Water Reclamation and Reuse Standards

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INTRODUCTION

These standards have been developed under the authorization and specific requirements delineated with RCW 90.46 (Reclaimed Water). The type of uses, treatment and legal definition within the standards were developed in association with the Reuse Advisory Committee established under RCW 90.46.

Users of this document are advised that reclaimed water suitable for reuse requires significant treatment and disinfection that is generally over and above conventional waste treatment facilities. Disinfection practices for Class A , B, C, and D reclaimed water are measured in total coliform, rather than fecal coliform traditionally used to measure wastewater disinfection effectiveness. Sampling is to be performed daily and Class A and B require less than 2.2 total coliforms per 100 milliliters based on a 7 day average.

These standards require that reclaimed water must be reliably generated. Emergency storage or alternate permitted discharge locations must be provided for reclamation facilities for use during upset conditions.. The standards also require automated alarms, redundancy of treatment units and stringent operator training and certification to meet the reliability criteria.

The standards describe allowable beneficial uses, the required level of reclaimed water treatment appropriate for each beneficial use, and any specific statutory requirements from RCW 90.46. Some treatment and beneficial uses are regulated uniquely to reclaimed water projects. The key to these uses is that it specifies “Reclaimed Water” must be generated prior to the allowance for a specific beneficial use. All reclaimed water generation and use must be covered under a reclaimed water permit that is issued jointly between Ecology and Health.

DEFINITIONS

"AKART" means all known, available, and reasonable methods of prevention, control, and treatment.

"Alarm" means an instrument or device which continuously monitors a specific function of a treatment process and automatically gives warning of an unsafe or undesirable condition by means of visual and audible signals.

"Approved Laboratory Methods" means those specified in 40 CFR Part 136 or in the latest edition of Standard Methods for the Examination of Water and Wastewater, prepared and published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, and which are conducted in laboratories approved or accredited by the Washington Department of Ecology.

"Beneficial Use" means the use of reclaimed water, which has been transported from the point of production to the point of use without an intervening discharge to waters of the State, for a beneficial purpose.

"Biological Treatment" means methods of wastewater treatment in which bacterial or biochemical action is intensified as a means of producing an oxidized wastewater.

"Beneficial Uses for Wetlands" (Section 2) means wetland functions and values, which are the physical, chemical, and biological processes that occur in a wetland, and the benefits and services to society and the environment that these provide. Beneficial uses commonly associated with natural and constructed wetlands include:

(a) Storm/flood water storage and retention;
(b) Hydrologic functions of low flow augmentation, ground water discharge and recharge, and surface water flow;
(c) Filtration, storage, and transformation of sediment, nutrients, and toxics;
(d) Shoreline protection from erosion;
(e) Habitat for aquatic organisms;
(f) Habitat for wildlife; and
(g) Recreational, cultural, educational, scientific, and natural aesthetic values and uses.

"Beneficial Uses Direct Recharge" (Section 3) means uses of waters of the state which include but are not limited to use for domestic, stock watering, industrial, commercial, agricultural, irrigation, mining, fish and wildlife maintenance and enhancement, recreation, generation of electric power and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state.

"Biochemical Oxygen Demand (BOD_5)" means the quantity of oxygen utilized in the biochemical oxidation of organic matter present in water or wastewater, reported as a five-day value established as determined using approved methods.

"Category I Wetland" means wetlands that provide a documented significant life support function for threatened or endangered species, represent a high quality example of a rare wetland type, are rare within a given region, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.

"Category II Wetland" means wetlands that provide habitat for very sensitive or important wildlife or plants that are difficult to replace, or provide very high functional quality, particularly for wildlife habitat.

"Category III Wetland" means wetlands that provide important functions and values, but are smaller, less diverse, and/or more isolated in the landscape than Category II wetlands.

"Category IV Wetland" means wetlands that are small, isolated, and lack vegetation diversity, and may be able to be enhanced, restored, or replaced.

"Class A Reclaimed Water" means reclaimed water that, at a minimum, is at all times an oxidized, coagulated, filtered, disinfected wastewater. The wastewater shall be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample.

"Class B Reclaimed Water" means reclaimed water that, at a minimum, is at all times an oxidized, disinfected wastewater. The wastewater shall be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 2.2 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of total coliform organisms does not exceed 23 per 100 milliliters in any sample.

"Class C Reclaimed Water" means reclaimed water that, at a minimum, is at all times an oxidized, disinfected wastewater. The wastewater shall be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 23 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed, and the number of total coliform organisms does not exceed 240 per 100 milliliters in any sample.

"Class D Reclaimed Water" means reclaimed water that, at a minimum, is at all times an oxidized, disinfected wastewater. The wastewater shall be considered adequately disinfected if the median number of total coliform organisms in the wastewater after disinfection does not exceed 240 per 100 milliliters, as determined from the bacteriological results of the last 7 days for which analyses have been completed.

"Coagulated Wastewater" means an oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated prior to filtration by the addition of chemicals or by an equally effective method.

"Constructed Treatment Wetland" means those wetlands intentionally constructed on nonwetland sites and managed for the primary purpose of wastewater treatment or stormwater treatment. Constructed treatment wetlands are considered part of the collection and treatment system and may receive reclaimed water in accordance with the provisions of RCW 90.46 and Section 1 and 2 of these standards as applicable. Constructed Treatment Wetlands not considered "waters of the state".

"Constructed Beneficial Use Wetlands" means those wetlands intentionally constructed on nonwetland sites to produce or replace natural wetland functions and values. Constructed beneficial use wetlands are considered "waters of the state".

"Contaminant" means any chemical, physical, biological, or radiological substance that does not occur naturally or occurs at unnaturally high concentrations in ground or surface water.

"CT Value" means the product of the disinfectant contact time (T) in minutes and the concentration of the disinfectant residual (C) in mg/L measured at the end of the contact time. The product of these two parameters (CT) provides a measure of the degree of inactivation of specific organisms.

"Department" means Washington State Department of Ecology and/or Health.

"Direct Recharge" means the controlled subsurface addition of water directly to the ground water basin that results in the replenishment of ground water. Direct recharge of reclaimed water is typically accomplished via injection wells but may be accomplished by other methods that directly recharge into the groundwater saturated zone by a subsurface means.

"Direct Recharge Facilities" means any equipment, facility, or building at a site approved for direct recharge and permitted by the Washington Departments of Ecology and Health.

"Discharge Area" means an area in which there are upward components of flow in underlying ground water and ground water flows and exits to the surface as springs, seeps, or baseflow to streams and rivers.

"Disinfected Wastewater" means wastewater in which pathogenic organisms have been destroyed by chemical, physical or biological means.

"Filtered Wastewater" means an oxidized, coagulated wastewater which has been passed through natural undisturbed soils or filter media, such as sand or anthracite, so that the turbidity as determined by an approved laboratory method does not exceed an average operating turbidity of 2 nephelometric turbidity units (NTU), determined monthly, and does not exceed 5 NTU at any time.

"Food Crops" mean any crops intended for human consumption.

"Greywater" means wastewater having the consistency and strength of residential domestic type wastewater. Greywater includes wastewater from sinks showers and laundry fixtures, but does not include toilet or urinal wastes.

"Ground Water" means water in a saturated zone or stratum beneath the surface of land or below a surface water body.

"Groundwater Recharge Criteria" means the contaminant criteria found in the drinking water quality standards adopted by the state board of health pursuant to chapter 43.20 RCW and the department of health pursuant to chapter 70.119A RCW.

"Ground Water Quality Criteria" means numerical values or narrative standards that represent the maximum allowable contaminant concentrations in the ground water listed or described in WAC 173-200.

"Hydrologic Regime" means the depth and duration of inundation or soil saturation in a wetland.

"Landscape Impoundment" means a body of reclaimed water which is used for aesthetic enjoyment or which otherwise serves a function not intended to include public contact. Examples may include but are not limited to: golf course water ponds/hazards, landscape ponds and vegetative landscape ponds, e.g. "lilly ponds."

"Land Treatment System" means a wastewater treatment system that is designed, constructed and operated to treat wastewater through the use of crops, irrigation methods, and soil. A State Waste Discharge permit specifies ground and surface water monitoring to assure conformance to specific water quality limits and

has an agency approved site control plan. Land Treatment Systems are not regulated as reclaimed water projects.

"Long-Term Storage or Disposal" means storing or disposing of untreated or partially treated wastewater for at least 20 days.

"Multiple Point Chlorination" means the application of chlorine simultaneously at the reclamation plant and subsequent chlorination stations located at the use area and/or some intermediate point. It does not include chlorine application for odor control purposes.

"Natural Wetlands" means those wetlands that occur due to natural causes other than construction by human activities. Natural wetlands are typically classified as "waters of the State."

"Nonpotable Ground Water" means ground water that is not used or intended to be used as, or is unsuitable for, a source of water supply for domestic purposes and has not been classified as an underground source of drinking water by the department.

"Multiple Units" means two or more units of a treatment process which operate in parallel and serve the same function.

"Nonrestricted Recreational Impoundment" means a body of reclaimed water in which no limitations are imposed on body-contact water sport activities. Examples may include but are not limited to: recreational lakes, public water features (ponds) and fish ponds.

"Oxidized Wastewater" means wastewater in which organic matter has been stabilized such that the biochemical oxygen demand (BOD) does not exceed 30 mg/L and the total suspended solids (TSS) do not exceed 30 mg/L, is nonputrescible, and contains dissolved oxygen.

"Peak Hourly Flow" means the average flow rate during the highest one-hour period of the day.
"Planed Groundwater Recharge Project" means any reclaimed water project designed for the purpose of recharging groundwater, via direct recharge or surface percolation.

"Potable Ground Water" means ground water that is used or intended to be used as, or is suitable for, a source of water supply for domestic purposes and has been classified as an underground source of drinking water by the department.

"Permittee" means any person to which a reclaimed water permit is issued for operation of a reclamation plant.

"Person" means any state, individual, public or private corporation, political subdivision, governmental subdivision, governmental agency, municipality, copartnership, association, firm, trust estate, or any other legal entity whatever.

"Power Source" means a source of supplying energy to operate unit processes or other individual pieces of equipment.

"Recharge Area" means an area in which there are downward components of flow in underlying ground water and infiltration moves downward into the deeper parts of the ground water.

"Reclaimed Water" means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for a beneficial use or a controlled use that would not otherwise occur and is no longer considered wastewater.

"Reclamation Plant" means an arrangement of devices, structures, equipment, processes, and controls which produce reclaimed water suitable for the intended reuse.

"Reverse Osmosis" means a treatment process which relies upon a semipermeable membrane to separate water from its impurities. An external force is used to reverse the normal osmotic flow, resulting in movement of water from a solution of higher solute concentration to one of lower concentration.

"Restricted Recreational Impoundment" means a body of reclaimed water in which recreation is limited to fishing, boating, and other non-body-contact water recreation activities.

"Reliability" means the ability of a treatment system or component(s) thereof to perform a required function under stated conditions for a stated period of time.

"Reliability Assessment" means a formal determination and review of the reliability of reclaimed water system components and equipment. The assessment should review and detail: operating standards, maintainability, critical operating conditions, spare parts requirements and availability, and any other issues that affect the reliability or the treatment performance of the reclamation facility.

"Reuse" means the use of reclaimed water, in compliance with Washington Departments of Health and Ecology regulations and these standards, for a direct beneficial use.

"Saturated Zone" means the zone below the water table in which all interstices are filled with water.

"Secondary Sedimentation" means the removal by gravity of settleable solids remaining in the effluent after the biological treatment process.

"Sewage" means water-carried human wastes from residences, buildings, industrial and commercial establishments, or other places, together with such ground water infiltration, surface waters, or industrial wastewater as may be present.

