating in conformance with the design specifications shall be provided.

SECTION 102 EXPERIMENTAL SYSTEMS

(A) EXPERIMENTAL SYSTEM DEFINED:

1. Any system proposed that varies from these standards or is not addressed in these standards is considered experimental and shall be subject to joint Regional Water Quality Control Board and Department review.

(B) EXPERIMENTAL SYSTEM APPROVAL REQUIREMENTS:

1. Experimental systems shall only be allowed for repairs of existing sewage disposal systems on existing lots.
2. The designer of an experimental system shall include proposed monitoring requirements in the design submittal. The Department and/or RWQCB may require modification and/or additional monitoring requirements of the system.
3. Experimental systems are subject to Environmental Review by the Napa County Planning Division. Conservation, Development and Planning Department.
4. If the proposed experimental system is approved by both agencies, the RWQCB may require a wastewater discharge permit. If required, the wastewater discharge permit shall establish performance standards that thewith which the experimental system must comply with.
5. A maximum of three (3) experimental systems shall be approved in any given calendar year.
6. The designer of the system shall provide the Department with a copy of the Operation and Maintenance manual for the system prior to final. The system must be monitored by an Aapproved Sservice Pprovider. The owner shall provide the Department with a copy of the contract between the owner and the Sservice Pprovider prior to issuance of the operation permit.

SECTION 11 DISINFECTION TREATMENT

(A) GENERAL FUNCTION AND APPLICABILITY:

1. These are devices or chemical injection systems which are designed to disinfect wastewater effluent following pretreatment by greatly reducing or eliminating pathogenic organisms. Disinfection treatment may be required for repairs or new wastewater systems in locations which without such treatment may pose a higher than acceptable risk to groundwater, surface water, and public health. Disinfection treatment components shall meet or exceed NSF/ANSI 46 standards or equivalent whenever used.
2. Increased maintenance intervals by the Sservice Pprovider may be required to ensure disinfection treatment components are operated and maintained in accordance with manufacturer specifications.

SECTION 124 NAPA COUNTY ALTERNATIVE SEWAGE TREATMENT SYSTEM MONITORING PROGRAM

(A) CODE SECTION AND APPLICABILITY

1. The Napa County Code, ~~Division II,~~ Chapter 13.~~56~~40, Section 13.~~56.010~~40.020 has established the legal authority for the ASTS monitoring program. The Director of the Department has determined that all ASTS's approved by the Department after January 1, 2000 shall be included in this ASTS Monitoring Program.
2. All ASTS's permitted~~*~~* on or after July 1, 2006 are subject to inspection and monitoring by an approved ~~S~~service ~~P~~provider. An approved ~~S~~service ~~P~~provider means a Registered Civil Engineer, Registered Environmental Health Specialist, or any person who is licensed as a certified onsite wastewater system inspector~~I~~ or other equivalent license by passing a state or nationally accredited test.
3. All ASTS's permitted* prior to July 1, 2006 will have the option of being permitted with an approved ~~S~~service ~~P~~provider, or remain as they are currently permitted.
4. The Director shall maintain the right to require any and all systems installed after September 25, 1969 to enter into this or any other monitoring program as allowed by Napa County Code.
5. ~~Upon sale of a property with a structure served by an ASTS, the new owners shall be required to enter the ASTS monitoring program and comply with all requirements therein.~~

***** Permitted in this sentence refers to the date the construction permit was issued for the ASTS.

(B) PROGRAM OVERVIEW

1. ASTS's employ enhanced treatment technologies to overcome restrictive site conditions where conventional sewage treatment systems are not feasible. ASTS allow for the development of otherwise unbuildable parcels or repairs of existing sewage disposal systems on sites that have greater environmental sensitivity. Due to the complex technologies and engineering principles utilized with these systems, monitoring and maintenance becomes an essential part of the performance of the system. The Department has established this ASTS monitoring program to formalize the requirements for monitoring and maintenance of these systems.
2. ASTS's are required to have an operational permit issued by the Department. The operational permit prescribes the maintenance and inspection requirements as conditions of the permit. Routine self-monitoring of the system as well as periodic inspections by Department staff or an approved ~~S~~service ~~P~~provider is required to assure the system is functioning properly and allows for the collection and analysis of data from the ASTS technologies utilized. Renewable operational permits provide a mechanism for continuous oversight of system performance and negotiating corrective action or levying penalties if compliance with the permit is not maintained. The ASTS monitoring program will serve to determine the overall success of the various types of ASTS's, to assist homeowners with the necessary maintenance requirements of their ASTS, and to provide necessary data on such systems that contribute to the continued research that ensures the protection of water quality, the environment, and public health and safety.

(C) OPERATION & MAINTENANCE REQUIREMENTS

1. All ASTS's in the monitoring program are required to have an operational permit.
2. Operational permits are not transferable. A new operating permit shall be obtained at the time of sale, or in the case of commercial properties, upon change of occupants (if the landlord is not the permit holder).
3. ASTS shall be operated and maintained in conformance with the conditions prescribed in the operational permit.
4. If in the opinion of the administrative authority, the ASTS is causing an adverse effect upon the ground or surface waters, public health, or a significant ~~effect~~ impact on the environment, enforcement action may be initiated. This may include but not be limited to ordering the permit holder on mandatory pump status or issuance of a Notice to Abate a Public Nuisance through the

District Attorney's office.

5. The County may recover costs associated with the abatement of operational permit violations.
6. The current owner of the property has the responsibility for informing succeeding property owners of the renewable operating permit and self-monitoring requirements.
7. Prior to issuance of the sewage disposal system ~~installation~~ construction permit, the owner of the property shall submit the Supplemental Application to Construct and Operate an ASTS to the Department.

(D) OWNER RESPONSIBILITIES

1. Operational permits are not transferable. With the sale of a property, a new operating permit shall be obtained by the new owner/operator. Change of ownership for residential properties shall mean when a property served by an ASTS is purchased and title to the property has changed. For commercial properties, change of ownership shall mean the effective date of any lease or other agreement to operate the business for which the ASTS serves.
2. Within thirty (30) days of gaining control of the property or business (close of escrow, lease/agreement effective date), a new operating permit must be applied for and obtained from the Department by the new owner/operator. In the case where the business owner is not the property owner, the operating permit may be issued to the property owner or the owner of the business.
3. Although property owners are responsible for assuring the alternative system does not create a threat to public health or the environment, the business served by the ASTS is responsible for wastewater discharged to the system. Therefore, the business owner will be required to obtain the operating permit unless the property owner submits a written request that he/she be the operating permit holder.
4. All required operating, maintenance, and monitoring of the ASTS is the responsibility of the permit holder. All required fees must be paid at the time of application.
5. Prior to final on the project and prior to issuance of the first operating permit, the owner shall provide a copy of a signed contract with the approved ~~S~~service ~~P~~provider.
6. Prior to final on the project and prior to issuance of the first operating permit, the owner shall sign and have notarized ~~and recorded,~~ the "Supplemental Application to Own and Operate and ASTS" which shall serve as notification to all future owners that the property is served by an ASTS
7. Self-monitoring reports shall be submitted as described in the ~~S~~service ~~P~~provider ~~M~~monitoring ~~R~~requirements detailed in this section and as prescribed on the operational permit conditions.
8. A copy of a signed contract with the approved s~~S~~ervicep~~-~~Provider, if applicable, and a completed monitoring inspection report shall be submitted to the Department with any application for a change of ownership.

(E) HOMEOWNER MAINTENANCE OF ALTERNATIVE SEWAGE TREATMENT SYSTEMS

1. ASTS's will function better and last longer if properly maintained. Following are some simple and practical maintenance procedures (Basic Maintenance below) that shall be performed to improve the operation of the system and comply with the requirements of the ASTS monitoring program. In addition to the maintenance requirements specified herein, the designer of the ASTS system must provide the homeowner with an operation and maintenance manual specific to the type of system installed. The manual shall cite homeowner procedures to ensure maintenance, repair, or replacement of critical items within 48 hours following failure. ~~(9.2.5)~~

(F) BASIC MAINTENANCE

1. Inspect the septic tanks and sumps for signs of leakage and groundwater intrusion on top of the tank, at the inlet and outlet, and ~~especially~~ around the risers.

2. Septic tanks are to be pumped when the combined sludge and scum layer is greater than thirty- five (35) percent of the liquid capacity of the tank. A licensed septic ~~tank~~ cleaning company~~pumper~~ shall pump the septic tanks. See manufacturer's specifications and/or ASTS ~~construction~~ as built or record drawings for tank capacities and dimensions.
3. Maintain all surface and subsurface drainage and improvements in accordance with the operation and maintenance manual.
4. Assure wastewater quality discharged to the system is consistent with the design parameters. The addition of any atypical wastewater component into the system is prohibited. Contact the Department prior to disposing of any wastewater constituent ~~incongruous~~that may be incompatible with the designed wastewater parameters.
5. ASTS shall be operated and maintained in conformance with the conditions prescribed in the operational permit.
6. Report any malfunction of the ASTS to the Department.
7. Do not allow any disturbance of the soil cover by animals, vehicles, structures, etc.
8. Do not hydraulically overload (exceed the design~~ed~~ capacity ~~daily wastewater flow~~) the ASTS. Repair leaking plumbing fixtures immediately.
9. Do not dispose of any hazardous material into a septic tank or system including toxic substances, pesticides, chlorine bleach, cleaners (other than minute concentrations contained in mild cleansers and chemicals used in normal household cleaning), or flammable products.
10. Do not plant vegetation incompatible with the proper function of a sewage treatment system in an area that may affect the disposal field or replacement area.
11. Do not disc, plow, rip, or allow any other disturbance of the soil in a manner that could adversely impact the function of the sewage treatment system and/or replacement area.

(G) SERVICE PROVIDER MONITORING REQUIREMENTS

1. Service p~~P~~rovider ~~M~~monitoring requirements will vary depending on the specific type of ASTS, but in general, may include the following:
   a. Recording of wastewater flows based on water meter readings, pump event counters, elapsed time meters or other approved methods~~.~~;
   b. Inspection and recording of water levels in the monitoring wells in the dispersal~~osal~~ field~~.~~;
   c. Water quality testing of selected water samples taken from points in the treatment process, including but not limited to~~;~~ monitoring wells, surface streams or drainage ways, and pre-treatment devices. Water quality parameters to be analyzed may include total and fecal coliform, nitrate, biochemical oxygen demand (BOD)~~,~~ and total suspended solids.
   d. Inspection and observation of pump operation and other mechanical equipment.
   e. General inspection of treatment and disposal areas for evidence of seepage, surfacing effluent, erosion or other indicators of malfunction.
2. Monitoring inspections shall be performed at a frequency of once during every six (6) month period. Each six (6) month period is denoted as winter season and summer season. Winter season shall mean ~~Winter~~winter season shall mean between the months of November 1st and April 30th. Summer season shall mean between the months of May 1st and October 31st. The two (2) self-monitoring inspections shall be performed a minimum of ninety (90) days apart.
3. Monitoring reports shall be submitted to the Department within 30 days of completion. All monitoring reports for the previous summer and winter seasons shall be submitted no later than December 1st of each year. All monitoring data shall be reported in the format established by the Department.
4. In some cases, additional monitoring requirements and/or an increase in monitoring frequency may be required at the discretion of the Director ~~of Environmental Management~~.
5. For systems permitted prior to July 1, 2006 and still under original ownership, the above noted monitoring can be performed by the owner/operator (operating permit holder), or an approved ~~S~~service ~~P~~provider. Once a ~~S~~service ~~P~~provider is hired, or upon change of ownership, the ASTS will be required to have a ~~S~~service ~~P~~provider for the remaining life of the system.

(H) COUNTY RESPONSIBILITIES~~:~~

1. Data in the ASTS yearly status report may be used to evaluate the effectiveness of the monitoring program, assess the treatment technologies utilized, and to make regulatory and/or policy improvements, as needed, to protect water quality, public health, and the environment.
2. All septic systems in the ASTS Monitoring Program are required to have a valid ~~O~~operational ~~P~~permit issued by the Department. Operational permits are valid for a period of one (1) year.
3. The Department shall inspect all ASTS's included in the monitoring program that are not permitted with an approved ~~S~~service ~~P~~provider at a frequency of once per calendar year. The Department may inspect the ASTS's in the monitoring program that are permitted with an approved ~~S~~service ~~P~~provider. Any inspection by the Department shall consist of an onsite evaluation of the system and written findings provided to the owner/operator.
4. All inspections by the Department shall be pre-arranged with the property owner or ~~S~~service ~~P~~provider for gaining access to the property.
5. A copy of the inspection reports shall be retained at the Department of Planning, Building and Environmental ~~Health~~ Services for a period of not less than ten (10) years.
6. The Department shall maintain a record keeping and tracking system to verify compliance with maintenance, operation, and monitoring requirements. The record keeping and tracking system shall including:
   a. System location including assessor's parcel number or some other distinctive identification number~~;~~.
   b. Type of System~~;~~.
   c. Date of final on the installation permit~~.~~;
   d. Owner of record~~.~~;
   e. Written maintenance, operation, and monitoring requirements; and~~.~~
   f. Results of maintenance and monitoring reports.

7. Data from the ASTS Monitoring Program will be recorded in the annual report to the RWQCB.

(I) NAPA COUNTY EVALUATION SYSTEM

~~The p~~Performance of the ASTS~~'s~~ will be ~~as~~ determined from annual inspections and self-monitoring reports~~. shall be used as the basis for determining the operational level of each ASTS for reporting purposes. Each system shall be classified according to one of the following operational levels:~~

~~FUNCTIONING: Minor, insignificant, or no operational or maintenance problems FUNCTIONING MARGINALLY: Operational problems or equipment malfunction NOT FUNCTIONING: Significant operational problems or overt malfunction.~~

~~To be classified as FUNCTIONING the ASTS must be in good working order with components functioning as required. The dose counter or flow meter is working, design flows are not being exceeded, monitoring wells are in good condition, no groundwater is present in the monitoring wells within twenty four (24) inches of the system installation depth, and the field evaluation reveals system to be in good physical condition. A system with minor problems in these areas may still be classified as functioning, however those minor problems must be repaired as needed and may require a follow up inspection.~~

~~To be classified as FUNCTIONING MARGINALLY the ASTS is in working order but shows signs of stress including excessive green growth, damp soil cover, groundwater at less than twenty four (24) inch separation (but greater than twelve (12) inches) to system installation depth, bacteriological analysis of a purged monitoring well twenty five (25) feet down gradient of the system reveals marginal treatment (e.g., >3000 MPN but <240,000 MPN total coliform with 2.2 MPN fecal bacteria), flow rates greater than~~

~~design capacity, field visit that reveal general neglect of system with extensive restoration necessary to return installation to original condition, routine monitoring of system reveals chronic operational difficulties. A system classified as "functioning marginally" will require specific repair and maintenance to be completed which will be verified at a follow up inspection.~~

~~To be classified as NOT FUNCTIONING the~~If an ASTS is failing to work properly such that the system is hydraulically overloaded almost to the point of sewage breakout or if surfacing sewage is documented in the area of the septic and/or sump tank or in the area of the final effluent dispersal system, a repair plan will be required. ~~Not functioning includes high groundwater (within twelve (12) inches of system installation depth) in any well and/or bacteriological analysis of a purged monitoring well twenty five (25) feet down gradient of the system indicates a subsurface malfunction (>240,000 MPN total coliform and/or greater than 2.2 MPN fecal bacteria), field visit that reveals severe neglect of the system with failure imminent and/or overt malfunction likely to occur soon, bacteriological analysis performed revealing gross contamination (>240,000 MPN total coliform and/or the presence of fecal bacteria) in samples obtained from the ground surface.~~ When the disposal system of an ASTS is identified as non-functioning and there is an immediate or imminent public health concern, the operator of the system will be placed on immediate pumping status such that no sewage effluent is allowed to discharge to the dispe~~r~~osal field. The operator will be directed to contact a qualified professional (Engineer or REHS) to assist with a repair proposal. Failure to repair the system will result in further enforcement action, which may include legal action.

TABLE III-1

Minimum Effluent Quality

SEPTIC TANK EFFLUENT (STE)

CONSTITUENT	CONCENTRATION (MG/L)
5-day Biochemical Oxygen Demand (BOD_5)	300
Total suspended solids (TSS)	350
Fats Oil and Grease (FOG)	100
Total Nitrogen (TN)	100

PRETREATED EFFLUENT (PTE)

CONSTITUENT	CONCENTRATION (MG/L)
5-day Biochemical Oxygen Demand (BOD_5)	30
Total suspended solids (TSS)	30
Total Nitrogen (TN)	As specified on a case by case basis by administrative authority

TABLE III-2

Soil Hydraulic Loading Rates

SEWAGE DISPERSAL SYSTEM HYDRULIC LOADING RATES (GAL/SQ.FT/DAY) BASED ON SOIL PROFILE				
TEXTURE	STRUCTURE		**Hydraulic loading, gal/day/ft^2**	
	Shape	Grade	STE[1]	PTE[1,2]
Coarse Sand, Sand, Loamy Coarse Sand	**Single Grain**	**Structureless**	**1.0**	**1.2**
Fine sand, Loamy Fine Sand	**Single Grain**	**Structureless**	**0.6**	**1.0**
Sandy Loam, Loamy Sand	**Massive**	**Structureless**	**0.35**	**0.5**
	Platy	**Weak**	**0.35**	**0.5**
	Prismatic, Blocky, Granular	**Weak**	**0.5**	**0.75**
		Moderate, Strong	**0.8**	**1.0**
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	**Massive**	**Structureless**		
	Platy	**Weak, Moderate, Strong**		
	Prismatic, Blocky, Granular	**Weak, Moderate**	**0.5**	**0.75**
		Strong	**0.8**	**1.0**
Sandy clay, Silty clay loam, Clay Loam	**Massive**	**Structureless**		
	Platy	**Weak, Moderate, Strong**		
	Prismatic, Blocky, Granular	**Weak, Moderate**	**0.35**	**0.5**
		Strong	**0.6**	**0.75**
Clay, Silty clay	**Massive**	**Structureless**		
	Platy	**Weak, Moderate, Strong**		
	Prismatic, Blocky, Granular	**Weak**		
		Moderate, Strong	**0.2**	**0.25**

1: See Table III-1

2: Higher hydraulic loading rates for pretreated effluent may only be used when pretreatment is **not** used for one foot of vertical separation credit

TABLEIII-3

[RESERVED]

TABLE III-4

Commercial design flow rates

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports	5 per passenger
Campgrounds: Campground with central comfort station Campground with flush toilet, no showers Day Camps (no meals) Luxury Camp, private bath Summer and seasonal	 35 per person 25 per person 15 per person 100 per person 50 per person
Churches (sanctuary) With kitchen wastes	5 per seat 7 per seat
Country Club	125 per person
Factories	35 per person per shift
Hospitals Kitchen waste only Laundry waste only	250 per bed space 25 per bed 40 per bed
Hotels/Motels with private bathroom (no kitchen waste) Hotels/Motels without private bathroom (no kitchen waste) Hotel/Motel with private bath and kitchen	60 per two person room 50 per two person room 75
Institutions other than hospitals	125 per bed space
Movie Theaters	5 per seat
Offices	20 per employee
Picnic parks with toilets and showers Picnic parks with toilet waste only	10 per person 5 per person
Resort camps with limited plumbing	50 gallons per person
Restaurants: Kitchen waste (multi-use utensils) Kitchen waste (disposable utensils) And add the following for type of facility present: Conventional sit down Short Order Bar and Cocktail	 5 per meal served 3 per meal served 10 per person 8 per person
School (non-boarding With gym and showers add With cafeteria using disposable utensils	20 per student 5 per student 3 per meal served
Self service laundries	50 gallons per wash
Service station	10 gallons per vehicle served
Retail stores For public restrooms add	20 per employee 1 per 10 square feet
Swimming pools and bathhouses	10 per person
Tourist camps or mobile home parks with individual bath units Tourist camps or trailer parks with central bathhouse	100 per person 75 per person
Work or construction camps (semi-permanent)	50 per person
Wine tasting facility (no meals served)	3 per person
Employee	15 per employee

TABLE III-5
Trench Spacing

SLOPE	TRENCH SPACING (MINIMUM)
0-5%	5 feet
6-10%	8 feet
11-20%	12 feet
21-30%	16 feet

TABLE III-6
Sand Specifications

SAND FILL MEDIA SPECIFICATIONS FOR MOUNDS	
Sieve Size	Percent passing
#3/8	100%
#4	95-100%
#8	80-100%
#16	50-85%
#30	25-60%
#50	10-30%
#100	2-10%
#200	0-5%

TABLE III-7
Linear Loading Rates

Linear Loading Rates Based on Limiting Conditions			
Nature of Limiting Condition	**Linear Loading Rate Range (gpd/linear ft)**		
	Conservative Value		**Space-Limited Value**
Solid bedrock	3	to	4
Impermeable soil layer	3	to	4
Seasonal high water table	3	to	4
Semi-permeable soil layer	5	to	6
Fractured compacted till	5	to	6
Creviced or fractured bedrock	8	to	10
Sand and/or gravel layer	8	to	10

TABLE III-8

Slope correction factors

DOWN SLOPE AND UP SLOPE CORRECTION FACTORS		
Slope (%)	Down Slope Correction Factor	Up Slope Correction Factor
0	1.0	1.00
1	1.03	0.97
2	1.06	0.94
3	1.10	0.92
4	1.14	0.89
5	1.18	0.88
6	1.22	0.85
7	1.27	0.83
8	1.32	0.80
9	1.38	0.79
10	1.44	0.77
11	1.51	0.75
12	1.57	0.73
13	1.64	0.72
14	1.72	0.71
15	1.82	0.69
16	1.92	0.68
17	2.04	0.66
18	2.17	0.65
19	2.33	0.64
20	2.50	0.62
21	2.70	0.61
22	2.94	0.60
23	3.23	0.59
24	3.57	0.58
25	4.00	0.57

TABLE III-9

Cover requirements

DOWNHILL SOIL COVER REQUIREMENTS (TOE WIDTH)	
Slope	Cover (lineal feet beyond sand/gravel)
0-2%	4
2-4%	6
4-6%	8
6-8%	10
8-12%	12
12-16%	16
>16%	20

TABLE 10

	Sand Specifications for Intermittent Sand Filters	Sand Specifications for Recirculating Sand Filters
Sieve Size	Percent Passing	
#3/8	100	100
#4	95-100	70-100
#8	80-100	5-78
#16	45-85	0-4
#30	15-60	0-2
#50	3-10	0-1
#100	0-2	0-1
#200	0-1	0-1

Intermittent Sand Filters:
Effective size and uniformity:
D_{10} > 0.3-0.5 mm
Cu = 1-4

Recirculating Sand Filters:
Effective size and uniformity
D_{10} > 1.5-2.5 mm
Cu = 1-3

Note to Reader –

Part IV of this technical document will not be submitted to the Regional Water Quality Control Board for review and approval as a part of the Napa County LAMP.

Part IV will be included as a part of the technical document referenced in code to be approved by the Board of Supervisors should Napa County apply to be a certified third party under the General Waiver issued by the Regional Water Quality Control Board for regulatory control over winery process wastewater.

PART IV

DESIGN, CONSTRUCTION AND INSTALLATION WINERY WASTEWATER TREATMENT SYSTEMS

SECTION **PAGE**

6. SUBSURFACE DISPERSAL
   (A) SITE CONDITIONS FOR SUBSURFACE DISPERSAL
   (B) DESIGN PARAMETERS
   (C) EFFLUENT LIMITATIONS
   (D) MONITORING

7. SURFACE DRIP DISPERSAL
   (A) GENERAL DESCRIPTION
   (B) DISPERSAL METHOD
   (C) SOIL CRITERIA
   (D) DISPERSAL SYSTEM SIZING AND DISTRIBUTION PIPING
   (E) PUMP CONTROL SPECIFICATIONS
   (F) ABOVE GROUND PROCESS WASTEWATER (PW) STORAGE TANK SPECIFICATIONS AND OPERATIONS
   (G) RECLAIMED WATER USE RESTRICTIONS AND EFFLUENT LIMITATIONS
   (H) PROHIBITIONS
   (I) MONITORING REQUIREMENTS
   (J) RECLAIMED WATER USE RESTRICTIONS AND EFFLUENT LIMITATIONS
   (K) MONITORING

8. DISPERSAL SYSTEM SETBACK REQUIREMENTS FOR WINERY PROCESS WASTEWATER

9. PLAN SUBMITTAL REQUIREMENTS
   (A) PLANS AND SPECIFICATIONS

SECTION 1 GENERAL DESCRIPTION AND APPLICABILITY

Napa County has been regulating subsurface disposal of winery process wastewater by Regional Water Quality Control Board Waiver since August 1979 and surface disposal of winery process wastewater by Memorandum of Understanding (MOU) since November 1982. On June 19, 2012 the State Water Resources Control Board (SWRCB) adopted the *Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems (the OWTS Policy).* The Policy only authorizes subsurface disposal of domestic strength wastewater and establishes minimum requirements for the permitting, monitoring, and operation of OWTS. Due to the history of winery wastewater permitting in Napa County and the success and continual improvement of the program over time, the Regional Water Quality Control Board has [issued a [insert mechanism here, ie General Waiver] to Napa County to allowed continued permitting of winery process wastewater systems.