"Short-Term Storage or Disposal" means storing or disposing of untreated or partially treated wastewater for at least a 24-hour period.

"Spray Irrigation" means application of reclaimed water to land by spraying it from sprinklers or orifices in piping.

"Standby Chlorinator" means a duplicate chlorinator for reclamation plants having one chlorinator and a duplicate of the largest unit for plants having multiple chlorinator units.

"Standby Power Source" means an automatically actuated self-starting alternate energy source maintained in immediately operable condition and of sufficient capacity to provide service during failure of the normal power supply.

"Standby Replacement Equipment" means reserve parts and equipment which can be placed in operation within a 24-hour period to replace broken-down or worn-out units.

"Standby Unit Process" means an alternate unit process or an equivalent alternative process which is maintained in operable condition and which is capable of providing comparable treatment for the entire design flow of the unit for which it is a substitute.

"Streamflow Augmentation" means the discharge of reclaimed water to rivers and streams of the state or other surface water bodies, but not wetlands.

"Surface Irrigation" means application of reclaimed water to land by means other than spraying and includes drip irrigation, where reclaimed water is applied from drippers or emitters.

"Surface Percolation" means the controlled application of water to the ground surface for the purpose of replenishing ground water.

"Total Organic Carbon (TOC)" means the oxidizable organic carbon present in reclaimed water as determined by an approved laboratory method.

"Total Suspended Solids (TSS)" means solids that either float on the surface of, or are suspended in, water or wastewater; the quantity of material removed from a sample in a laboratory test referred to as filterable residue, as determined using approved laboratory methods.

"Underground Source of Drinking Water (USDW)" means ground waters which contain less than 10,000 mg/L of total dissolved solids or which are obtainable for beneficial uses.

"Unit Process" means an individual stage in the wastewater treatment sequence which performs a major single treatment operation.

"Use Area" means any facility, building, or area approved for reuse and permitted by the Washington Departments of Health and Ecology.

"Wastewater Treatment Facility" means a facility that receives water and waste discharges from homes, businesses and industry through a sewer system. A wastewater treatment facility is not considered a reclamation plant.

"Wetland or Wetlands, RCW 90.46 definition" means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation and typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands regulated under RCW 90.46 shall be delineated in accordance with the manual adopted by the Department of Ecology pursuant to RCW 90.58.380.

"Wetland or Wetlands, Shoreline Management Act and Growth Management Act definition" means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation and typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including but not limited to irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990 that were unintentionally created as a result of the construction of a road, street or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate the conversion of wetlands. (1995 definition)

"Wetland Enhancement" means actions taken to intentionally improve the wetland functions, processes and values of existing but degraded wetlands where all three defining criteria are currently met (i.e., hydrology, vegetation and soils).

"Wetland Restoration" means actions taken to re-establish a wetland area, including its functions and values that were eliminated by past actions, in an area that no longer meets the definition of a wetland.

SECTION 1 - GENERAL REQUIREMENTS

State of Washington Water Reclamation and Reuse Standards

Article 1. Irrigation

Section 1. ***Nonfood Crops***

(a) Reclaimed water used for the irrigation of trees or fodder, fiber, and seed crops shall be at all times Class D reclaimed water or better.

(b) Reclaimed water used for the irrigation of sod, ornamental plants for commercial use, or pasture to which milking cows or goats have access shall be at all times Class C reclaimed water or better.

Section 2. ***Land Treatment Systems***

The use of wastewater effluent (not reclaimed water) through land treatment systems to irrigate non-food crops is not subject to the requirements within these standards for reclaimed water. Such use of wastewater effluent, either existing or proposed, must be authorized by an existing or proposed state waste discharge permit (WAC 173-216), and must be on land owned or under the direct long term control of the permittee.

Requirements and design criteria for land treatment systems are covered under WAC 173-240 (Ecology) and "Design Criteria for Land Treatment Systems for Public Health Protection" (Health, February 1994) and WAC 246-271(Health).

Section 3. ***Food Crops***

(a) Except as authorized by Health and Ecology under Section 3 1(e), reclaimed water used for spray irrigation of food crops shall be at all times Class A reclaimed water or better.

(b) Except as noted in Section 3 (c), (d), and (e), reclaimed water used for surface irrigation of food crops, where there is no contact between the reclaimed water and edible portion of the crop, shall be at all times Class B reclaimed water or better.

(c) Except as noted in , Section 3 (e), reclaimed water used for surface irrigation of root crops shall be at all times Class A reclaimed water or better.

(d) Reclaimed water used for surface irrigation of orchards and vineyards shall be at all times Class D reclaimed water or better. No orchard or vineyard fruit may be harvested that has come in contact with the irrigating water or the ground.

(e) As authorized by Health and Ecology, food crops that undergo physical or chemical processing sufficient to destroy all pathogenic agents prior to distribution or sale may be spray or surface irrigated with Class D reclaimed water or better.

Section 4. Landscape Irrigation

(a) Reclaimed water used for the irrigation of restricted access areas (e.g., freeway landscapes, or other areas where the public has similar access or exposure to the reclaimed water) shall be at all times Class C reclaimed water or better.

(b) Reclaimed water used for the irrigation of open access areas (e.g., golf courses, parks, playgrounds, schoolyards, residential landscapes, or other areas where the public has similar access or exposure to the reclaimed water) shall be at all times Class A reclaimed water or better.

Article 2. Impoundments

Section 1. Landscape Impoundments

Reclaimed water used as a source of supply for a landscape impoundment shall be at all times Class C reclaimed water or better.

Section 2. Restricted Recreational Impoundments

Reclaimed water used as a source of supply for a restricted recreational impoundment shall be at all times Class B reclaimed water or better.

Section 3. Nonrestricted Recreational Impoundments

(a) Reclaimed water used as a source of supply for a nonrestricted recreational impoundment shall be at all times Class A reclaimed water or better.

(b) Reclaimed water shall not be used as a source of supply for swimming pools **unless specifically authorized by Health and Ecology under a reclaimed water permit.**

(c) Nutrient removal to reduce levels of phosphorus and/or nitrogen is recommended for reclaimed water used as a source of supply for recreational impoundments to minimize algal growths and maintain acceptable aesthetic conditions.

Section 4. Constructed Beneficial Use and Constructed Treatment Wetlands

(a) Reclaimed water discharged to constructed beneficial use wetlands and constructed treatment wetlands shall be at all times Class A or B reclaimed water or better.

(b) Wetlands created to replace natural habitat are intended to mitigate the conversion or loss of natural wetlands and are regulated as such. If acceptable to the appropriate review agencies and done according to an approved wetland mitigation plan, Class A reclaimed water may be used as a water supply for mitigation wetlands. Otherwise, the discharge of reclaimed water to mitigation wetlands is not authorized under these standards.

(c) All constructed beneficial use wetland projects and constructed treatment wetlands that are designed to receive reclaimed water (Section 4 (a)) must be incorporated within a locally adopted and State approved sewer or water comprehensive plan. Note: These planning documents may also be referred to as general sewer plans

(WAC 173-240-050), facilities plans (40 CFR 35.2030), or water system plans and project reports (WAC 246-290).

(d) Reclaimed water that does not meet Class A or B reclaimed water standards may be discharged into constructed treatment wetlands provided:

(1) A lesser standard has been specifically authorized by Health and Ecology; and

(2) The project includes a comprehensive monitoring plan to evaluate the effectiveness of the project and the degree of water quality improvement provided.

Proponents of wetland projects that include discharges of reclaimed water are advised to contact Health and Ecology for specific reclaimed water permit requirements. If the wetland has an outlet that potentially flows into waters of the state, Federal Clean Water Act requirements apply to the discharge. Streamflow augmentation and groundwater recharge criteria in accordance with RCW 90.46 may also apply to a reclaimed water created wetland project.

Article 3. Groundwater Recharge by Surface Percolation

Section 1. Applicability

Reclaimed water may be beneficially used for surface percolation provided the reclaimed water meets the groundwater recharge criteria as measured in the groundwater beneath or down gradient of the recharge project site. Reclaimed water used for groundwater recharge shall be at all times of a quality that fully protects public health and the water quality of waters of the state. Reclaimed water that does not meet the groundwater recharge criteria may be beneficially used for surface percolation where the Departments of Health and Ecology has specifically authorized such a use at a lower standard.

Section 2. Treatment Requirements

Until final ground water recharge standards are developed by Health and Ecology, the following criteria shall be used for surface percolation of reclaimed water as allowed under RCW 90.46:

(1) The minimum pre-treatment for ground water recharge shall be Class A reclaimed water to ensure significant pathogen reduction unless a lesser level is allowed under pilot project status from Health and Ecology.

(2) The secondary treatment process to provide oxidized wastewater shall include an additional step to reduce nitrogen prior to the final discharge to ground water.

Section 3. Other Requirements

(1) The generator of the reclaimed water shall either have an Ecology delegated industrial wastewater pre-treatment program or all industries discharging into the generators wastewater collection system shall have current waste discharge permits issued by Ecology.

(2) The recharge project shall meet all other requirements outlined within these standards including but not limited to:

(i) reliability.

(ii) emergency storage for upset conditions.

(iii) any additional water quality monitoring for chemical constituents.

(iv) the use of CT values in the disinfection process for sensitive and vulnerable aquifers.

(3) The comprehensive water and/or sewer plan as required under RCW 90.46 shall be prepared in accordance with WAC 173-240 (Ecology) and WAC 246-271 and WAC 246-290 (Health) and include a complete description of the proposed recharge project. The project description shall discuss the estimated beneficial uses, the expected users, and the intended water rights status (artificially stored per WAC 173-136, or abandoned and available for appropriation to others) of all of the reclaimed water to be stored in the recharged groundwater. The comprehensive plan shall be prepared in addition to the engineering report required within these standards.

Section 4. Evaluation

The Washington Departments of Health and Ecology project evaluation will be based on all relevant aspects of each project, including the following: treatment and treatment reliability provided; reclaimed water quality and quantity; use or potential use of the groundwater; operation and management of the recharge facilities; soil characteristics; hydrogeology; residence time of the reclaimed water in the underground prior to withdrawal; and distance from the recharge area to nearest point of withdrawal.

Article 4. Commercial and Industrial Uses

The following commercial and industrial uses of reclaimed water and requirements are included in these standards for example purposes and are not intended to limit consideration of other possible uses. Other reclaimed water uses not listed under this article shall be evaluated as prescribed in Article 5.

Section 1. Fish Hatchery Basins

Reclaimed water used as a source of supply for basins at fish hatcheries shall be at all times Class B reclaimed water or better.

Section 2. Decorative Fountains

Reclaimed water used as a source of supply for decorative fountains shall be at all times Class A reclaimed water or better.

Section 3. Flushing of Sanitary Sewers

Reclaimed water used to flush sanitary sewers shall be at all times Class D reclaimed water or better.

Section 4. ***Street Cleaning***

(a) Reclaimed water used for dampening brushes and street surfaces during street sweeping shall be at all times Class C reclaimed water or better.

(b) Reclaimed water used for spray washing of streets shall be at all times Class A reclaimed water or better.

Section 5. ***Washing of Yards, Lots, and Sidewalks on Corporation Grounds***

Reclaimed water used for washing yards, lots, and sidewalks on corporation grounds under the control of responsible maintenance personnel shall be at all times Class B reclaimed water or better.

Section 6. ***Dust Control***

Reclaimed water used for dampening unpaved roads and other surfaces for dust control shall be at all times Class C reclaimed water or better.

Section 7. ***Dampening of Soil for Compaction***

Reclaimed water used for dampening soil for compaction at construction sites, landfills, and elsewhere shall be at all times Class C reclaimed water or better.

Section 8. ***Water Jetting for Consolidation of Backfill around Pipelines***

Reclaimed water used for water jetting for consolidation of backfill material around pipelines for reclaimed water, sewage, storm drainage, and gas, and conduits for electricity shall be at all times Class C reclaimed water or better. Reclaimed water shall not be used for water jetting for consolidation of backfill material around pipelines for potable water.

Section 9. ***Fire Fighting***

Reclaimed water used for fire fighting by dumping from aircraft shall be at all times Class C reclaimed water or better.

Section 10. ***Fire Protection***

(a) Reclaimed water used for fire protection in hydrants or in sprinkler systems located in commercial or industrial facilities or buildings, hotels, or motels shall be at all times Class A reclaimed water or better.

(b) Reclaimed water may be used for fire protection in sprinkler systems located in apartment buildings and condominiums where the residents do not have access to the plumbing system for repairs or modifications.

Section 11. ***Toilet and Urinal Flushing***

(a) Reclaimed water used to flush toilets and urinals in commercial or industrial facilities or buildings, hotels, and motels shall be at all times Class A reclaimed water or better.

(b) Reclaimed water used to flush toilets in apartment buildings and condominiums where the residents do not have access to the plumbing system for repairs or modifications shall be at all times Class A reclaimed water or better.

(c) Reclaimed water shall not be used to flush toilets in any residential property or dwelling unit where the residents have access to the plumbing system for repairs or modifications.

(d) When authorized by a local greywater program, greywater may be used to flush toilets and urinals, including within residential property or dwelling units, but only where the residents do not have access to the plumbing system for repairs or modifications. The treatment for the greywater shall be oxidized, coagulated, filtered and disinfected, and be consistent at all times with Class A reclaimed water or better.

Section 12. Ship Ballast

Reclaimed water used for ship ballast water shall be at all times Class C reclaimed water or better.

Section 13. Washing Aggregate and Making Concrete

Reclaimed water used for washing aggregate and making concrete shall be at all times Class C reclaimed water or better.

Section 14. Industrial Boiler Feed

Reclaimed water used for industrial boiler feed shall be at all times Class C reclaimed water or better.

Section 15. Industrial Cooling

(a) Reclaimed water used for industrial cooling purposes where aerosols or other mist are not created shall be at all times Class C reclaimed water or better.

(b) Reclaimed water used for industrial cooling purposes where aerosols or other mist are created shall be at all times Class A reclaimed water or better.

Section 16. Industrial Process Water

(a) Reclaimed water used as industrial process water without exposure of workers shall be at all times Class C reclaimed water or better.

(b) Reclaimed water used as industrial process water with exposure of workers shall be at all times Class A reclaimed water or better.

Article 5. Other Uses of Reclaimed Water

Section 1. Streamflow Augmentation

(a) Reclaimed water intended for beneficial reuse may be discharged for streamflow augmentation provided the reclaimed water meets the requirements of the federal water pollution control act, chapter 90.48 RCW and is incorporated within a sewer or water comprehensive plan as applicable, adopted by the applicable local government and approved by the departments of Health and Ecology as applicable.

(b) For the purposes of these standards, streamflow augmentation projects must identify a beneficial purpose that includes but is not limited to in-stream flow

enhancement, irrigation supplies, water right replenishment or transfer and fisheries propagation.

Section 2. Other Uses of Reclaimed Water

(a) Reclaimed water may be suitable for nonpotable uses other than those included in these regulations that do not conflict with provisions of Washington Administrative Code, federal regulations, statute or other law. Reclaimed water used for such uses shall require Washington Departments of Health and Ecology consideration and approval on a case by case basis.

(b) Reclaimed water shall not be used for food preparation and shall not be incorporated into food or drink for humans.

(c) Wastewater effluent used for sewage treatment plant purposes within the bounds of the wastewater treatment facility (wash down water, yard hydrants and restricted site irrigation) is not required to meet these standards unless potential public exposure, as determined by Health and Ecology requires the use of reclaimed water.

All uses within the bounds of the wastewater treatment facility shall be in conformance with an approved cross connection control program managed by the local water purveyor if potable water service is provided to the wastewater treatment facility.

Article 6. Other Methods of Treatment

Section 1. Other Methods of Treatment

(a) Methods of treatment other than those included in these standards and their reliability features may be accepted if the applicant demonstrates to the satisfaction of the Washington Departments of Health and Ecology that the methods of treatment and reliability features will assure an equal degree of treatment, public health protection and treatment reliability.

(b) For uses where oxidized, filtered, disinfected reclaimed water is required, pilot plant or other studies may be required to demonstrate that methods of treatment other than those specified in these standards are capable of reliably producing reclaimed water that is essentially free of measurable levels of viable pathogens.

(c) Projects that propose methods of treatment other than outlined within this standard are urged to request pilot project status from the Departments of Health and Ecology as outlined within chapter 90.46 RCW.

Article 7. Sampling and Analysis

Section 1. Protocols and Minimum Frequencies

(a) Samples for BOD shall be 24-hour composite samples. Samples for BOD shall be collected at least weekly. Compliance with the BOD requirement shall be determined monthly, based on the arithmetic mean of all samples collected during the month.

(b) Samples for TSS shall be 24-hour composite samples. Samples for TSS shall be collected at least daily. Compliance with the TSS requirement shall be determined monthly, based on the arithmetic mean of all samples collected during the month. Reduced TSS sampling for those projects that provide Class A reclaimed water (filtered) may be allowed by Health and Ecology on a case by case basis.

(c) Grab samples for coliform organisms shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities and disinfection procedures. Compliance with the coliform requirements shall be determined daily, based on the median value determined from the bacteriological results of the last seven days for which analyses have been completed. Daily coliform sampling may be waived by the Departments of Health and Ecology for only those projects using Class D reclaimed water. Criteria to be considered for reduced sampling includes: additional site access controls, disinfection reliability and irrigation methods. Reduced sampling shall be no less than two per week and must still comply with levels based on the last seven days for which analysis have been completed.

(d) Turbidity analysis shall be performed by a continuous recording turbidimeter. Turbidity measurements shall be read at least every four hours. Compliance with the average operating turbidity requirement shall be determined monthly, based on the arithmetic mean of all measurements read during the month.

(e) Grab samples for dissolved oxygen shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities.

(f) Samples collected for BOD, TSS, total coliform, turbidity, and dissolved oxygen analyses shall be analyzed by approved laboratory methods, and analyses shall be conducted in laboratories approved by the Washington Department of Ecology.

(g) Additional sampling parameters may be specified by the Departments of Health and Ecology within water quality permits to satisfy existing regulatory requirements or to meet health regulations.

Article 8. Engineering Report

Section 1. Scope and Minimum Requirements

(a) No person shall produce or supply reclaimed water for a direct beneficial use or a controlled use that would not otherwise occur unless he files an engineering report with the Washington Departments of Health and Ecology.

(b) The report shall be prepared by an engineer registered in Washington and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these standards and any other reclamation requirements specified by the Washington Departments of Health and Ecology. The engineering report shall also meet the regulatory requirements found within chapter 173-240-060 WAC (Submission of Plans and reports for Construction of Wastewater Facilities) and chapter 246-290 (Group A Public Water Systems) for applicable sections (i.e. Cross-connection control WAC 246-290-490, Water

System Plans WAC 246-290-100 (cross-connection control programs, conservation programs (including reuse) also see Planning Handbook available from Health).

(c) The engineering report shall contain, but not be limited, to the following elements:

(1) Process description and diagram that delineates the secondary treatment process, the reclamation process and reliability features and controls.

(2) Identification of the basis for design predicated on such sources as pilot plant results, recognized design standards published by industry professional organizations, accepted engineering design and operation references, USEPA, state regulatory agencies or site specific experience and operations data.

(3) Description and results of any pilot plant studies undertaken to assess the applicability of selected and alternative treatment processes and used to define unit design and operations parameters.

(4) Reliability assessment of complete treatment trains, unit processes, major and/or significant equipment and/or components.

(5) Engineering design calculations for the reclamation process that include: disinfection contact time, coagulation process, filtration process (if Class A), irrigation process and water balance (if necessary). Design approaches shall be consistent with accepted engineering practice as defined by Water Environment Federation, American Society of Civil Engineers, American Water Works Association, USEPA, USDA, Soil Conservation Service and recognized engineering references.

(6) A summary checklist should be submitted that outlines if each article within the standard was addressed in the report or why a particular section(s) were omitted (see appendix 1 for example).

(d) The report shall contain a contingency plan which will assure that no untreated or inadequately-treated wastewater will be delivered to the use area.

(e) The report shall discuss cross-connection control issues and detail the water purveyors program for cross-connection control and whom will be responsible for compliance and testing of cross-connection control activities.

Article 9. Operational Requirements

Section 1. Personnel

(a) Each reclamation plant shall be provided with a sufficient number of qualified personnel to operate the facility effectively so as to achieve the required level of treatment at all times.

(b) Qualified personnel shall be those meeting wastewater treatment plant certification and other requirements established pursuant to Washington Administrative Code (WAC) 173-230, Statutory Authority RCW 78.95.

Section 2. Maintenance

A preventive maintenance program shall be provided at each reclamation plant to ensure that all equipment is kept in a reliable operating condition.

Section 3. Operating Records and Reports

(a) Operating records shall be maintained at the reclamation plant or a central depository within the operating agency. These shall include: all analyses specified in these regulations; records of operational problems, unit process and equipment breakdowns, and diversions to emergency storage or disposal; and all corrective or preventive action taken.

(b) Process or equipment failures triggering an alarm shall be recorded and maintained as a separate record file. The recorded information shall include the time and cause of failure and corrective action taken.

(c) A monthly summary of operating records as specified under (a) of this section shall be filed monthly with the Washington Departments of Health and Ecology.

(d) Any discharge of untreated or partially treated wastewater to the use area, and the cessation of same, shall be reported immediately by telephone to the Washington Departments of Health and Ecology and the local health department.

Section 4. Bypass

There shall be no bypassing of untreated or partially treated wastewater from the reclamation plant or any intermediate unit processes to the point of use.

Section 5. Disinfection

(a) Where chlorine is used as the disinfectant in the treatment process a minimum chlorine residual of at least 1 mg/L after a contact time of at least 30 minutes is required.

(b) If pipelines or other facilities are used to meet the required chlorine contact time, such facilities are considered to be part of the treatment process and shall be subject to applicable requirements of these regulations and any other reclamation requirements specified by the Washington Departments of Health and Ecology.

(c) A chlorine residual of at least 0.5 mg/L shall be maintained in the reclaimed water during conveyance from the reclamation plant to the use area unless waived by the Departments of Health and Ecology.

(d) Maintenance of a chlorine residual is not required in reclaimed water impoundments and storage ponds, and, at the discretion of the Washington Departments of Health and Ecology, may not be required in reclaimed water distributed from storage ponds.

(e) A CT value greater than provided under these standards to assure pathogen reduction may be required by the Washington Department of Health for those reuse projects that need additional public health protection and where the threat of public exposure to possible pathogens remaining within the reclaimed water may be present. Projects proposing a planned ground water recharge project with reclaimed water may also need to provide greater CT values for vulnerable or sensitive ground water regimes.

(f) Review and approval of the design and installation of ultraviolet radiation, ozonation, mixed oxidant or other non-chlorine based disinfection systems shall be performed on a case-by-case basis. Design and operation requirements shall conform to recognized standards and engineering practices as defined by USEPA, Water Environment Federation, American Society of Civil Engineers, American Water Works Association and other recognized engineering references.

Section 6. Responsibilities

(a) The permittee shall maintain control over, and be responsible for, all facilities and activities inherent to the production of reclaimed water to ensure that the reclamation plant operates as approved by the Washington Departments of Health and Ecology. The permittee shall control industrial and toxic discharges that may affect reclaimed water quality through either a delegated pre-treatment program with Ecology or assuring all applicable discharges have permits issued under RCW 90.48 and WAC 173-220.