By this [waiver], Napa County will retain jurisdiction over surface and subsurface disposal of winery process wastewater. This arrangement will continue to eliminate duplication of effort and reduce the time required to obtain county building permits by waiving, reducing or eliminating much of the Regional Board's formal involvement, subject to certain conditions which assure the Board that its concerns regarding water quality effects of these discharges are being addressed by the County.

Winery process wastewater is defined as the waste that is a byproduct of operations that produce wine. Winery waste includes: pomace (e.g., grape skins, stems, and seeds), lees, bottle and barrel rinse water, and equipment/floor wash water. Winery waste does not include waste produced by agricultural operations associated with the growing of wine grapes. Winery process wastewater shall only be disposed of after required treatment to meet the minimum parameters set forth in this document.

Part III of Napa County OWTS technical standards is intended to regulate the following:

1. Winery wastewater supplemental treatment systems;
2. Winery wastewater pond systems with surface irrigation dispersal;
3. Winery wastewater subsurface dispersal systems; and
4. Winery wastewater surface drip dispersal systems.

The specific design requirements for each of these systems are outlined herein. If the proposal includes combined subsurface dispersal of both sanitary and winery process wastewater, the more restrictive of the design standards shall apply. Napa County does not regulate any type of surface dispersal of sanitary wastewater.

SECTION 2 ADMINISTRATIVE REQUIREMENTS

(A) REQUIREMENTS SUBJECT TO CHANGE

1. The technology for winery wastewater treatment is constantly evolving and changing. Technical data is gathered about existing Alternative Sewage Treatment Systems (ASTS) through the Department of Planning, Building and Environmental Services, specifically the Environmental Health Division via the ASTS Monitoring Program as well as through research studies by other agencies and organizations. Because of the evolving technology and information gathered through the monitoring program, the requirements for winery process wastewater pretreatment and dispersal may change.

(B) CURRENT REGULATIONS AND CONSTRUCTION PERMITS

1. Property owners, designers, and contractors are cautioned that requirements for ASTS's may change by legislative action, action of the Regional Water Quality Control Boards, or the Department. Therefore, despite previously performed and accepted work by the Department; any proposal for an ASTS must meet the regulations that are in effect at the time that the Department approves the septic system permit. Any plans approved without an installation permit issued, or where an installation permit has expired, are subject to Department review and shall comply with the ASTS regulations in place at the time the sewage permit is issued regardless of prior approval.

(C) EXISTING SYSTEMS

1. Existing wastewater ponds, subsurface dispersal and surface drip dispersal systems which were installed prior to adoption of these standards, shall be allowed to continue to operate as designed. Any increase in flow or design modifications to these systems after the adoption of these standards shall require the system to upgrade to meet these standards. Plans which are approved prior to adoption of these standards are subject to evaluation of compliance with these standards prior to issuance of a construction permit.

(D) MONITORING PROGRAM

1. All newly proposed and constructed winery process wastewater systems with supplemental treatment (whether dispersal is to a conventional system or not) are considered an ASTS and will be included in Napa County's monitoring program. Any ASTS that is modified is required to enter into the ASTS monitoring program. See: Part III, Section 13 of Napa County OWTS Technical Standards on ASTS Monitoring Program regulations. All new and existing winery wastewater ponds will also be in a monitoring program. All monitoring and reporting requirements are subject to change.

SECTION 3 GENERAL REQUIREMENTS

(A) DESIGNER QUALIFICATIONS

1. A California Registered Civil Engineer or a California Registered Environmental Health Specialist must prepare designs for winery wastewater ponds or ASTS's. Designers must file proof of current registration with the Department. The designer must be knowledgeable in onsite wastewater treatment systems; in particular the rules and regulations specified herein and must possess adequate drafting skills and adequate verifiable experience in the design and construction of wastewater ponds and/or ASTS's.

(B) DESIGN TECHNICAL DATA

1. Designs for wastewater ponds and ASTS's shall include such technical data as necessary to support and demonstrate that the system will function as designed, will not adversely affect surface and/or groundwater quality, and will not create a public health hazard.

(C) PROHIBITIONS

1. Winery process wastewater with surface disposal shall be discharged to an approved land mass via a surface drip system. Spray irrigation shall be prohibited unless explicitly approved after sufficient documentation has been submitted assuring the spray irrigation system will not result in any measurable drift of treated effluent outside the dispersal area.
2. Lees, bentonite and diatomaceous earth (DE) shall be excluded from treatment and disposal systems to the greatest extent practicable.

(D) SYSTEM INSTALLERS

1. Installers of ponds or ASTS's must have an active California Type A, C-42 or C-36 contractor's license and must have current verification of Workmen's Compensation Insurance on file with the Department if applicable. Property owners may apply for sewage dispersal system installation permits but may not install ASTS's unless they have an appropriate and current contractor's license as stated above. Installation permits will not be issued until a qualified licensed contractor is designated on the application.

(E) SUPPLEMENTAL APPLICATION REQUIRED

1. Prior to issuance of the sewage dispersal system installation permit, the owner of the property shall submit the Supplemental Application to Construct and operate a wastewater pond or ASTS and Record Request and Update Form to the Department.

(F) INSPECTION REQUESTS

1. All meetings and inspections shall be scheduled with the Department at least forty-eight (48) hours in advance and shall occur during normal business hours.

(G) DESIGNER RESPONSIBILITIES DURING CONSTRUCTION

1. The pond or ASTS designer and the Department must inspect the construction of the system during the stages of its installation for its conformance with the approved plans. Upon completion of the system, and prior to final, the designer shall
   a. submit a written certification verifying that the system has been constructed in conformance with the approved plans, including an As-Built drawing (only required if the installation varied from the approved plan) and certify that it is functioning properly; and
   b. provide the Department with a copy of the Operations and Maintenance manual for the pond or ASTS in electronic format.

(H) CROSS CONNECTION CONTROL

1. Any existing or new pond or ASTS system which mixes potable water sources for irrigation with treated reuse wastewater shall demonstrate and/or install components which will prohibit backflow or contamination of the potable water source satisfactory to the administrative authority.

SECTION 4 SUPPLEMENTAL TREATMENT AND SYSTEM SIZING

(A) SUPPLEMENTAL TREATMENT REQUIREMENTS

1. All winery wastewater systems are required to have supplemental treatment before surface or

subsurface dispersal. The level of treatment required is based on the type of dispersal system selected.

2. All supplemental treatment systems shall comply with the design and construction requirements as outlined in Napa County OWTS Technical Standards Part III, Section 9. Winery wastewater treatment systems which are not NSF40 certified may be used provided the manufacturer submits sufficient documentation demonstrating that the system can meet the standards herein.
3. All systems with pretreatment are required to have a service provider and an annual operating permit. Monitoring and reporting requirements shall be specific for each system, determined upon system design and outlined in the operating permit.
4. Additional treatment for pH adjustment, aeration, and/or flow equalization may be required.

(B) SYSTEM SIZING

1. Winery process wastewater flows shall be sized based on estimated peak daily flows and calculated using the formula below:

WINERY SIZE	FORMULA
Up to 20,000 gallons per year	$\frac{\text{annual production (gal) X 1.5}}{\text{30 day harvest period}}$
20,000 to 50,000 gallons per year	$\frac{\text{annual production (gal) X 1.5}}{\text{45 day harvest period}}$
50,000 and above	$\frac{\text{annual production (gal) X 1.5}}{\text{60 day harvest period}}$

2. Alternative sizing may be allowed with supporting documentation from past practice and/or monitoring data.

SECTION 5 POND SYSTEMS WITH SURFACE IRRIGATION

(A) DESIGN REQUIREMENTS

1. Designs for wastewater ponds shall include such technical data as necessary to support and demonstrate that the system will function as designed, will not adversely affect surface and/or groundwater quality, and will not create a public health hazard.
2. Designs shall be approved by the Mosquito Abatement District and meet the following requirements:
   a. Access to ponds for maintaining mosquito control, weed control, and aquatic midge control. All fenced ponds must have locked gates that will allow access to the levees for mosquito and maintenance vehicles. A key must be given to the Mosquito Abatement District.
   b. Ability to launch boat in ponds.
   c. [reserved]
3. An Operation and Maintenance Manual shall be included with the Design.

(B) SIZING

1. Holding Ponds are widely used for the storage of wastewater during the wet season with application to agricultural land during the dry season. Holding ponds are designed on the basis

of the anticipated waste flow during the period in which storage is necessary, plus the rainfall onto the ponds, minus any evaporation that occurs.

2. The 10-year wet seasonal rainfall should be the design basis for holding ponds. The ponds shall be designed with enough capacity to store the anticipated rainfall plus wastewater for the wet season. A good water balance analysis is paramount in pond design; without it treatment and containment reliability will be questionable. Two feet of freeboard shall be maintained at all times. For new or expansion of existing ponds the bottom of the pond(s) shall be lined with suitable clay soils, or compacted so that percolation of water into subsurface soils has a rate of not more 10^{-6} cm/sec or shall be lined with an equivalent synthetic liner. All ponds shall be protected from washout or erosion resulting from a 100-year return interval flood flow.

(C) TREATMENT AND OPERATION PARAMETERS

The treatment of winery wastewaters in ponds is typically conducted in two stages. The first stage or 'pretreatment' stage involves the physical and/or chemical treatment operations of solids removal, pH correction, and flow metering. The second stage is the destruction of waste organic matter by biological oxidative and reductive processes. The oxidative process may have to be supported with mechanical aerators.

1. Solids Removal. The primary objective in removing solids from the waste stream prior to treatment is to prevent the physical blockage or clogging of collection system piping and pumps by large objects or accumulations of smaller particles. In addition, many of the solids found in wine waste (e.g. grape skins, leaves, etc.) are biodegradable, and can represent a substantial additional organic load to the treatment system if not removed early in the process. Screening of winery effluent is the most effective method of removing these solids down to a particle size of about ½ millimeter.
2. pH Correction. Consideration should be given to the nature of winery process wastes-organic acids formed by yeast cells during the fermentation of grape juice reduce the pH of wine waste to the range of 3 to 5. These acidic conditions can inhibit or completely halt many of the biological reactions employed in the waste treatment process. For these reasons, a discussion and analysis on pH adjustment is required. pH shall be maintained between 6 and 9.
3. Flow Metering is required to measure all wastewater entering the pond and the total amount of wastewater reused of via irrigation.
4. Pond Loading and Aeration. The system design must be based on a design concept emphasizing simplicity, economy, effectiveness and fail-safe operation. The installation must be capable of efficiently treating the waste to the degree necessary for preventing odors and other nuisances, and to promote dispersal of treated waste through surface irrigation.
5. Odors occur when there is insufficient dissolved oxygen in the upper layers of the pond. Proper selection and placement of mechanical aerators will enhance pond performance and reliability. Floating aerators provide backup to supplement the pond's natural oxygen-generating capabilities during periods of peak loading (e.g. crush season). Standard engineering practice for sizing aerators requires that 1 to 2 pounds of aerator oxygen be available for each pound of BOD introduced to facultative ponds at the seasonal peak. Bubble diffusers alternatively may be approved for aeration and shall be sized similarly to floating aerators. Dissolved oxygen (DO) of 2.0 shall be maintained at all times.

(D) DISPERSAL/REUSE AREA

1. The designer shall document, by appropriate soils and engineering studies, that adequate area exists to disperse or reclaim all annual wastewater plus the 10-year wet season rainfall during the

seven month dry season. If the discharger provides adequate documentation, allowance may be made to disperse of some wastewater during the wet weather months. The designer shall include accurate site maps showing all irrigation areas with applicable setbacks as required. The surface irrigation portion of the system may be designed and installed by a landscape or vineyard professional. The landscape irrigation plans shall be submitted for review in conjunction with the surface drip dispersal system plans and construction of the landscape irrigation system (surface features only) shall be inspected by this Department prior to final approval being granted.