(b) Where the reclaimed water use area is under direct control of the permittee, the permittee shall maintain control, and be responsible for, all facilities and activities inherent to the use of the reclaimed water to ensure that the entire reuse system operates as approved by the Washington Departments of Health and Ecology.

(c) Where the reclaimed water distribution system or use area is not under direct control of the permittee, the person(s) who distributes reclaimed water, owns, or otherwise maintains control over the use area is responsible for reuse facilities and activities inherent to the distribution and use of the reclaimed water to ensure that the system operates as approved by the Washington Departments of Health and Ecology.

(d) Where the reclaimed distribution system or use area is not under direct control of the permittee, a binding agreement among the parties involved is required to ensure that construction, operation, maintenance, and monitoring meet all requirements of the Washington Departments of Health and Ecology.

Article 10. General Requirements of Design

Section 1. Flexibility of Design

The design of process piping, equipment arrangement, and unit structures in the reclamation plant must allow for efficiency and convenience in operation and maintenance and provide flexibility of operation to permit the highest possible degree of treatment to be obtained under varying circumstances.

Section 2. Alarms

(a) Alarms required for various unit processes as specified in other sections of these regulations shall be installed to provide warning of:

(1) Loss of power from the normal power supply;

(2) Failure of a biological treatment process;

(3) Failure of a disinfection process;

(4) Failure of a coagulation process;

(5) Failure of a filtration process; and

(6) Any other specific process failure for which warning is required by the Washington Departments of Health and Ecology.

(b) All required alarms shall be independent of the normal power supply of the reclamation plant.

(c) The person to be warned shall be the plant operator, superintendent, or other responsible person designated by the management of the reclamation plant and capable of taking prompt corrective action.

(d) Individual alarms may be connected to a master alarm to sound at a location where it can be conveniently observed by the attendant. Where the reclamation plant is not attended full time, the alarm(s) shall be connected to sound at a police station, fire station or other full-time service unit with which arrangements have been made to alert the person in charge at times that the reclamation plant is unattended.

Section 3. Power Supply

The power supply shall be provided with one of the following reliability features:

(1) Alarm and standby power source.

(2) Alarm and automatically actuated short-term storage or disposal provisions as specified in Article 12, Section 1.

(3) Automatically actuated long-term storage or disposal provisions as specified in Article 12, Section 1.

Section 4. Storage, Where No Approved Alternative Disposal System Exists

(a) Where no alternative disposal system is permitted, system storage or other acceptable means shall be provided to assure the retention of reclaimed water under adverse weather conditions or at other times when reuse is precluded.

(b) When wet weather conditions preclude the use of reclaimed water, the system storage volume shall be established by determining the storage period that would

be required for the duration of a 10-year storm, using weather data that is available from, or is representative of, the area involved. A minimum of 20 years of climatic data shall be used in storage volume determinations.

(c) At a minimum, system storage capacity shall be the volume equal to three times that portion of the average daily flow of reuse capacity for which no alternative reuse or disposal system is permitted.

Article 11. Alternative Reliability Requirements

Section 1. Emergency Storage or Disposal

(a) Where short-term storage or disposal provisions are used as a reliability feature, these shall consist of facilities reserved for the purpose of storing or disposing of untreated or partially treated wastewater for at least a 24-hour period. The facilities shall include all the necessary diversion works, provisions for odor control, conduits, and pumping and pump back equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(b) Where long-term storage or disposal provisions are used as a reliability feature, these shall consist of ponds, reservoirs, percolation areas, downstream sewers leading to other treatment or disposal facilities or any other facilities reserved for the purpose of emergency storage or disposal of untreated or partially treated wastewater. These facilities shall be of sufficient capacity to provide disposal or storage of wastewater for at least 20 days, and shall include all the necessary diversion works, provisions for odor and nuisance control, conduits, and pumping and pump back equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(c) Diversion to a different type of reuse is an acceptable alternative to emergency disposal of partially treated wastewater provided that the quality of the partially treated wastewater is suitable for that type of reuse.

(d) Subject to prior approval by the Washington Departments of Health and Ecology, diversion to a discharge point where the wastewater meets all discharge requirements is an acceptable alternative to emergency disposal of partially treated wastewater.

(e) Automatically actuated short-term storage or disposal provisions and automatically actuated long-term storage or disposal provisions shall include, in addition to provisions of (a), (b), (c), or (d) of this section, all the necessary sensors, instruments, valves, and other devices to enable fully automatic diversion of untreated or partially treated wastewater to approved emergency storage or disposal in the event of failure of the treatment process, and a manual reset to prevent automatic restart until the failure is corrected.

Section 2. Biological Treatment

All biological treatment unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple biological treatment units capable of producing oxidized wastewater with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions; or

(4) Automatically actuated long-term storage or disposal provisions.

Section 3. Secondary Sedimentation

All secondary sedimentation unit processes shall be provided with one of the following reliability features:

(1) Multiple sedimentation units capable of treating the entire flow with one unit not in operation;

(2) Standby sedimentation unit process; or

(3) long-term storage or disposal provisions.

Section 4. Coagulation

(a) All coagulation unit processes shall be provided with the following features for uninterrupted chemical feed:

(1) Standby feeders;

(2) Adequate chemical storage and conveyance facilities;

(3) Adequate reserve chemical supply; and

(4) Automatic dosage control.

(b) All coagulation unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple coagulation units capable of treating the entire flow with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and standby coagulation unit process.

Section 5. Filtration

All filtration unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple filter units capable of treating the entire flow with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and standby filtration unit process.

Section 6. Disinfection

(a) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with the following features for uninterrupted chlorine feed:

(1) Standby chlorinator;

(2) Standby chlorine supply;

(3) Manifold systems to connect chlorine cylinders;

(4) Chlorine scales;

(5) Automatic switchover to full chlorine cylinders; and

(6) Continuous measuring and recording of chlorine residual.

(b) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with one of the following reliability features:

(1) Alarm and standby chlorinator;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and multiple point chlorination. Each point of chlorination shall have an independent power source, separate chlorinator, and separate chlorine supply.

(c) All other disinfection unit processes shall be provided with one of the following reliability features:

(1) Alarm and standby disinfection unit capable of treating the design flow rate with the largest operating unit out of service;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions; and

(4) Automatically actuated long-term storage or disposal provisions.

Section 7. Other Alternatives to Reliability Requirements

Other alternatives to reliability requirements set forth in Articles 10 and 11 may be accepted if the applicant demonstrates to the satisfaction of the Washington Departments of Health and Ecology that the proposed alternative will assure an equal degree of reliability.

Article 12. Use Area Requirements

Section 1. General

(a) The public and employees shall be notified of the use of reclaimed water at all use areas. This shall be accomplished by the posting of advisory signs at use areas, notices on scorecards, distribution of written notices to residents or employees, or by other methods.

(b) Adequate measures shall be taken to prevent unplanned ponding of reclaimed water.

(c) Except as approved by the Washington Departments of Health and Ecology, reclaimed water, including runoff and spray, shall be confined to the designated and approved use area in accordance with the state discharge permit.

(d) Precautions shall be taken to assure that reclaimed water will not be sprayed on people or any facility or area not designated for reuse, including but not limited to buildings, passing vehicles, and drinking water fountains.

(e) Maximum attainable separation between reclaimed water lines and potable water lines shall be practiced. A minimum horizontal separation of 10 feet shall be maintained between reclaimed water lines and potable water lines. When crossing, a minimum vertical separation of 18 inches shall be maintained between reclaimed water lines and potable water lines in accordance with the 1985 Edition of *Criteria for Sewage Works Design*, Washington Department of Ecology, and the potable water line shall be above the reclaimed water line unless otherwise approved by the Washington Departments of Health and Ecology.

(f) All reclaimed water valves, storage facilities, and outlets shall be tagged or labeled to warn the public or employees that the water is not intended for drinking. The signage or advisory notification shall be colored purple with white or black lettering [Pantone 522 or 512 or other shades of purple acceptable to review agencies]. Signs or notification should read “Reclaimed Water do Not Drink” or other advisory or educational language acceptable to the Washington Departments

of Health or Ecology. Where appropriate (depending on the level of reclaimed water treatment), such warning shall inform the public or employees to avoid contact with the water.

(g) All reclaimed water piping, valves, outlets, and other appurtenances shall be color-coded purple [Pantone 522 or other shades of purple acceptable to review agencies], taped purple [Pantone 512 or other shades of purple acceptable to review agencies], or otherwise marked to identify the source of the water as being reclaimed water.

(1) All reclaimed water piping and appurtenances shall be either colored purple [Pantone 522 or other shades of purple acceptable to review agencies] and embossed or integrally stamped or marked "CAUTION: RECLAIMED WATER - DO NOT DRINK" or be installed with a purple [Pantone 512 or other shades of purple acceptable to review agencies] identification tape or polyethylene vinyl wrap. The warning shall be stamped on opposite sides of the pipe and repeated every three feet or less.

(2) Identification tape shall be at least three inches wide and have white or black lettering on a purple [Pantone 512 or other shades of purple acceptable to review agencies] field stating "CAUTION: RECLAIMED WATER - DO NOT DRINK." Identification tape shall be installed on top of reclaimed water pipelines, fastened at least every ten feet to each pipe length, and run continuously the entire length of the pipe.

Note: Other pipe and construction warning tape markings may be acceptable to the review agencies provided the colors and messages are consistent with the above sections.

(h) All reclaimed water valves and outlets shall be of a type, or secured in a manner, that permits operation only by authorized personnel.

(i) Except as authorized by the Washington Departments of Health and Ecology, hose bibs on reclaimed water lines are prohibited.

(j) For any irrigation use of reclaimed water, the hydraulic loading rate of reclaimed water shall be determined based on a detailed water balance analysis. The calculated loading rate(s) and the parameters and methods used to determine the loading rate(s) shall be submitted to the Washington Departments of Health and Ecology for approval.

(k) There shall be no application of reclaimed water for irrigation purposes when the ground is saturated or frozen.

(l) Adequate measures shall be taken to prevent the breeding of vectors of health significance and the creation of odors, slimes, or aesthetically displeasing deposits.

(m) Reclaimed water impoundments and storage ponds shall not result in contamination of groundwater that is used as, or suitable to be used as, a source of water supply for domestic purposes. Reclaimed water impoundments and storage ponds that are not lined or sealed to prevent seepage are acceptable if it is

demonstrated to the satisfaction of the Washington Departments of Health and Ecology that such contamination will not occur.

(n) A groundwater monitoring program may be required by the Washington Departments of Health and Ecology. Where required, the groundwater monitoring program shall be established by the permittee and approved by the Washington Departments of Health and Ecology. The monitoring program shall be based on reclaimed water quality and quantity, site specific soil and hydrogeologic characteristics, and other considerations.

Section 2. Tank Trucks

(a) Tank trucks and other equipment used to distribute reclaimed water shall be clearly identified with advisory signs.

(b) Tank trucks used to transport reclaimed water shall not be used to transport potable water that is used for drinking or other potable purposes.

(c) Tank trucks used to transport reclaimed water shall not be filled through on-board piping or hoses that may subsequently be used to fill tanks with water from a potable water supply.

(d) Tank trucks used to transport reclaimed water shall be inspected and approved for such use, by the water supplier which provides potable water to the use area, prior to transporting reclaimed water.

Section 3. Cross-Connection Control

(a) There shall be no cross-connections between the reclaimed water and potable water systems. The permittee or person(s) who distributes reclaimed water or owns or otherwise maintains control over the use area shall coordinate with the water supplier which provides potable water to the use area to establish and obtain approval from the Washington Department of Health for a cross-connection control and inspection program pursuant to WAC 246-290-490.