2. Designs for surface dispersal systems shall comply with the applicable requirements set forth in Section 7 below.

(E) FREEBOARD

1. Freeboard is the difference between the elevation of the top of the berm and wastewater level in the pond. A pond that is properly designed and operated will generally achieve maximum design freeboard immediately prior to the onset of the wet season (mid-November in this area).
2. Freeboard requirements, which specify that a minimum of 2 feet of freeboard be maintained at all times, are intended to insure that excess holding capacity is always available to protect against high-rainfall events of shorter than seasonal duration. Extra freeboard also protects against unanticipated short-term increases in wastewater flow, such as a process spill or broken water line and provides the potential to accommodate intentional but unanticipated increases in the routine wastewater flow.
3. Overflow pipes cannot be installed.
4. A visible method for measuring freeboard shall be provided. The measurement technique shall be easily readable from the pond berms and adequately maintained.

(F) PROTECTION FROM FLOODING

1. Ponds shall be protected from flooding by requiring that they be constructed outside of flood plains or at least that the elevation of the top of the berm be higher than the maximum high water predicted during a 100 year flood event. Provision for diversion and drainage of storm water runoff around the ponds must be included. Storm drainage provisions such as ditches and culverts must be designed on the basis of the maximum intensity expected for a rainfall event of relatively short duration.

(G) RECLAIMED WATER USE RESTRICTIONS AND EFFLUENT LIMITATIONS

1. No reclaimed water shall be applied to the dispersal area in anticipation of or during rainfall, 48 hours after a rainfall or when soils are saturated.
2. No reclaimed water used for irrigation shall be allowed to escape to areas outside the irrigation areas, either by surface flow or airborne spray, except for minor quantities associated with good irrigation practice.
3. Ponding shall not occur in the dispersal area in amounts which could cause a mosquito problem.
4. The following effluent limits shall be maintained prior to discharge to land, irrigation reservoir, or other irrigation storage facility and shall be taken within 1 foot of the surface of the pond(s) or after pretreatment prior to effluent reuse and dispersal:

BOD_5 (surface drip)	160 mg/L maximum
BOD_5 (overhead spray for frost protection)	50 mg/L maximum
TSS (surface drip)	80 mg/L maximum

Settleable Solids	1.0 mg/L maximum
Dissolved Oxygen	2.0 mg/L minimum
pH	6.0-9.0

(H) FENCING AND SIGN REQUIREMENTS FOR PONDS AND DISPERSAL FIELDS

1. All wastewater ponds shall have clearly legible warning signs posted at the access gate and around the perimeter at a minimum of 100 foot intervals. Such signs should read "Warning-Waste Water" or other wording to be approved by County in block lettering of at least 2 inches.
2. Existing ponds must maintain the fences they were required to have at the time of approval. If ponds containing only winery process wastewater were not required to have fences or don't present a clear hazard because of their location, fences will not be required. If a significant hazard is present (for example children and/or small animals) then a fence as described in #3 below should be strongly recommended.
3. New ponds containing only process wastewater will be required to install a minimum type fence of three strands of barbed wire spaced at 12 inches, 24 inches and 36 inches above the ground.
4. All fenced ponds must have locked gates that will allow access to the levees for mosquito abatement and maintenance vehicles.

(I) SURFACE IRRIGATION DISPERSAL - PIPING AND SIGN REQUIREMENTS

1. All treated winery wastewater dispersal irrigation control boxes shall be purple colored and labeled "reclaimed water" or similar.
2. Surface drip tubing shall be purple striped.
3. All surface dispersal areas shall be posted with signs to indicate the area is irrigated with reclaimed process wastewater. Signs may be posted at the entry to the property and as needed if irrigation occurs near areas of public access or around structures.
4. Existing irrigation components to be converted to use for treated winery wastewater may be allowed to color these components purple subject to approval of the administrative authority.

(J) CONSTRUCTION AND INSPECTION REQUIREMENTS

1. Prior to beginning construction and/or covering any elements of the system, and prior to final, the following minimum inspections are required:
   a. Pre-construction inspection where the following items shall be verified:
      (i) Imminent weather conditions are such that they will not create unsuitable soil conditions during construction;
      (ii) Construction staking or marking of all components of the system shall occur prior to commencement of construction so that configuration, location, and system details may be verified; and
      (iii) Review and approval of the source of the materials to be used.
   b. Interim Inspection(s):
      (i) Placement of pond liner;
      (ii) Plumbing to and within the pond system; and
      (iii) Plumbing connections at wastewater tanks.
   c. Final Inspection:
      (i) Function and setting of all control devices;
      (ii) Function and setting of any pretreatment systems, aerators, etc.
      (iii) All construction elements are in general conformance with the approved plans and specifications.

(iv) All monitoring wells (if required) are installed and erosion control has been completed.
(v) System controls are hardwired to permanent power and all floats, pumps and alarms tested.
(vi) Fencing and signs as required per approved plans.
(vii) An as-built or record drawing and final letter from the designer stating that the system has been installed and is operating in conformance with the design specifications must be submitted to the Department. The as-built must also include all areas that are to be irrigated with the treated process wastewater.
(viii) The Septic System Sump Pump Electrical System Installation Conformance Certification and Wastewater Tank Watertight Certification forms must be completed, signed, and returned to the Department.

(K) MONITORING AND REPORTING REQUIREMENTS

1. Weekly monitoring throughout the year shall be done for DO, pH, freeboard and odor.
2. Monthly monitoring throughout the year shall be done for BOD, total flow, winery related activities, pond and surface irrigation area condition and operation.
3. Volume (in gallons) of wine produced and volume of wine custom crushed shall be reported once the year's crush period has concluded.
4. All monitoring shall be reported quarterly using the online reporting system.
5. All monitoring is due no later than two weeks after the end of the quarter.

(L) SLUDGE LAND APPLICATION REQUIREMENTS

1. Prior to the removal of winery pond sludge, an application and site map shall be submitted to this Department for review and approval.
2. The sludge shall be spread on the same property as the winery ponds are located. The area for sludge disposal shall be agricultural in use.
3. The sludge shall be spread a minimum distance of 100 feet from any water wells, creeks, ditches, drainages, etc., and shall not create nuisance or ponding issues.
4. The sludge shall be incorporated in the soil within 7 days of spreading by disking, rototilling, or other approved method.
5. The sludge shall be spread and incorporated during the dry season.

SECTION 6 SUBSURFACE DISPERSAL

(A) SITE CONDITIONS FOR SUBSURFACE DISPERSAL

1. A site evaluation must be performed prior to design of the system, see Part I. All winery process wastewater ASTS's must have a minimum of three (3) feet of acceptable soil above a limiting condition. Up to one (1) foot of the required three (3) feet of soil is satisfied because of the requirement for an approved pretreatment device. In all cases, a minimum of two (2) feet of suitable permeable soil shall be available. Suitable permeable soil shows no signs of presence of previous high groundwater levels, has less than fifty (50) percent rock content by volume, and is not fractured rock, bedrock, hardpan, or clay pan.

(B) DESIGN PARAMETERS

1. Refer to Napa County OWTS Technical Document Part II for conventional system designs and Part III, for design and construction information related to ASTS.
2. All winery wastewater systems proposing conventional subsurface disposal must provide

pretreatment. Soil application rates will be based on the Conventional System Sizing Table II-2.

(C) EFFLUENT LIMITATIONS

1. The following effluent limits shall be maintained prior to any subsurface dispersal (except drip, see below) accomplished by pretreatment (pH adjustment may be required prior to discharge):

BOD_5	300 mg/L maximum
TSS	300 mg/L maximum

2. The following effluent limits shall be maintained prior to subsurface drip dispersal with pretreatment:

BOD_5 (subsurface drip)	30 mg/L maximum
TSS (subsurface drip)	30 mg/L maximum

(D) MONITORING

1. Any winery wastewater subsurface dispersal system shall follow the monitoring and reporting requirements listed in Napa County OWTS Technical Standards Part III.

SECTION 7 SURFACE DRIP DISPERSAL

(A) GENERAL DESCRIPTION

A typical drip surface dispersal system installation includes collection and processing tanks, pretreatment system, treated wastewater storage tanks or dosing chamber, pump(s), control panel, timed dosing and flow monitoring, and surface irrigation area(s).

These above ground systems allow wastewater dispersal on sites with shallow or slowly permeable soil over impermeable soil, fractured rock or bedrock, rapidly draining soils or sites with high groundwater on slopes up to and exceeding thirty (30) percent. Surface drip dispersal systems also allow for the beneficial reuse of process wastewater and shall be used to irrigate landscaping or vineyard whenever possible.

(B) DISPERSAL METHOD

1. Winery process wastewater shall be discharged to an approved landmass via a surface drip system. Spray irrigation shall be prohibited unless explicitly approved by the Director after sufficient documentation has been submitted assuring the spray irrigation system will not result in any measurable drift of treated effluent outside the dispersal area.

(C) SOIL CRITERIA

1. Wastewater shall be distributed evenly on a vegetated plot. Soils and vegetation shall be adequate to accept the wastewater applied. Land mass loading, including vegetation uptake shall be included in all designs. The area to be applied with wastewater shall have such land features to prevent runoff or ponding of effluent in concave areas, and shall not adversely impact erosion.

(D) DISPERSAL SYSTEM SIZING AND DISTRIBUTION PIPING

1. Surface drip systems are site specific and therefore, require distinctive designs. Dispersal area calculations shall take into account the type of vegetation, slope of the land the effluent will be dispersed onto and the amount of effluent the specific types of vegetation can reasonably accept. This evaluation must include seasonal transpiration rates throughout the entire year. The designer shall document, by appropriate soils, nutrient uptake, and engineering studies, etc., that adequate area exists to dispose or reclaim all annual wastewater. If the discharger provides adequate documentation, allowance may be made to dispose of some wastewater during the wet weather months.
2. All surface drip dispersal system materials must be warranted by the manufacturer for use with wastewater and be resistant to plugging from solids and bacterial slime. All materials shall meet applicable ASTM standards and be resistant to common household chemicals. The drip tubing must be color coded, by the manufacturer, to be easily identified as tubing designed for wastewater dispersal.
3. All transport piping; supply and return manifolds and fittings must be Schedule 40 PVC or greater.
4. Fittings used to join drip line to the distribution manifolds must be in accordance with manufacturer's recommendations. Both compression and barb fittings may be specified, depending on the manufacturer recommendations and system operating pressure.
5. The length of each distribution line shall not exceed manufacturer's specifications to insure equal distribution to each emitter.
6. Vacuum breakers/air release valves shall be installed as per manufacturer's specification.
7. A surface drip dispersal system shall contain, if necessary, pressure compensating devices or regulators to ensure equal distribution from all emitters at +/- ten (10) percent of the designed discharge rate.
8. The surface irrigation portion of the system may be designed and installed by a landscape or vineyard professional. The landscape irrigation plans shall be submitted for review in conjunction with the surface drip dispersal system plans and construction of the landscape irrigation system (surface features only) shall be inspected by this Department prior to Final.

(E) PUMP CONTROL SPECIFICATIONS

1. All surface drip dispersal systems shall utilize a weather based monitoring system to efficiently irrigate vegetation. Time dosed systems shall only be used during the dry season.
2. Detailed site maps showing irrigation areas and corresponding irrigation zones shall be maintained and available at all times within or near the control panel.

(F) ABOVE GROUND PROCESS WASTEWATER (PW) STORAGE TANK SPECIFICATIONS AND OPERATIONS

1. Above ground PW storage tanks shall be constructed in accordance with manufacturer recommendation and permitted by the Building Division when required and may only be used to store process wastewater after it has undergone sufficient treatment
2. Above ground PW storage tanks shall provide sufficient capacity to store treated process wastewater during periods of rainfall throughout the winter months and shall be sized per the design engineer accordingly.
3. Above ground PW storage tanks shall have an outlet for pumping should it be required when discharge is not allowed due to rainfall, components of the surface irrigation system are under repair, etc.

4. Above ground PW storage tanks shall be provided with a visual level indicator.
5. When other potable water sources are pumped into an above ground PW storage tank an air gap shall be installed which can be visually observed from the outside of the tank.
6. Above ground PW storage tanks shall be labeled as "Recycled Water Storage Tank" in minimum 2" high lettering.
7. Above ground PW storage tanks shall meet minimum setback distances as listed in Section 8 below (Dispersal System Setback Requirements for Winery Process Wastewater).
8. Dissolved oxygen (DO) shall be maintained in tanks to prevent odors.

(G) RECLAIMED WATER USE RESTRICTIONS AND EFFLUENT LIMITATIONS

1. No reclaimed water shall be applied to the dispersal area in anticipation of or during rainfall, 48 hours after a rainfall or when soils are saturated.
2. No reclaimed water used for irrigation shall be allowed to escape to areas outside the irrigation areas, either by surface flow or airborne spray, except for minor quantities associated with good irrigation practice.
3. Ponding shall not occur in the dispersal area in amounts which could cause a mosquito problem.
4. The following effluent limits shall be maintained prior to discharge to land:

BOD_5 (surface drip)	160 mg/L maximum
BOD_5 (overhead spray)	50 mg/L maximum
TSS (surface drip)	80 mg/L maximum
Settleable Solids	1.0 mg/L maximum
Dissolved Oxygen	2.0 mg/L minimum
pH	6.0-9.0

(H) PROHIBITIONS

1. Any discharge that results is a pollution, contamination, or nuisance
2. Discharge of any waste to land that is not under the control of the discharger.
3. The discharge of untreated or partially treated winery waste from anywhere within the collection, treatment, or dispersal facility is prohibited.
4. The discharge of wastewater, other than winery wastewater, into a surface drip winery wastewater system is prohibited.
5. The use of treated winery process wastewater shall be restricted to designated vineyards, pastures, or landscape irrigation areas under control of the discharger.
6. Treated winery wastewater shall not be applied to the irrigation areas within two days of a forecasted rain event, during rainfall, 48 hours after a rainfall event or when soils are saturated.
7. Bypass or overflow of treated or untreated winery wastewater is prohibited.
8. The direct or indirect discharge of any waste to surface waters or surface water drainage courses is prohibited.
9. The discharge of waste classified as "hazardous" or "designated", as defined in CCR, Title 23, Chapter 15, Section 2521 (a) to any part of the wastewater dispersal system is prohibited.

(I) MONITORING REQUIREMENTS

1. Weekly monitoring throughout the year shall be done to ensure all components of the surface drip treatment and dispersal system are properly functioning. A log shall be kept onsite with records available to this Department during inspection.
2. Monthly monitoring throughout the year shall be done for BOD, TSS, total flow and winery

related activities including volume (in gallons) of wine produced and volume of wine custom crushed.

3. All systems shall require a Service Provider approved by this Division. The pretreatment system manufacturer may provide service for their own system.
4. All monitoring shall be reported quarterly using the online reporting system.
5. All monitoring is due no later than two weeks after the end of the quarter.

SECTION 8 DISPERSAL SYSTEM SETBACK REQUIREMENTS FOR WINERY PROCESS WASTEWATER

(A) Setbacks listed in Napa County Ordinance, Title 13, shall apply unless otherwise listed here.

(B) The following setback table shall apply only to water storage and surface effluent dispersal of pre-treated winery process wastewater which meets minimum treatment levels of 30 mg/L BOD and 30 mg/L TSS.

Setback Feature	Above Ground PW Storage Tank	Dispersal Field
Structures	None	None
Subsurface drainage (minimum 2 foot depth below grade)	None	None
Wells (constructed under permit and verified by well log)	50 feet	25 feet
Wells (without permit or well log)	100 feet*	100 feet*
Cut or fill banks, cuts, or steep slopes	10 feet	10 feet
Creeks-blue line or other unlined reservoirs	50 feet	50 feet
Above grade or upslope reservoirs	25 feet	10 feet
Other creeks/ditches/storm water conveyance	25 feet	10 feet

*****Administrative authority may reduce setback to minimum of 50 feet subject to review of well construction, condition, and location.

SECTION 9 PLAN SUBMITTAL REQUIREMENTS

(A) PLANS AND SPECIFICATIONS

1. Three copies of design plans and design calculations are required for approval.
2. Plans must be drawn to an appropriate scale to show sufficient detail. The preferred scale is one (1) inch = twenty (20) feet when possible.
3. The design plan shall include:
   a. Lot dimensions with North point.
   b. Vicinity map, owner's name with site address and assessor's parcel number.
   c. Accurate topographic contours shall be shown in the area of the sewage treatment system, primary dispersal field and reserve area.
   d. Location of existing, proposed or abandoned wells, springs, lakes, ponds, marsh areas, streams, and drainage ditches or channels within two hundred (200) feet of any portion of the sewage

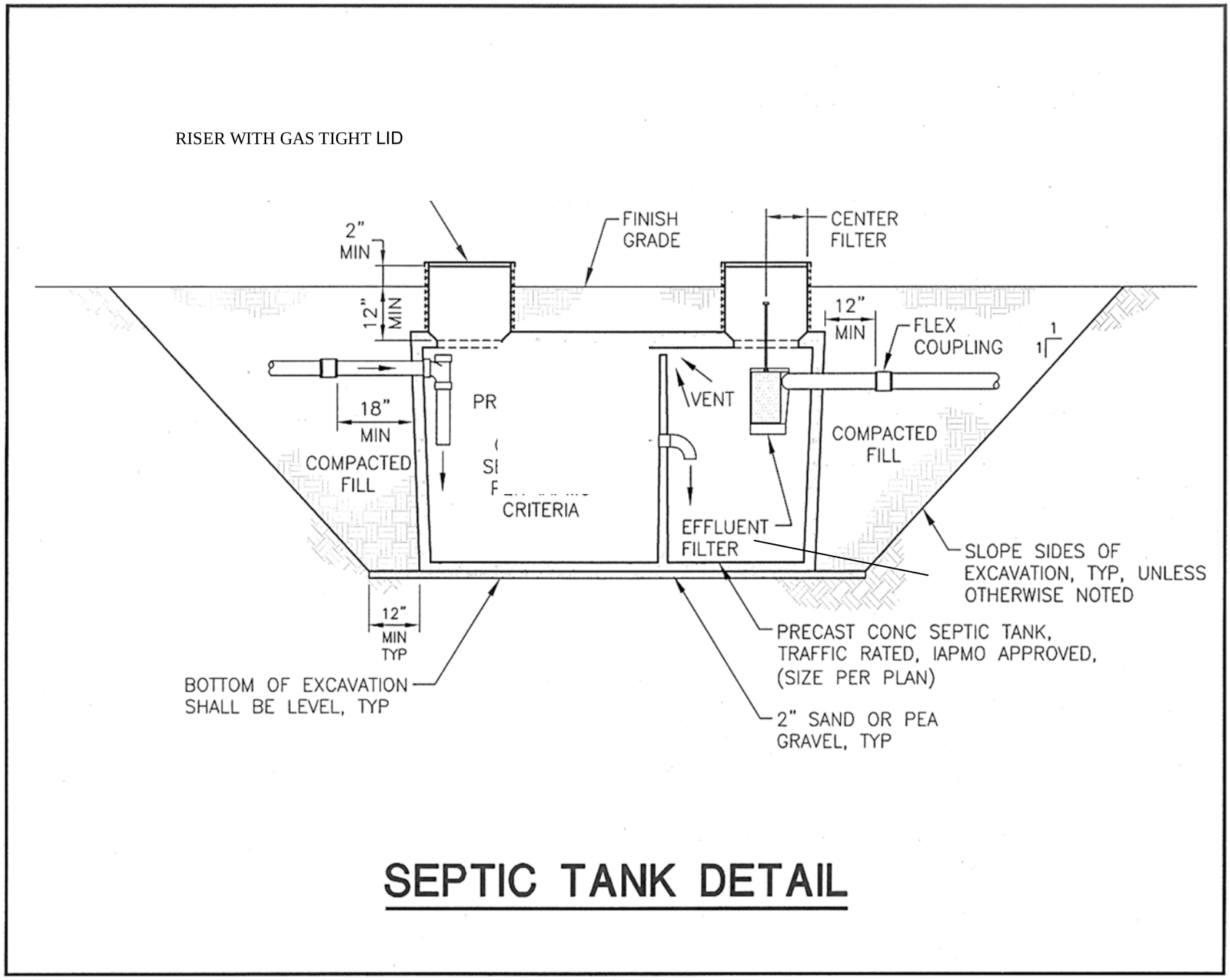
treatment and dispersal field and reserve area.

e. Location of existing and/or proposed structures, driveways, swimming pools, patios, retaining walls, paved areas, large trees, and cut banks.
f. Location of existing sewage dispersal systems and existing and/or proposed easements, water lines, and underground utilities.
g. Location of all site evaluation profile holes and soil sample locations.
h. Designer's inspection schedule shall be clearly specified on the plans.
i. Designated replacement area with potential system design identified. Design criteria and drawings may be required. The replacement area shall be sized according to these standards based on the site and soil conditions in the replacement area location. Replacement areas shall remain fully protected and unencumbered to prevent damage to soils and any adverse impact on immediate surroundings that may affect the installation of the replacement system or its function.

FIGURES

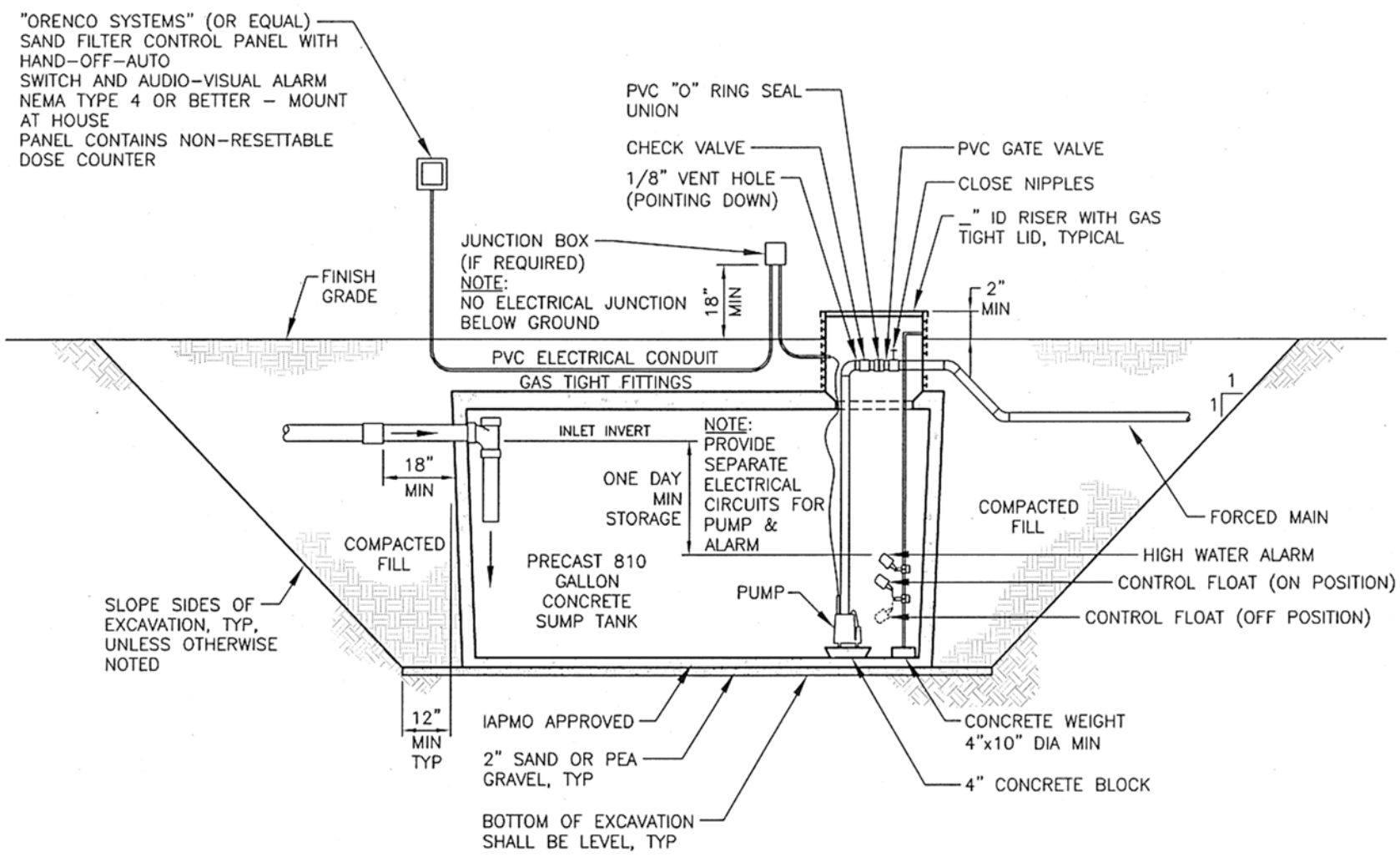
(These figures are included for reference only. Refer to manufacturer's specifications for details if available. Alternate designs may be included in plan submittals and will be reviewed for compliance with the technical standards.)