(b) Where both reclaimed water and potable water are supplied to a reclaimed water use area, a reduced pressure principle backflow prevention device or an approved air gap separation shall be installed at the potable water service connection to the use area.

(c) Where potable water is used to supplement a reclaimed water system, there shall be an air gap separation, approved and regularly inspected by the potable water supplier, between the potable water and reclaimed water.

(d) Reclaimed water shall not enter a dwelling unit or a building containing a dwelling unit except as allowed in Article 4, Sections 10 and 11.

Section 4. Setback Distances

(a) For Class A reclaimed water, the following setback distances shall apply:

(1) There shall be a minimum of 50 feet between any reclaimed water pipeline and potable water supply well.

(2) Where reclaimed water is used for spray or surface irrigation, there shall be a minimum of 50 feet between the area subject to irrigation and any potable water supply well.

(3) Where reclaimed water is used for an impoundment or storage pond or wetland that is not lined or sealed to prevent measurable seepage, there shall be a minimum of 500 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(4) Where reclaimed water is used for an impoundment or storage pond or wetland that is lined or sealed to prevent measurable seepage, there shall be a minimum of 100 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(b) For Class B reclaimed water, the following setback distances shall apply:

(1) There shall be a minimum of 100 feet between any reclaimed water pipeline and potable water supply well.

(2) Where reclaimed water is used for spray irrigation, there shall be a minimum of 50 feet between the area subject to irrigation and areas accessible to the public and the use area property line.

(3) Where reclaimed water is used for spray or surface irrigation, there shall be a minimum of 100 feet between the area subject to irrigation and any potable water supply well.

(4) Where reclaimed water is used for an impoundment or storage pond or wetland that is not lined or sealed to prevent measurable seepage, there shall be a minimum of 500 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(5) Where reclaimed water is used for an impoundment or storage pond or wetland that is lined or sealed to prevent measurable seepage, there shall be a minimum of 100 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(c) For Class C reclaimed water, the following setback distances shall apply:

(1) There shall be a minimum of 100 feet between any reclaimed water pipeline and potable water supply well.

(2) Where reclaimed water is used for spray irrigation, there shall be a minimum of 50 feet between the area subject to irrigation and areas accessible to the public and the use area property line.

(3) Where reclaimed water is used for spray or surface irrigation, there shall be a minimum of 100 feet between the area subject to irrigation and any potable water supply well.

(4) Where reclaimed water is used for an impoundment or storage pond or wetland that is not lined or sealed to prevent measurable seepage, there shall be a minimum of 500 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(5) Where reclaimed water is used for an impoundment or storage pond or wetland that is lined or sealed to prevent measurable seepage, there shall be a minimum of 100 feet between the perimeter of the impoundment or wetland and any potable water supply well.

(d) For Class D reclaimed water, the following setback distances shall apply:

(1) There shall be a minimum of 300 feet between any reclaimed water pipeline and potable water supply well.

(2) Where reclaimed water is used for spray irrigation, there shall be a minimum of 100 feet between the area subject to irrigation and areas accessible to the public and the use area property line.

(3) Where reclaimed water is used for spray or surface irrigation, there shall be a minimum of 300 feet between the area subject to irrigation any potable water supply well.

(4) Where reclaimed water is used for a storage pond **or wetland** that is not lined or sealed to prevent measurable seepage, there shall be a minimum of 1,000 feet between the perimeter of the pond **or wetland** and any potable water supply well.

(5) Where reclaimed water is used for a storage pond **or wetland** that is lined or sealed to prevent measurable seepage, there shall be a minimum of 200 feet between the perimeter of the pond or wetland and any potable water supply well.

(e) Exceptions to the setback distances noted in Article 12, Section 4 (a), (b), (c), and (d) may be approved by the Washington Departments of Health and Ecology if lesser setback distances can be demonstrated to the satisfaction of the Departments to assure an equal degree of public health protection.

Article 13. Summary of General Requirements

Section 1. Reclaimed Water Treatment and Quality Requirements

Provisions of Articles 1 through 12 of these standards shall govern use of reclaimed water. Table 1 summarizes the treatment and quality requirements for reclaimed water uses included in these standards. Table 1 is not intended to indicate all requirements of the articles cited above in this section, nor to contain any requirement not specified in these standards.

Section 2. Monitoring Requirements

Provisions of Article 7 set forth the sampling and analysis requirements associated with the production and use of reclaimed water. Highlights of these provisions are summarized in

Table 2. Table 2 is not intended to indicate all of the monitoring requirements cited in these standards, nor to contain any requirement not specified in these standards.

Section 3. ***Setback Distances***

Provisions of Article 12, Section 4 set forth the setback distance requirements for the distribution and use of reclaimed water. These provisions are summarized in Table 3.

Table 1.
Treatment and Quality Requirements for Reclaimed Water Use

Use	Type of Reclaimed Water Allowed			
	Class A	**Class B**	**Class C**	**Class D**
Irrigation of nonfood Crops				
Trees and Fodder, Fiber, and Seed Crops	YES	YES	YES	YES
Sod, Ornamental Plants for Commercial Use, and Pasture to Which Milking Cows or Goats Have Access	YES	YES	YES	NO
Irrigation of Food Crops				
Spray Irrigation				
All Food Crops	YES	NO	NO	NO
Food Crops Which Undergo Physical or Chemical Processing Sufficient to Destroy All Pathogenic Agents	YES	YES	YES	YES
Surface Irrigation				
Food Crops Where There is No Reclaimed Water Contact With Edible Portion of Crop	YES	YES	NO	NO
Root Crops	YES	NO	NO	NO
Orchards and Vineyards	YES	YES	YES	YES
Food Crops Which Undergo Physical or Chemical Processing Sufficient to Destroy All Pathogenic Agents	YES	YES	YES	YES
Landscape Irrigation				
Restricted Access Areas (e.g., Cemeteries and Freeway Landscapes)	YES	YES	YES	NO
Open Access Areas (e.g., Golf Courses, Parks, Playgrounds, Schoolyards, and Residential Landscapes)	YES	NO	NO	NO
Impoundments				
Landscape Impoundments	YES	YES	YES	NO
Restricted Recreational Impoundments	YES	YES	NO	NO
Nonrestricted Recreational Impoundments	YES	NO	NO	NO
Fish Hatchery Basins	YES	YES	NO	NO
Decorative Fountains	YES	NO	NO	NO
Flushing of Sanitary Sewers	YES	YES	YES	YES
Street Cleaning				
Street Sweeping, Brush Dampening	YES	YES	YES	NO
Street Washing, Spray	YES	NO	NO	NO
Washing of Corporation Yards, Lots, and Sidewalks	YES	YES	NO	NO
Dust Control (Dampening Unpaved Roads and Other Surfaces)	YES	YES	YES	NO
Dampening of Soil for Compaction (at Construction Sites, Landfills, etc.)	YES	YES	YES	NO

Table 1.
Treatment and Quality Requirements for Reclaimed Water Use (Cont.)

Use	Type of Reclaimed Water Allowed			
	Class A	**Class B**	**Class C**	**Class D**
Water Jetting for Consolidation of Backfill around Pipelines				
Pipelines for Reclaimed Water, Sewage, Storm Drainage, and Gas, and Conduits for Electricity	YES	YES	YES	NO
Fire Fighting and Protection				
Dumping from Aircraft	YES	YES	YES	NO
Hydrants or Sprinkler Systems in Buildings	YES	NO	NO	NO
Toilet and Urinal Flushing	YES	NO	NO	NO
Ship Ballast	YES	YES	YES	NO
Washing Aggregate and Making Concrete	YES	YES	YES	NO
Industrial Boiler Feed	YES	YES	YES	NO
Industrial Cooling				
Aerosols or Other Mist not Created	YES	YES	YES	NO
Aerosols or Other Mist Created (e.g., Use in Cooling Towers, Forced Air Evaporation, or Spraying)	YES	NO	NO	NO
Industrial Process				
Without Exposure of Workers	YES	YES	YES	NO
With Exposure of Workers	YES	NO	NO	NO

Table 2.
Monitoring Requirements

Parameter	Sample Type & Frequency	Compliance Requirements
Biochemical Oxygen Demand	24-hour composite, collected at least weekly	Shall not exceed 30 mg/L determined monthly, based on the arithmetic mean of all samples collected during the month.
Total Suspended Solids	24-hour composite, collected at least daily*	Shall not exceed 30 mg/L, determined monthly, based on the arithmetic mean of all samples collected during the month.
Total Coliforms	Grab, collected at least daily	Compliance determined daily, based on the median value determined from the bacteriological results of the last 7 days for which analyses have been completed.
Turbidity	Continuous recording turbidimeter	Filtered wastewater shall not exceed an average operating turbidity of 2 NTU, determined monthly, and shall not exceed 5 NTU at any time.
Dissolved Oxygen	Grab, collected at least daily	Shall contain dissolved oxygen.

- **TSS sampling may be reduced for those projects generating Class A reclaimed water on a case by case basis by Health and Ecology.**

Table 3.
Setback Distances

Conditions	Setback Distance (Feet) By Type of Reclaimed Water			
	Class A	**Class B**	**Class C**	**Class D**
Minimum Distance between any reclaimed water pipeline and potable water supply well.	50	100	100	300
Where reclaimed water is used for spray or surface irrigation, minimum distance between the area subject to irrigation, and any potable water supply well.	50	100	100	300
Where reclaimed water is used for spray irrigation, minimum distance between the area subject to irrigation and areas accessible to the public and the use area property line.	0	50	50	100
Where reclaimed water is used for an impoundment that is not lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the impoundment and any potable water supply well.	500	500	500	n/a
Where reclaimed water is used for an impoundment that is lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the impoundment and any potable water supply well.	100	100	100	n/a
Where reclaimed water is used for a storage pond that is not lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the pond and any potable water supply well.	500	500	500	1,000
Where reclaimed water is used for a storage pond that is lined or sealed to prevent measurable seepage, minimum distance between the perimeter of the pond and any potable water supply well.	100	100	100	200

Table 3 is not intended to indicate all of the setback requirements cited in this section, nor to contain any requirement not specified in this section.

Flexibility of Design

- ❑ Sufficient flexibility for convenience & efficiency in operation and maintenance

Review notes & comments: _____
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Alarms

Required alarm conditions:

- ❑ Loss of power from normal power supply
- ❑ Biological treatment process failure
- ❑ Disinfection process failure
- ❑ Coagulation process failure
- ❑ Filtration process failure
- ❑ Other or specific process failure

Independence:

- ❑ Alarms independent of normal power supply

Personnel notified:

- ❑ Plant operator
- ❑ Superintendent
- ❑ Other responsible party:_____

Master alarm:

- ❑ Inter-connect all site alarms
- ❑ Located for convenient observation by attendant
- ❑ Less than 24 hour plant attendance:
- ❑ Alarms interconnected to
  - ❍ Police station
  - ❍ Fire station
  - ❍ Other full-time service unit:_____

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Power Supply Reliability. Provide at least one reliability feature:

- ❑ Alarm and standby power source
- ❑ Alarm & automatically actuated short term storage/disposal
- ❑ Automatically actuated long term storage/disposal

Review notes & comments: _____

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Storage without alternative disposal system

- ❑ Retain reclaimed water under adverse weather conditions
- ❑ Wet weather conditions: Retain reclaimed water during 10-year storm as determined from 20 years of weather data
- ❑ Minimum storage capacity: 3 times average daily flow of reuse capacity

Review notes & comments: _____

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Alternative Reliability Requirements

Emergency Storage & Disposal

- ❑ Short-term emergency storage
  - ❍ Facility reserved solely for reclaimed wastewater storage or disposal
  - ❍ Minimum of 24 hour storage period
  - ❍ All equipment provided with standby power or independent of normal power source
  - ❍ Pumping & pump-back equipment provided
- ❑ Long term emergency storage
- ❑ Diversion to alternative, approved reuse site
- ❑ Diversion to discharge point approved by Department of Ecology
- ❑ Automatically actuated emergency storage provisions
- ❑ Provide all necessary sensors, instruments, valves & other devices for
  - ❍ full automatic diversion of untreated or partially treated effluent
  - ❍ failure of treatment process
  - ❍ Manual reset to prevent automatic restart

Review notes & comments: _____
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Biological Treatment

- ❑ Optional features
  - ❍ Alarm & multiple treatment units capable of producing oxidized wastewater with one unit inoperable
  - ❍ Alarm & short-term storage/disposal provisions with standby replacement equipment
  - ❍ Alarm & long term storage or disposal
  - ❍ Automatically actuated long-term storage or disposal provisions

Review notes & comments: _____
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Secondary Sedimentation

- ❑ Optional features
  - ❍ Multiple sedimentation units capable of treating the entire flow with one unit inoperable
  - ❍ Standby sedimentation unit process
  - ❍ Long term storage or disposal provisions

Review notes & comments: _____
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Coagulation

- ❑ Required features
  - ❍ Standby feeders
  - ❍ Adequate chemical storage and conveyance facilities
  - ❍ Adequate reserve chemical supply
  - ❍ Automatic dosage control

- ❑ Optional features
  - ❍ Alarm & multiple treatment units capable of producing oxidized wastewater with one unit inoperable
  - ❍ Alarm & short-term storage/disposal provisions with standby replacement equipment
  - ❍ Alarm & long term storage or disposal
  - ❍ Automatically actuated long-term storage or disposal provisions

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Filtration

- ❑ Optional Features
  - ❍ Alarm & multiple filter units capable of treating the entire flow with one unit inoperable
  - ❍ Alarm & short-term storage/disposal provisions with standby replacement equipment
  - ❍ Alarm & long term storage or disposal
  - ❍ Automatically actuated long-term storage or disposal provisions
  - ❍ Alarm & standby filtration unit process

Review notes & comments: _____
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Disinfection

- ❑ Required features
  - ❍ Standby chlorinator
  - ❍ Standby chlorine supply
  - ❍ Manifold system to connect chlorine cylinders
  - ❍ Chlorine scales
  - ❍ Automatic switch-over to full chlorine cylinders
  - ❍ Continuous measuring & recording of chlorine residual
- ❑ Optional features
  - ❍ Alarm & standby chlorinator
  - ❍ Alarm & short-term storage/disposal provisions with standby replacement equipment
  - ❍ Alarm & long term storage or disposal
  - ❍ Automatically actuated long-term storage or disposal provisions

- ❍ Alarm & multiple point chlorination; each point with:
  - ❒ independent power source
  - ❒ separate chlorinator
  - ❒ separate chlorine supply

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General Use Area Requirements

General

- ❑ Public & employee notification of use of reclaimed water in use areas
  - ❍ Advisory signs
  - ❍ Written notices
  - ❍ Golf course score cards
- ❑ Ponding of reclaimed water prevented
- ❑ Reclaimed water use confined to designated and approved use area
- ❑ Spraying with reclaimed water prohibited:
  - ❍ People
  - ❍ Facilities not designated for Reuse
  - ❍ Areas not designated for Reuse
    - ❒ Buildings
    - ❒ Passing vehicles
    - ❒ Drinking fountains
- ❑ Minimum horizontal separation of reclaimed water lines & potable water lines at 10 feet
- ❑ Vertical separation at crossings:
  - ❍ Crossing at right angles
  - ❍ Minimum edge-to-edge vertical separation = 18 inches
  - ❍ Potable waterline placed above the reclaimed waterline
- ❑ Reclaimed water valves, storage facilities & outlets tagged or labeled
  - ❍ Warning to avoid contact with water where appropriate
- ❑ Reclaimed water piping:
- ❑ Reclaimed water valves secured to prevent operation except by authorized personnel
- ❑ Hose bibbs on reclaimed water lines;
  - ❍ Prohibited except as authorized by departments
- ❑ Irrigation use of reclaimed water
  - ❍ Hydraulic loading rate determined by detailed water balance
  - ❍ Calculated loading rate & parameters provided for approval
  - ❍ No application when ground is frozen
- ❑ Prevention of breeding of vectors of public health significance
- ❑ Prevention of creation of slimes, odors or aesthetically displeasing deposits
- ❑ Reclaimed water impoundments:
  - ❍ Prevent contamination of groundwater used as source of water supply for domestic purposes

- ❍ Provide seepage rate control acceptable to departments unless satisfactory demonstration is provided to assure nondegredation of groundwater.
- ❑ Groundwater monitoring program as required by Washington Dept. of Ecology

Review notes & comments: _____

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Cross Connection Control

- ❑ No cross connections between reclaimed water and potable water systems
- ❑ Potable water system purveyor maintains an approved and acceptable cross connection control program pursuant to WAC 246-290-490
- ❑ Coordination with potable water system purveyor established
- ❑ Site specific requirements:
- ❑ Reclaimed water use area serviced by both reclaimed and potable water:
  - ❍ Reduced pressure backflow prevention assembly (RBPA)
  - ❍ Approved air gap
  - ❍ Installation at potable water service connection to the use area
- ❑ Potable water supplementing reclaimed water system:
  - ❍ Approved air gap separation
  - ❍ Regular inspection by potable water supplier
- ❑ Reclaimed water entering dwelling unit or building containing dwelling unit:
  - ❍ Article 5, Section 10-Fire Protection uses
  - ❍ Article 5, Section 11-Toilet & Urinal Flushing uses

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SECTION 2 - RECLAIMED WATER STANDARDS FOR WETLANDS

Article 1. Applicability

Section 1. ***Category 1 and Salt Water Wetlands***

Discharge of reclaimed water to Category I wetlands or to salt-water dominated wetlands is not permitted, except where it can be demonstrated that no existing significant wetlands functions will be decreased and overall net environmental benefits will result from the discharge.

Section 2. ***Waters of the State***

Wetlands which receive reclaimed water meeting the requirements of these standards are considered waters of the State. These include existing natural wetlands and constructed beneficial use wetlands. These standards do not apply to constructed treatment wetlands which are not considered waters of the State (see Section 1, Article 2 (4))

Article 2. Hydrologic and Hydraulic Criteria

Section 1. ***Hydraulic Loading***

Augmentation of wetland hydrologic regime is not to exceed an additional (above background) average annual hydraulic loading rate of 2 cm/day to Category II wetlands and 3 cm/day to Category III and IV wetlands, unless monitoring can demonstrate that net ecological benefits (Article 6) can be maintained at higher hydraulic loading rates. Maximum annual average hydraulic loading rate to constructed beneficial use wetlands is limited to 5 cm/day unless monitoring can demonstrate that net ecological benefits can be maintained at higher hydraulic loading rates. Hydraulic loading rate will be determined as the ratio of the average annual flow rate of reclaimed water to the effective wetted area of the wetland, and will be reported in units of cm/day.

Section 2. ***Water Levels***

Water levels fluctuations within a wetland receiving reclaimed water must satisfy the two following conditions:

(a) Average monthly water level elevations under the reclaimed water wetland hydrologic regime are not to increase by more that 10 cm compared to the average pre-augmentation monthly water level, and

(b) The frequency and duration of water level fluctuations above pre-augmentation average may be further limited in the following situations:

(1) If the wetland is characterized by relatively high vegetation species richness, then the frequency of stage excursions above 15 cm shall not exceed 6 per year and the duration shall not exceed 72 hours per excursion; or

(2) If the wetland contains a high quality bog or fen component, then the duration of stage excursions shall not exceed 24 hours in any year; or

(3) If the wetland is inhabited by breeding native amphibians, then during the breeding season (February through May) and within the breeding zones, water level excursions shall not exceed 8 cm and the duration of all excursions shall not exceed 24 hours in any 30 day period.

These criteria may be modified if a demonstration based on site-specific monitoring and other acceptable scientific data can show that unacceptable changes to the biological criteria (Article 4) will not occur, or net environmental benefits are gained (Article 6).

Article 3. Water Quality Criteria: Standards for Discharge to Wetlands

Section 1. Minimum Quality

Reclaimed water discharged to natural wetlands shall be treated to Class D reclaimed water standards. Where natural and constructed beneficial use wetlands receiving reclaimed water provide potential human contact recreational or educational beneficial uses, discharge shall meet Class A reclaimed water standards. Where natural and constructed beneficial use wetlands receiving reclaimed water provide fisheries, or potential human non-contact recreational or educational beneficial uses, discharge shall meet Class B reclaimed water standards. Where natural wetlands receiving reclaimed water provide potential non-contact recreational or educational beneficial uses through restricted access, discharge shall, at a minimum, meet Class C reclaimed water standards.

Section 2. Water Quality Criteria

Reclaimed water discharged to wetlands shall not exceed, on an average annual basis, the following concentrations, unless net environmental benefits are provided (Article 6):

(1)	BOD_5	20 mg/L
(2)	TSS	20 mg/L
(3)	Total Kjeldahl Nitrogen (as Nitrogen)	3 mg/L
(4)	Total Phosphorus (as Phosphorus)	1 mg/L

Section 3. Loading Rates

For wetlands contiguous with a phosphorus-limited lake, the allowable discharge total phosphorus limit to the wetland will be determined based on an analysis of the expected assimilation capacity of the wetland for total phosphorus and based on the appropriate total phosphorus loading to the lake that will not cause or contribute to a violation of eutrophication standards. Mass loadings on an annual average basis are not to exceed:

(1)	BOD5	5 kg/ha/d
(2)	TSS	9 kg/ha/d
(3)	Total Nitrogen (as Nitrogen)	1.2 kg/ha/d
(4)	Total Phosphorus (as Phosphorus)	0.2 kg/ha/d

These are the annual average mass loadings that can be expected to achieve near-background ambient constituent concentrations within the natural or constructed beneficial use wetland. Higher mass loading rates will be considered if an applicant provides monitoring and other scientific data that demonstrate that higher mass loadings can be assimilated without violation of the biological criteria in Article 4 of these standards and that the wetland will still result in a net increase in environmental function (Article 6).

Section 4. Ammonia

Un-ionized ammonia concentrations in reclaimed water discharged to a natural or constructed beneficial use wetland must not exceed Washington chronic toxicity standards (WAC 173-201A-040(3)) for freshwater systems, unless compliance with biological standards (Article 4) within the wetland receiving higher concentrations can be demonstrated and the net environmental benefit standard (Article 6) can be met.

Section 5. Metals

Metal concentrations in reclaimed water discharged to a natural or constructed beneficial use wetland must not exceed Washington surface water quality standards (WAC 173-201A), unless acute whole effluent toxicity testing using daphnids demonstrates absence of toxicity or can be demonstrated that net environmental benefits will be created as described in Article 6 of these standards.

Article 4. Biological Criteria: Standards in Wetlands Receiving Reclaimed Water

Section 1. Beneficial Uses

Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed, unless the discharge of reclaimed water will result in a net environmental benefit as described in Article 6 (WAC 173-201A-070).

Section 2. Natural Conditions

Whenever the natural conditions of said waters are of a lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria (WAC 173-201A-070).

Section 3. Biological Criteria

(a) Biological criteria will be used to provide protection for the existing or planned structure and function of the natural or constructed beneficial use wetland. Biological criteria are established for the following wetland structural components: vegetation, macroinvertebrates, amphibians, fish, and birds. Biological criteria are also established for populations of threatened or endangered species as defined in Washington's rules.