FIGURE 1



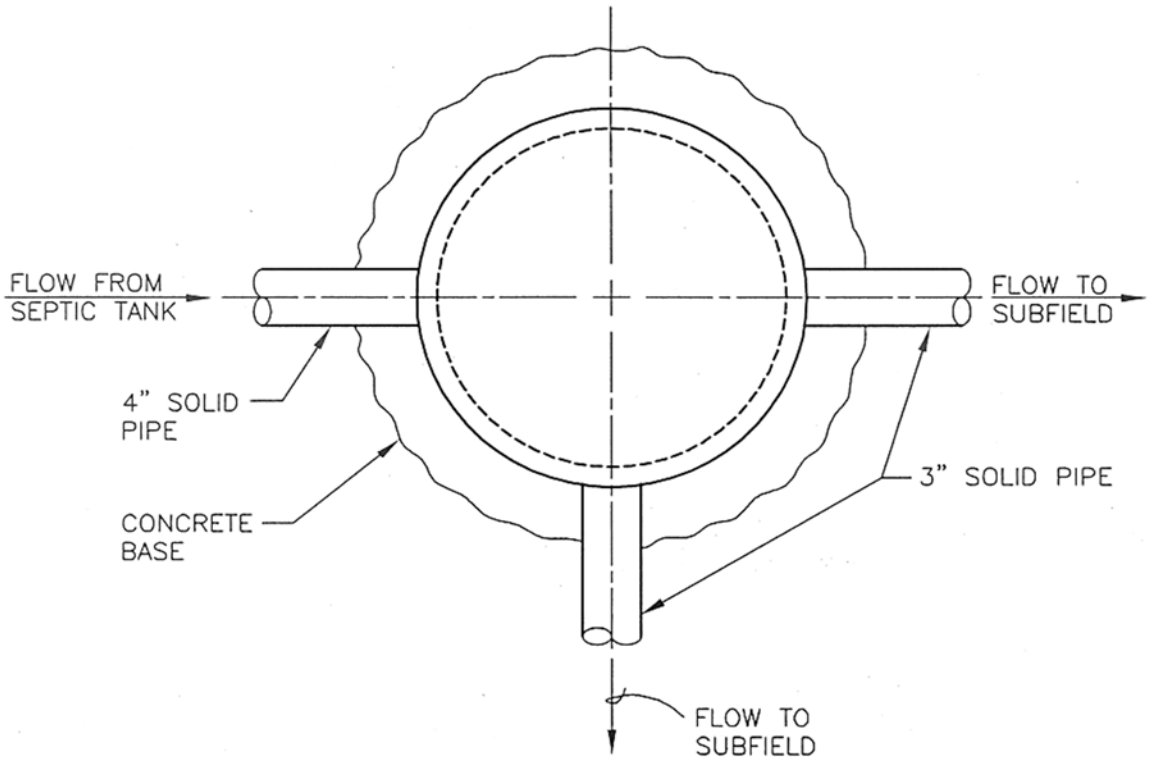
SEPTIC TANK DETAIL

FIGURE 2

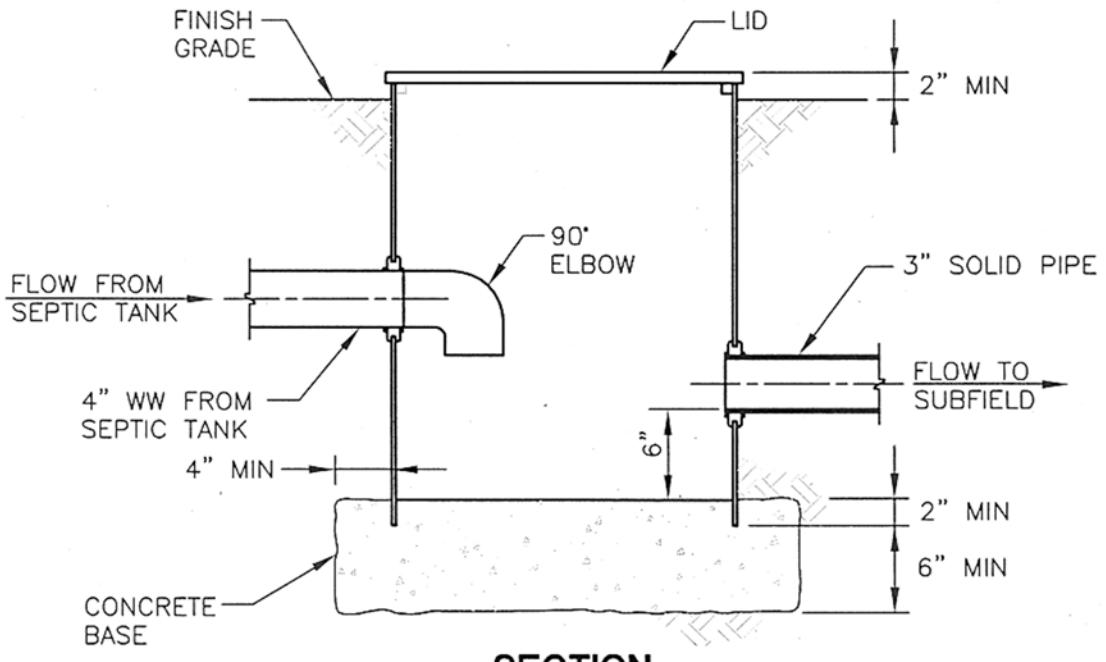


DOSING TANK DETAIL

FIGURE 3



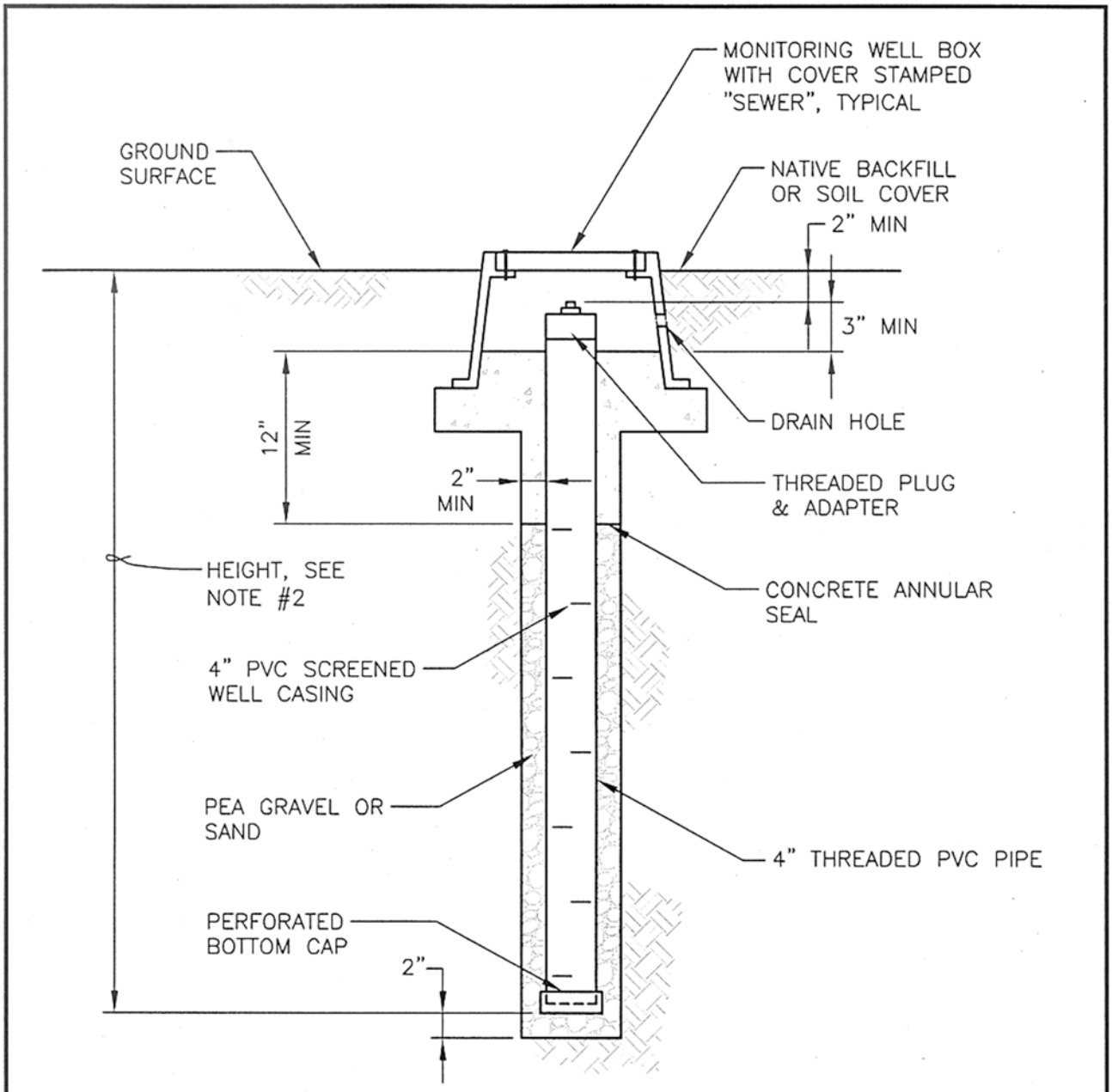
PLAN



SECTION

DISTRBUTION BOX DETAIL

FIGURE 4A

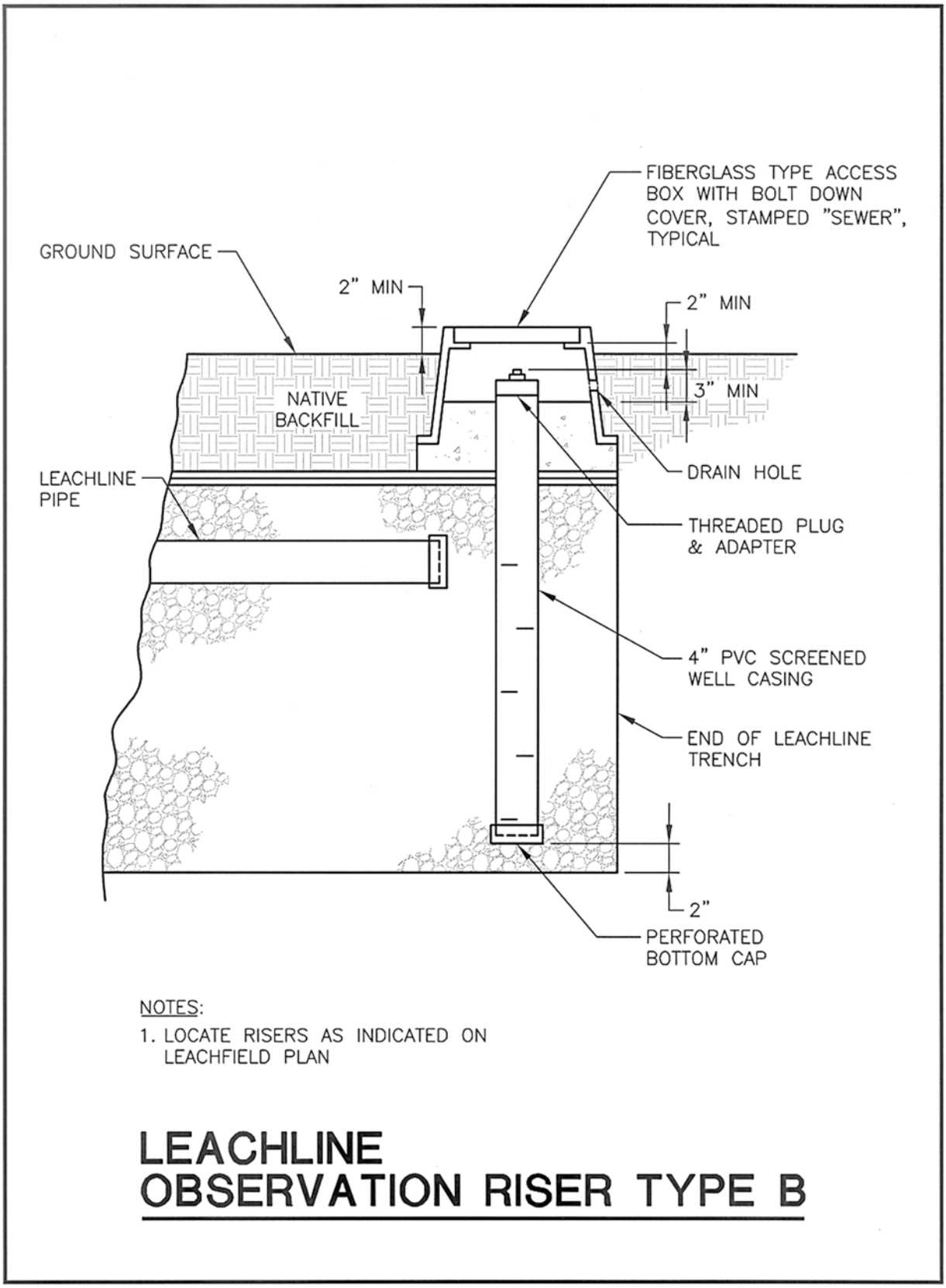


NOTES:

1. LOCATE MONITORING WELL AS INDICATED ON LEACHFIELD PLAN
2. MONITORING WELL DEPTH
3. DRILL OR HAND AUGER MONITORING WELLS

MONITORING WELL

FIGURE 4B

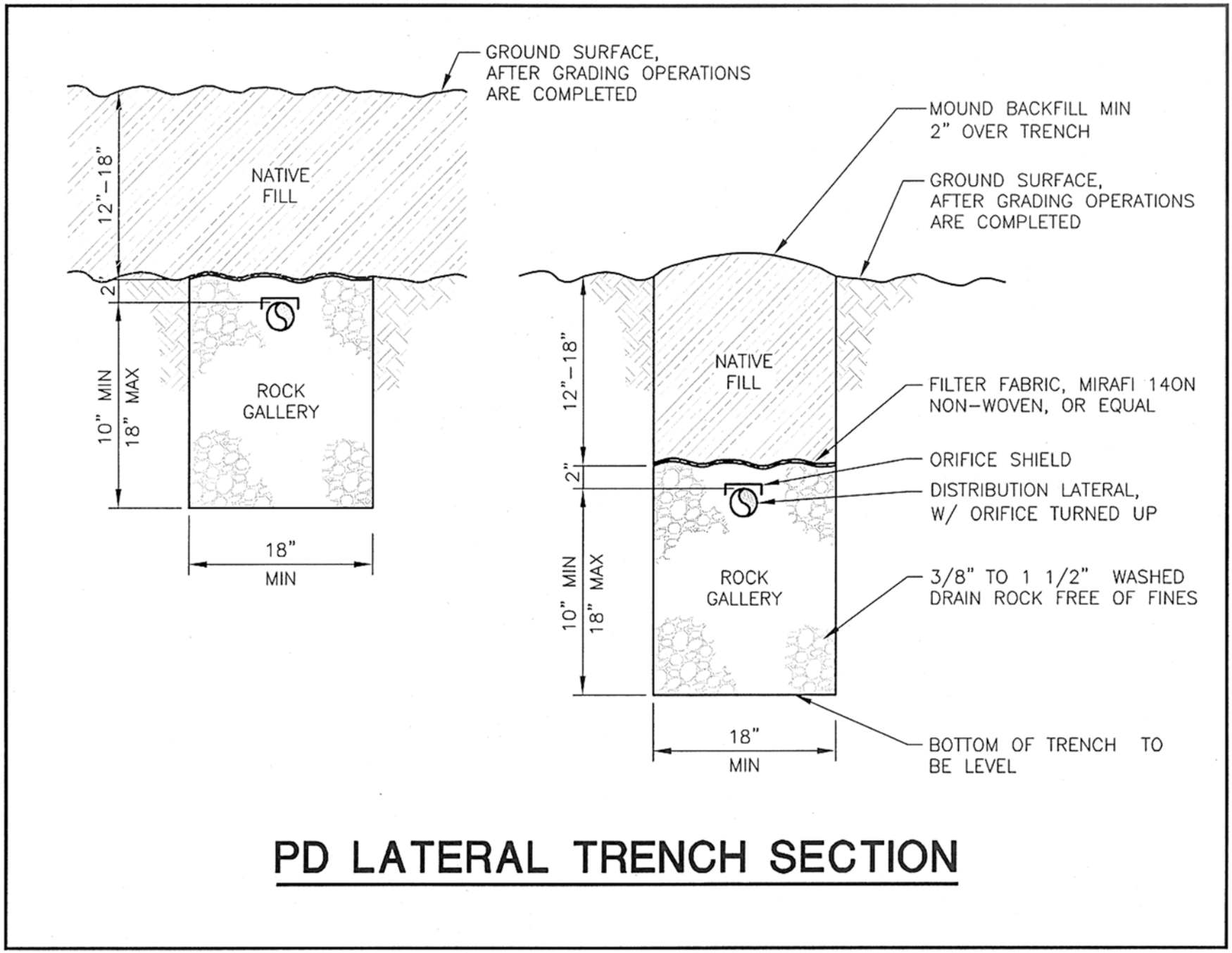


NOTES:

1. LOCATE RISERS AS INDICATED ON LEACHFIELD PLAN

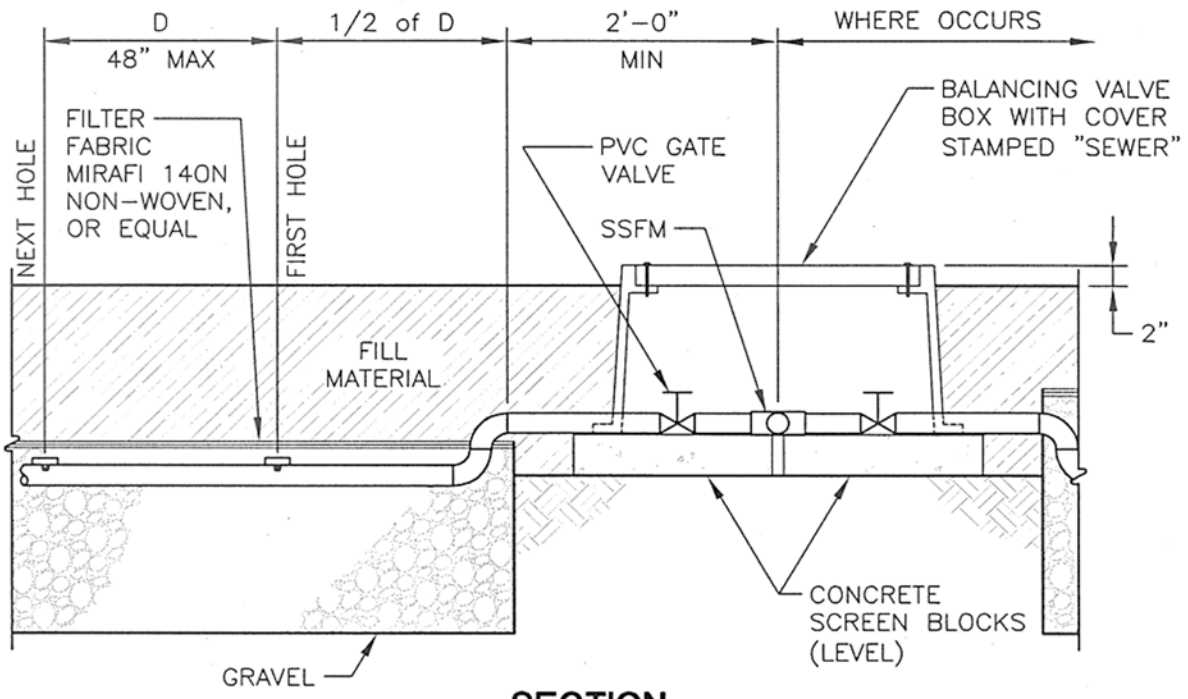
LEACHLINE OBSERVATION RISER TYPE B

FIGURE 5

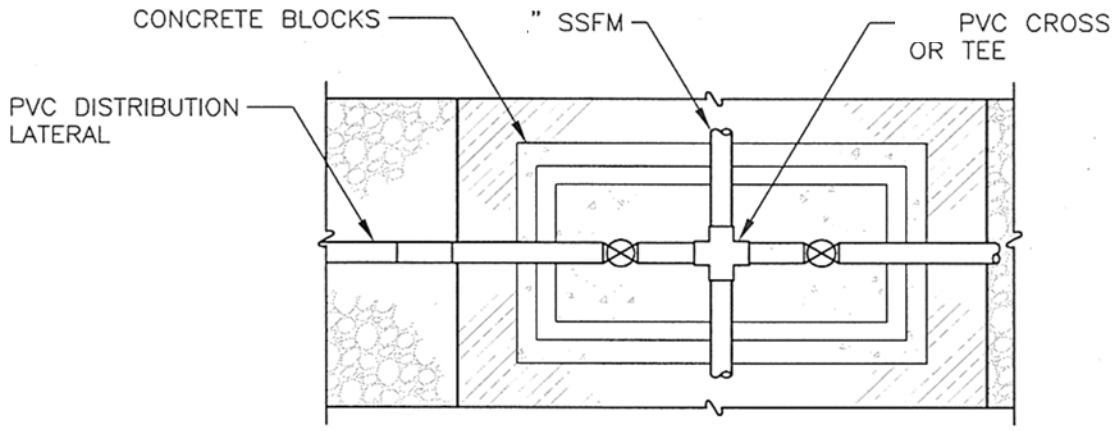


PD LATERAL TRENCH SECTION

FIGURE 6



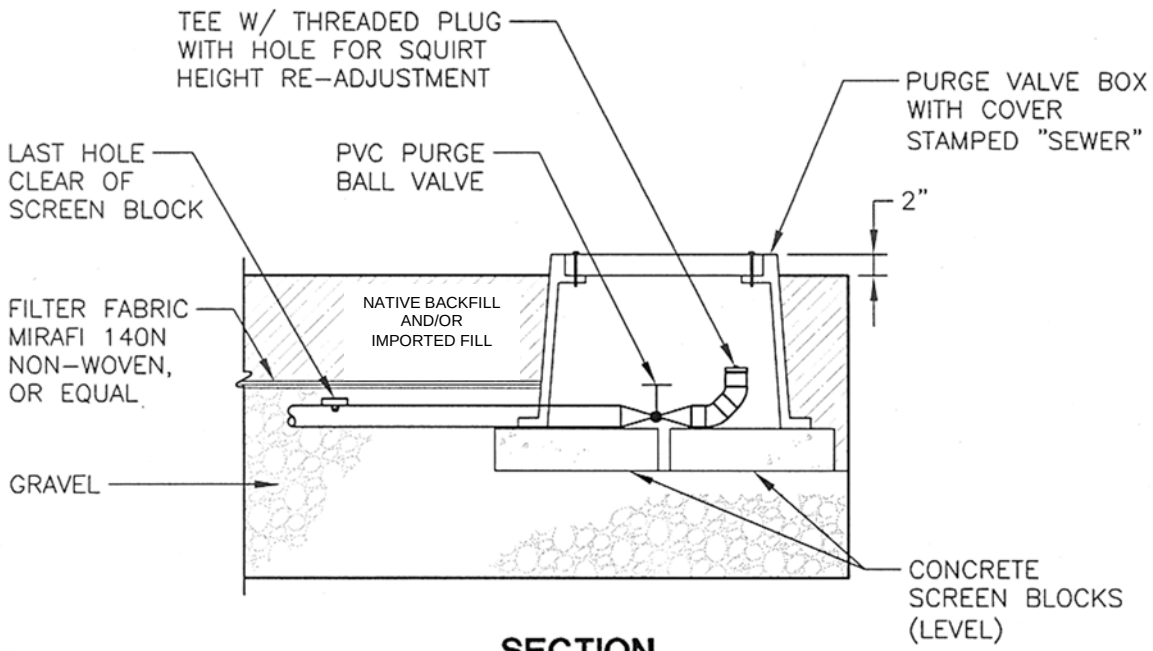
SECTION



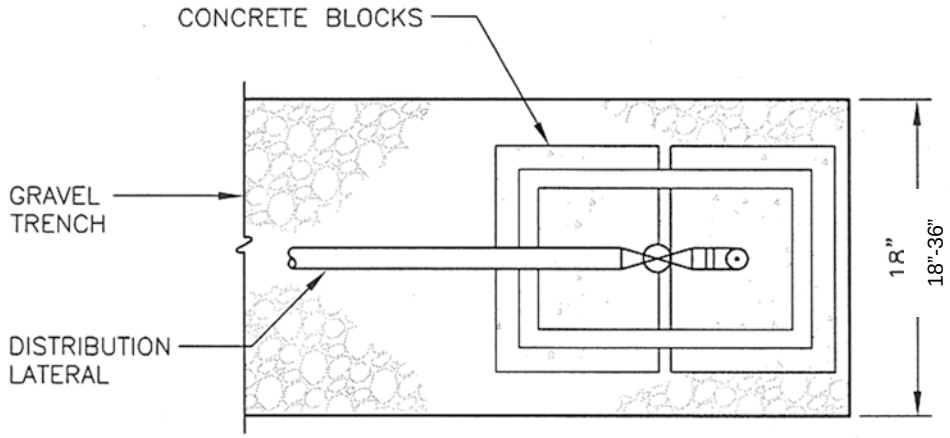
PLAN

BALANCING VALVE

FIGURE 7



SECTION



PLAN

PURGE VALVE

FIGURE 8A

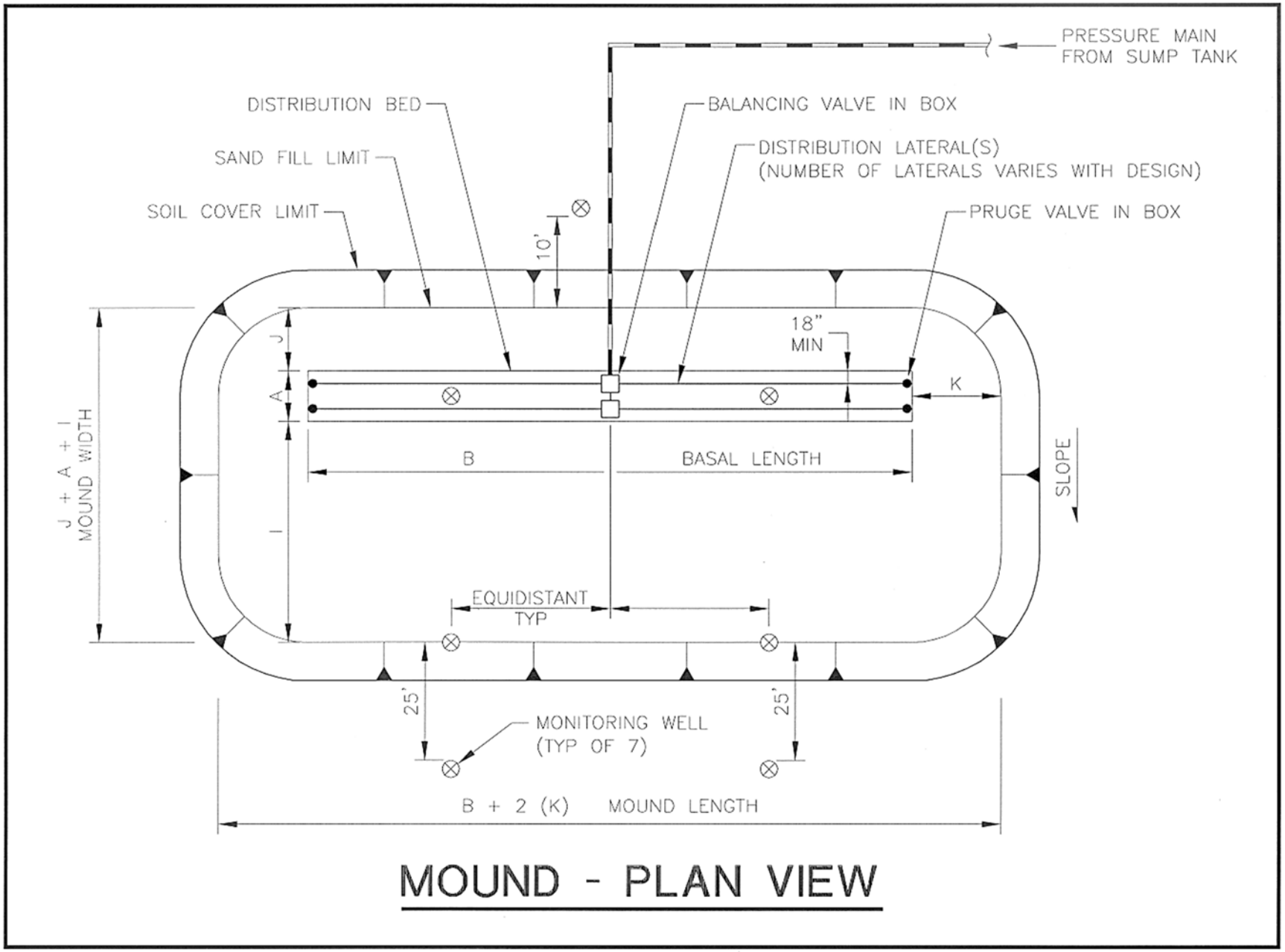
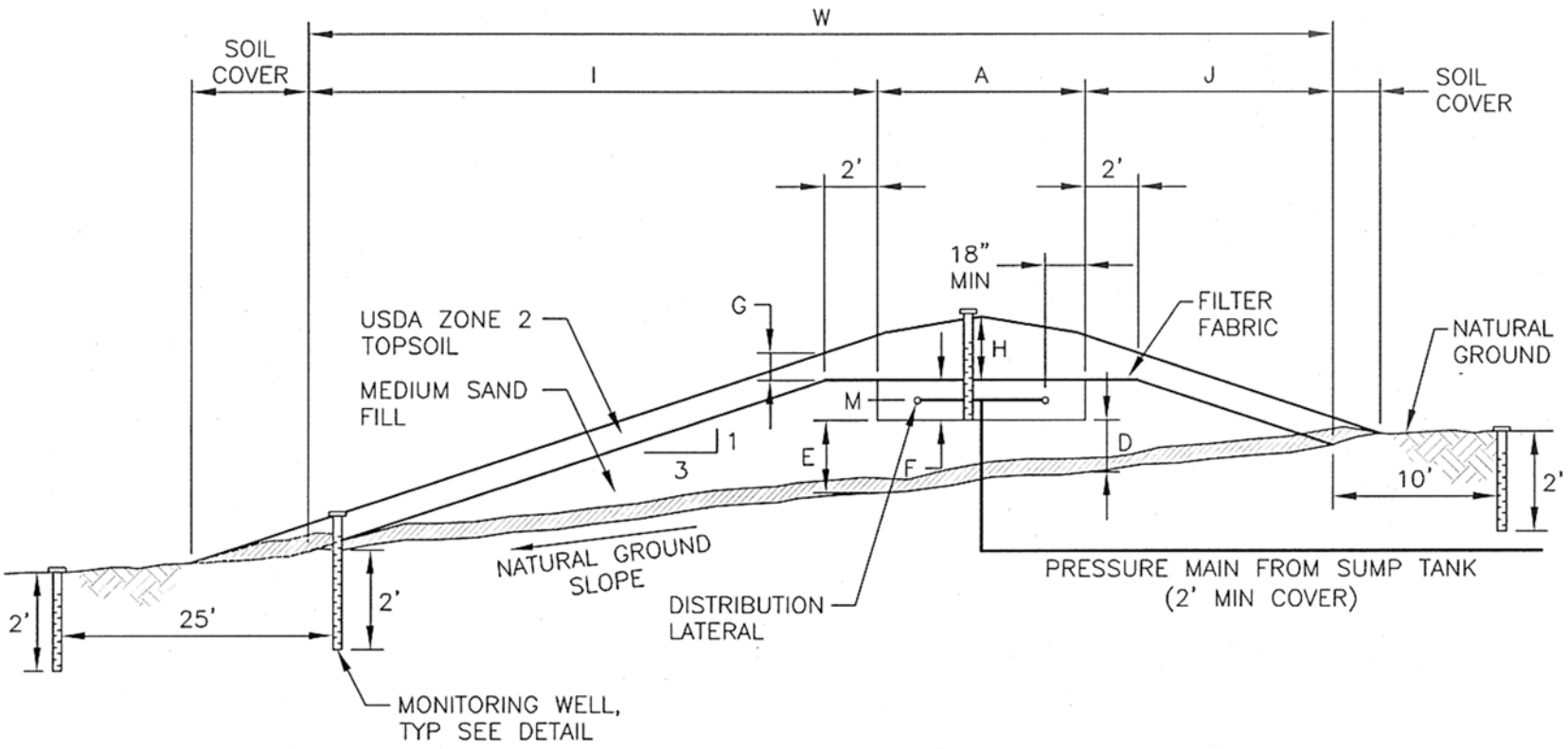

PRESSURE MAIN
FROM SUMP TANK
DISTRIBUTION BED
BALANCING VALVE IN BOX
SAND FILL LIMIT
DISTRIBUTION LATERAL(S)
(NUMBER OF LATERALS VARIES WITH DESIGN)
SOIL COVER LIMIT
PRUGE VALVE IN BOX
10'
18"
MIN
J
A
K
J + A + I
MOUND WIDTH
B
BASAL LENGTH
SLOPE
I
EQUIDISTANT
TYP
25'
25'
MONITORING WELL
(TYP OF 7)
B + 2 (K) MOUND LENGTH
MOUND - PLAN VIEW

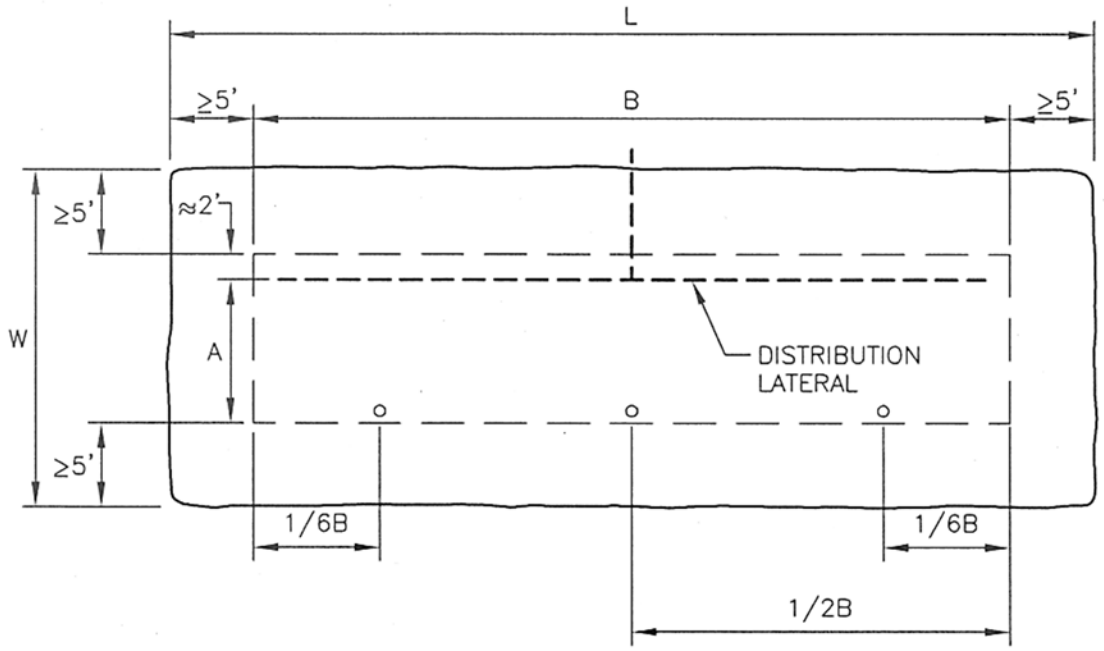
FIGURE 8B



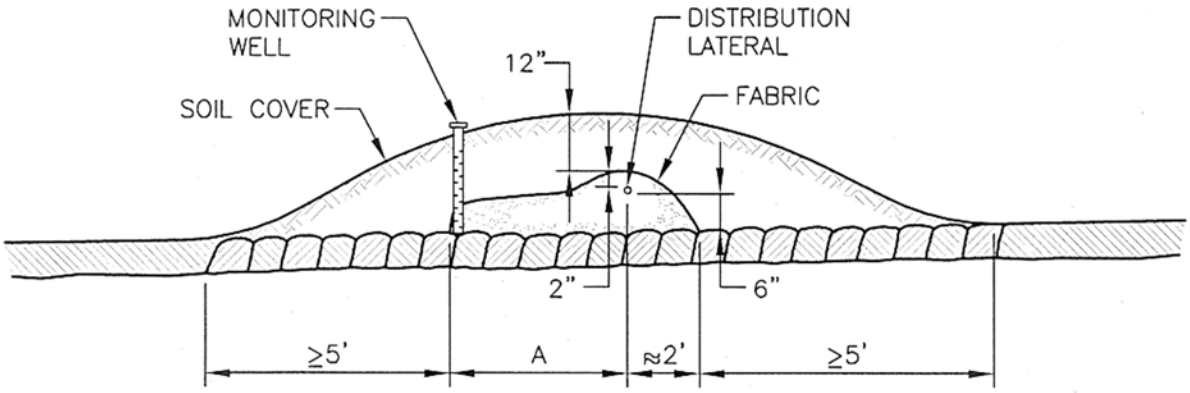
CROSS SECTION

MOUND DETAIL

FIGURE 9



PLAN



SECTION

WISCONSIN AT-GRADE UNIT