(b) Biological criteria will reference existing, pre-discharge conditions in natural wetlands, and negotiated mature conditions in constructed beneficial use wetlands. Biological criteria will not be lowered by more than 25 percent compared to the reference condition over the entire area of the natural or constructed beneficial use wetland, and by no more than 50 percent at any individual station. For constructed beneficial use wetlands receiving reclaimed water, these biological criteria will not be enforced for the first five years of operation. Acceptable sampling methods and numbers of stations to quantify these biological criteria will be determined on a case-by-case basis and will be the minimum necessary to demonstrate compliance.

(c) Specific biological criteria include:

(1) Vegetation cover or dominance. The average annual combined percent cover or dominance of all macrophytic plant species.

(2) Plant diversity. The average annual total number of macrophytic plant species.

(3) Macroinvertebrates. The average annual macroinvertebrate biomass (weight of organisms per square meter) and number of species.

(4) Amphibians. The average annual number of amphibian species.

(5) Fish. The average annual fish population biomass and number of species.

(6) Birds. The average annual density of wetland dependent birds (number per hectare) and number of species.

(7) Threatened or endangered species. Percent cover or population density and total number of species.

Article 5. Ground Water Protection Criteria

Section 1. Hydrogeologic Evaluation

(a) For any wetland receiving reclaimed water, sufficient hydrogeologic evaluation should be performed to determine if the wetland occurs in an area that provides ground water recharge at any time of the year, and if so:

(b) Application of reclaimed water exhibiting parameter concentrations 50 percent or lower than the ground water quality criteria require no additional ground water evaluation or follow-up action.

(c) Application of reclaimed water exhibiting parameter concentrations greater than 50 percent of the ground water quality criteria require site-specific hydrogeologic investigation (i.e., evaluation of wetland/ground water interaction, ground water recharge/discharge, gradient, project proximity to water supply wells, etc.) to show that hydrogeologic conditions are adequate to prevent degradation of ground water quality.

(d) Application of reclaimed water exhibiting parameter concentrations exceeding the ground water quality criteria may undergo additional treatment in the wetland environment which may also constitute AKART. However, application of reclaimed water exhibiting parameter concentrations exceeding the ground water quality criteria will require ground water monitoring and analysis for sufficient length of time to determine that the application of this reclaimed effluent will not degrade existing ground water quality.

Article 6. Net Environmental Benefit

Section 1. Required Demonstrations

Where it can be demonstrated that net environmental benefits will be derived as a result of the discharge of reclaimed water, exceptions to the standards herein will be considered. In order to demonstrate net environmental benefit, two criteria must be met:

(1) Full and uninterrupted protection will be given to significant, existing beneficial uses of the receiving water, including ground water, in the absence of the reclaimed water discharge; and

(2) New beneficial uses or fuller realization of existing or potential beneficial uses will result from the reclaimed water discharge as demonstrated from existing scientific evidence and continued monitoring of biological indicators listed in Article 4.

Article 7. Application and Monitoring Requirements

Section 1. Background Studies

For approval of discharge of reclaimed water to wetlands, the applicant must perform sufficient background studies to:

(1) Identify the category of the existing wetland and proposed wetlands;

(2) Identify the existing beneficial uses of the existing and proposed wetland;

(3) Determine the hydrologic regime of the existing and proposed wetland, including depth and duration of inundation, and average monthly water level fluctuations. An estimated monthly water budget will be provided by the applicant and compared to actual conditions during operation;

(4) Identify class of reclaimed water to be discharged, associated parameter concentrations, and annual loading rates to the wetlands;

(5) Determine whether the wetland occurs in a ground water recharge or discharge area;

(6) Provide baseline monitoring information for natural wetlands sufficient to allow determination of reference conditions for parameters referenced in Articles 2, 3, and 4, to be performed during a growing season prior to initiation of discharge;

(7) Provide an estimated description of the mature biological structure for a constructed beneficial use wetland; and

(8) Support any claims of net environmental benefit (Article 6).

Section 2. Operational Monitoring

After approval of discharge, periodic monitoring will be performed to document that beneficial uses existing prior to reclaimed effluent discharge and biological standards as defined in Article 4 are protected or enhanced. At a minimum, this monitoring will be conducted during the first, second, fourth, sixth, eighth, and 10th growing season after initiation of discharge, and includes the following items. Additional monitoring may be required in the permit to demonstrate protection and enhancement of beneficial uses.

(1) Vegetation, macroinvertebrates, amphibians, fish, birds, and threatened or endangered species surveys;

(2) Continuous surface water depth readings at a minimum of one station typical of the wetland;

(3) Annual monitoring shall be performed for 10 years or, where net environmental benefit is a stipulated goal, until long-term protection or enhancement of beneficial uses and biological criteria is demonstrated; and

(4) For those projects receiving reclaimed water characterized by average annual parameter concentrations less than or equal to 50 percent of ground water quality criteria, and less than 50 percent of required surface water discharge concentrations, no annual ground water monitoring or follow-up action is required.

Article 8. Summary of Standards

Section 1. ***Reclaimed Water Treatment and Quality Requirements***

Provisions of Articles 2 through 7 of these standards shall govern use of reclaimed water for discharge to wetlands. Table 1 summarizes the treatment and quality requirements for reclaimed water uses included in these standards. Table 1 is not intended to indicate all requirements of the articles cited above in this section, nor to contain any requirement not specified in these standards.

Section 2. ***Monitoring Requirements***

Provisions of Article 7 set forth the sampling and analysis requirements associated with the production and use of reclaimed water. Highlights of these provisions are summarized in Table 2. Table 2 is not intended to indicate all of the monitoring requirements cited in these standards, nor to contain any requirements not specified in these standards.

Table 1.
Treatment and Quality Requirements for Reclaimed Water Use

Use	Class A	Class B	Class C	Class D
Discharge to constructed beneficial use wetlands	Yes	Yes	No	No
Discharge to natural wetlands	Yes	Yes	Yes	Yes
Human non-contact restricted access	Yes	Yes	Yes	No
Fisheries or human non-contact recreation	Yes	Yes	No	No
Human contact	Yes	No	No	No

Table 2.
Monitoring Requirements

Parameter	Sample Type & Frequency	Compliance Requirements
Biochemical Oxygen Demand	24-hour composite, collected at least weekly	Shall not exceed 20 mg/L on an average annual basis
Total Suspended Solids	24-hour composite, collected at least weekly	Shall not exceed 20 mg/L on an average annual basis
Total Coliforms	Grab, collected at least daily	Compliance determined daily, based on the median value determined from the bacteriological results of the last 7 days for which analyses have been completed.
Kjeldahl Nitrogen	24-hour composite collected weekly	Shall not exceed 3 mgTKN-N/L on an average annual basis
Total Ammonia-Nitrogen	24-hour composite collected weekly	Shall not exceed Washington chronic standards for freshwater or as specified in Article 3 (4)
Total Phosphorus	24-hour composite collected weekly	Shall not exceed 1 mg P/L on an average annual basis
Metals: Arsenic, Cadmium, Copper, Lead, Mercury, Nickel, Zinc	24-hour composite collected weekly	Shall not exceed Washington surface water quality standards, or as specified in Article 3 (5)
Flow Rate	Continuous Recording	2 to 5 cm/day, depending on wetland category & type
Water Level Elevation	Continuous Recording	Increase not greater than 10 cm above average pre-augmentation water level elevation
Biological: Vegetation cover, plant diversity, macroinvertebrate biomass, amphibian species, fish biomass & species, bird density & species, threatened/ endangered density & species	Once/year during 1st, 2nd, 4th, 6th, 8th & 10th growing seasons	No more than 25% reduction in parameter measurements over wetland, or 50% reduction at any one location within wetlands.

SECTION 3 - STANDARDS FOR DIRECT AQUIFER RECHARGE

Article 1. Applicability

Section 1. ***Applicability***

These standards shall apply only to planned, direct ground water recharge projects using reclaimed water. The creation or operation of direct recharge facilities to cause the injection of reclaimed water into a ground water basin is evidence of a planned ground water recharge project.

Article 2. Treatment Requirements

Section 1. ***Potable Ground Water***

(a) AKART shall be applied to all wastewater prior to direct recharge.

(b) Reclaimed water used for direct recharge to potable ground water aquifers shall be reclaimed water that, as a minimum, is at all times an oxidized, coagulated, filtered, reverse osmosis-treated, disinfected wastewater.

(c) Any withdrawal facilities constructed solely for the purpose of extracting reclaimed water from the underground shall comply with chapter 173-136 WAC and chapter 173-150 WAC.

(d) It is recommended that all direct recharge projects prepare a comprehensive water and/or sewer plan in accordance with chapter 173-240 WAC, chapter 246-271 WAC (as applicable), and chapter 246-290 WAC, and include a complete description of the proposed recharge project. The project description shall discuss the estimated beneficial uses, the expected users, and the intended water rights status (artificially stored per chapter 173-136 WAC, or abandoned and available for appropriation to others) of all of the reclaimed water to be stored in the recharged ground water. The comprehensive plan should be prepared in addition to the engineering report required within these standards.

Section 2. ***Nonpotable Ground Water***

(a) AKART shall be applied to all wastewater prior to direct recharge.

(b) As a minimum, reclaimed water used for direct recharge to nonpotable ground water aquifers shall be Class A reclaimed water.

(c) Any withdrawal facilities constructed solely for the purpose of extracting reclaimed water from the underground shall comply with chapter 173-136 WAC and chapter 173-150 WAC.

(d) It is recommended that all direct recharge projects prepare a comprehensive water and/or sewer plan in accordance with chapter 173-240 WAC, chapter 246-271 WAC (as applicable), and chapter 246-290 WAC, and include a complete description of the proposed recharge project. The project description shall discuss the estimated beneficial uses, the expected users, and the intended water rights status (artificially stored per chapter 173-136 WAC, or abandoned and available

for appropriation to others) of all of the reclaimed water to be stored in the recharged ground water. The comprehensive plan should be prepared in addition to the engineering report required within these standards.

Section 3. Other Methods of Treatment

(a) Methods of treatment other than those included in these standards and their reliability features may be accepted if the applicant demonstrates to the satisfaction of the Washington Departments of Health and Ecology that the methods of treatment and reliability features will assure an equal degree of treatment, public health protection, and treatment reliability.

(b) For direct recharge into nonpotable ground water aquifers, pilot plant or other studies may be required to demonstrate that methods of treatment other than those specified in these standards are capable of reliably producing reclaimed water that meets all applicable reclaimed water quality limits specified in these standards.

(c) For direct recharge into potable ground water, pilot plant or other studies are required to demonstrate that methods of treatment other than those specified in these standards are capable of reliably producing reclaimed water that meets all applicable reclaimed water quality limits specified in these standards.

(d) Projects that propose methods of treatment other than outlined within these standards are urged to request pilot project status from the Departments of Ecology and Health as outlined within chapter 90.46 RCW.

Article 3. Reclaimed Water Quality Requirements

Section 1. Direct Recharge to Potable Ground Water

(a) Reclaimed water used for direct recharge to potable ground water aquifers shall meet the water quality criteria for primary contaminants (except nitrate), secondary contaminants, radionuclides, and carcinogens listed in Table 1 in chapter 173-200 WAC and any other maximum contaminant levels pursuant to chapter 246-290 WAC.

(1) The total coliform requirement specified in Table 1 in chapter 173-200 WAC shall be determined pursuant to Article 5, Section 3(c), and the number of total coliform organisms shall not exceed 5/100 mL in any sample.

(2) For the primary contaminants, secondary contaminants, and radionuclides listed in Table 1 in chapter 173-200 WAC, the criteria shall be the most stringent concentration of the following and those listed in Table 1 in chapter 173-200:

(i) Maximum contaminant level goals;

(ii) Maximum contaminant levels; and

(iii) State maximum contaminant levels published in chapter 246-290 WAC as presently promulgated or subsequently amended or repromulgated.

(3) The criteria for primary and secondary contaminants and radionuclide contaminants in Table 1 in chapter 173-200 WAC shall be amended as the federal and state rules are amended and without amendment of these standards.

(b) In addition, the reclaimed water shall meet the following water quality criteria:

(1) Turbidity ≤ 0.1 NTU (average) and 0.5 NTU (maximum);

(2) Total nitrogen ≤ 10 mg/L as N;

(3) TOC ≤ 1.0 mg/L; and

(4) any other constituent limits deemed appropriate by the Departments of Ecology or Health.

Section 2. Direct Recharge to Nonpotable Ground Water

Reclaimed water quality criteria for direct recharge of reclaimed water into nonpotable ground water aquifers shall be determined by the department on a case-by-case basis, taking into consideration the existing ground water quality, hydrogeology, subsequent use of any reclaimed water that is withdrawn from the underground, and other factors.

As a minimum, the following criteria shall be met:

(1) Class A reclaimed water requirements for total coliform organisms;

(2) BOD ≤ 5 mg/L;

(3) TSS ≤ 5 mg/L; and

(4) any other constituent limits deemed appropriate by the Departments of Ecology or Health.

Section 3. Point of Compliance

(a) The point of compliance is the location where reclaimed water quality criteria required pursuant to these standards shall be measured and shall not be exceeded pursuant to these standards.

(b) The point of compliance with reclaimed water quality and monitoring criteria required pursuant to these standards shall be the point of direct recharge of reclaimed water into the underground. Generally, the reclaimed water quality compliance point will be at a location immediately prior to injection into the underground.

Article 4. Sampling and Analysis

Section 1. ***Oxidized Wastewater***

(a) Samples for BOD shall be 24-hour composite samples. Samples for BOD shall be collected at least weekly. Compliance with the BOD requirement shall be determined monthly, based on the arithmetic mean of all samples collected during the month.

(b) Samples for TSS shall be 24-hour composite samples. Samples for TSS shall be collected at least daily. Compliance with the TSS requirement shall be determined monthly, based on the arithmetic mean of all samples collected during the month.

(c) Grab samples for dissolved oxygen shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities.

Section 2. ***Filtered Wastewater***

Turbidity analysis shall be performed by a continuous recording turbidimeter. Turbidity measurements shall be read at least every four hours. Compliance with the average operating turbidity requirement shall be determined monthly, based on the arithmetic mean of all measurements read during the month.

Section 3. ***Reclaimed Water***

(a) Samples for BOD shall be 24-hour composite samples. Samples for BOD shall be collected at least daily. Compliance with the BOD requirement shall be determined daily, based on the arithmetic mean of all daily samples collected during the last 7 days of operation.

(b) Samples for TSS shall be 24-hour composite samples. Samples for TSS shall be collected at least daily. Compliance with the TSS requirement shall be determined daily, based on the arithmetic mean of all daily samples collected during the last 7 days of operation.

(c) Grab samples for total coliform organisms shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities and disinfection procedures. Compliance with the coliform requirements shall be determined daily, based on the median value determined from the bacteriological results of the last 7 days for which analyses have been completed.

(d) Turbidity analysis shall be performed by a continuous recording turbidimeter. Turbidity measurements shall be read at least every four hours. Compliance with the average operating turbidity requirement shall be determined monthly, based on the arithmetic mean of all measurements read during the month.

(e) Samples for TOC shall be 24-hour composite samples. Samples for TOC shall be collected at least daily. Compliance with the TOC requirement shall be determined daily, based on the arithmetic mean of all daily samples collected during the last 30 days of operation.

(f) Samples for primary contaminants (except total coliform organisms), secondary contaminants, radionuclides, and carcinogens, shall be grab or 24-hour composite

samples. Samples for primary contaminants (except total coliform organisms), secondary contaminants, radionuclides, and carcinogens shall be collected at least quarterly. Compliance with each constituent requirement (except total coliform organisms) shall be determined annually, based on the arithmetic mean of all samples collected during the previous 12 months.

(g) Samples for total nitrogen shall be grab or 24-hour composite samples. Samples for total nitrogen shall be collected at least weekly. Compliance with the total nitrogen requirement shall be determined annually, based on the arithmetic mean of all samples collected during the previous 12 months.

(h) Samples for constituents not included in this section, and their compliance requirements, may be specified by the Departments of Ecology and Health within water quality permits to satisfy existing regulatory requirements or to meet health regulations.

Section 4. Ground Water from Monitoring Wells

(a) Samples from monitoring wells for constituents required pursuant to Article 5, Section 9(b)(1)(i) shall be collected at least quarterly.

(b) Samples from monitoring wells for constituents required pursuant to Article 5, Section 9(b)(2)(i), and their sampling frequency, shall be determined on a case-by-case basis by the department.

Section 5. Laboratory Methods and Analyses

Samples collected pursuant to this article shall be analyzed by approved laboratory methods, and analyses shall be conducted in laboratories approved by the department.

Article 5. Operational Requirements

Section 1. Personnel

(a) Each reclamation plant shall be provided with a sufficient number of qualified personnel to operate the facility effectively so as to achieve the required level of treatment at all times.

(b) Qualified personnel shall be those meeting wastewater treatment plant certification and other requirements established pursuant to chapter 173-230 WAC, Statutory Authority RCW 78.95.

Section 2. Maintenance

A preventive maintenance program shall be provided at each reclamation plant to ensure that all equipment is kept in a reliable operating condition.

Section 3. Operating Records and Reports

(a) Operating records shall be maintained at the reclamation plant or a central depository within the operating agency. These shall include: all analyses specified in these regulations; records of operational problems, unit process and equipment breakdowns, and diversions to emergency storage or disposal; and all corrective or preventive action taken.

(b) Process or equipment failures triggering an alarm shall be recorded and maintained as a separate record file. The recorded information shall include the time and cause of failure and corrective action taken.

(c) A monthly summary of operating records as specified under (a) of this section shall be filed monthly with the Washington Departments of Ecology and Health.

(d) Any direct recharge of untreated or partially treated wastewater to the underground, and the cessation of same, shall be reported immediately by telephone to the Washington Departments of Ecology and Health and the local health department.

Section 4. Bypass

There shall be no bypassing of untreated or partially treated wastewater from the reclamation plant or any intermediate unit processes to the point of recharge.

Section 5. Disinfection

(a) Where chlorine is used as the disinfectant in the treatment process a minimum chlorine residual of 1 mg/L after a minimum contact time of 30 minutes, based on peak hourly flow, is required. A CT value greater than provided under these standards to assure pathogen reduction may be required by the Washington Department of Health.

(b) If pipelines or other facilities are used to meet the required chlorine contact time, such facilities are considered to be part of the treatment process and shall be subject to applicable requirements of these regulations and any other reclamation requirements specified by the Washington Departments of Health and Ecology.

(c) A chlorine residual of at least 0.5 mg/L shall be maintained in the reclaimed water during conveyance from the reclamation plant to the point of recharge unless waived by the Departments of Health and Ecology.

(d) Maintenance of a chlorine residual is not required in reclaimed water storage ponds, and, at the discretion of the Washington Departments of Health and Ecology, may not be required in reclaimed water conveyed from storage ponds to the point of recharge.

(e) Review and approval of the design and installation of ultraviolet radiation, ozonation, mixed oxidant or other non-chlorine based disinfection systems shall be performed on a case-by-case basis. Design and operation requirements shall conform to recognized standards and engineering practices as defined by USEPA, Water Environment Federation, American Society of Civil Engineers, American Water Works Association and other recognized engineering references.

Section 6. Responsibilities

(a) The permittee shall maintain control over, and be responsible for, all facilities and activities inherent to the production of reclaimed water to ensure that the reclamation plant operates as approved by the Washington Departments of Ecology and Health. The permittee shall control industrial and toxic discharges

that may affect reclaimed water quality through either a delegated pretreatment program with the department or assuring all applicable discharges have permits issued under RCW 90.48 and chapter 173-220 WAC.

(b) Where the reclaimed water transmission and distribution system or direct recharge facilities are under direct control of the permittee, the permittee shall maintain control, and be responsible for, all facilities and activities inherent to the direct recharge of the reclaimed water to ensure that the entire reuse system operates as approved by the Washington Departments of Ecology and Health.

(c) Where the reclaimed water transmission and distribution system or direct recharge facilities are not under direct control of the permittee, the person(s) who conveys reclaimed water, owns, or otherwise maintains control over the direct recharge facilities is responsible for reuse facilities and activities inherent to the conveyance and direct recharge of the reclaimed water to ensure that the system operates as approved by the Washington Departments of Ecology and Health.

(d) The permittee or person(s) who maintains control over the direct recharge facilities where the recharged water is withdrawn as a source of drinking water supply shall prevent the withdrawal of ground water within the area required to achieve the minimum retention time in the underground specified in Article 5, Section 7(a), and minimum horizontal separation distance between the point of direct recharge and withdrawal specified in Article 5, Section 8(a).

(e) Where the reclaimed water transmission and distribution system or direct recharge facilities are not under direct control of the permittee, a binding agreement among the parties involved is required to ensure that construction, operation, maintenance, and monitoring meet all requirements of the Washington Departments of Ecology and Health.

Section 7. Retention Time in the Underground

(a) Reclaimed water shall be retained underground for a minimum of 12 months prior to being withdrawn as a source of drinking water supply.

(b) Reclaimed water withdrawn for nonpotable purposes can be withdrawn at any time after direct recharge.

Section 8. Separation Distance in the Underground

(a) The minimum horizontal separation distance between the point of direct recharge and withdrawal as a source of drinking water supply shall be 2,000 feet.

(b) Reclaimed water withdrawn for nonpotable purposes can be withdrawn at any distance from the point of direct recharge.

Section 9. Ground Water Monitoring

(a) A ground water monitoring program will be required by the Washington Departments of Ecology and Health. The ground water monitoring program shall be established by the permittee and approved by the Washington Departments of Ecology and Health. The monitoring program shall be based on reclaimed water

quality and quantity, site specific soil and hydrogeologic characteristics, and other considerations.

(b) Monitoring wells shall be provided to detect the influence of the direct recharge operation.

(1) For direct recharge into potable ground water aquifers, monitoring wells, as a minimum, shall be located at points 500 feet and 1,000 feet (plus or minus 10%) along the ground water flow path from the point of recharge to the nearest point of withdrawal of ground water used as a source of drinking water supply. The number and location of proposed monitoring wells shall be described in the engineering report submitted pursuant to Article 9.

(i) Ground water from monitoring wells shall be sampled for TOC and primary contaminants, secondary contaminants, radionuclides, and carcinogens listed in Table 1 in chapter 173-200 WAC.

(ii) Sampling for constituents other than those required pursuant to Article 5, Section 9(b)(1)(i) may be specified by the Departments of Ecology and Health.

(2) For direct recharge into nonpotable ground water aquifers, monitoring wells shall be established on a case-by-case basis. At the discretion of the Departments of Ecology and Health, withdrawal wells that extract ground water for nonpotable applications may be designated as monitoring wells.

(i) Constituents to be sampled from ground water monitoring wells shall be determined on a case-by-case basis by the department.

Article 6. General Requirements of Design

Section 1. Flexibility of Design

The design of process piping, equipment arrangement, and unit structures in the reclamation plant must allow for efficiency and convenience in operation and maintenance and provide flexibility of operation to permit the highest possible degree of treatment to be obtained under varying circumstances.

Section 2. Alarms

(a) Alarms required for various unit processes as specified in other sections of these regulations shall be installed to provide warning of:

(1) Loss of power from the normal power supply,

(2) Failure of a biological treatment process,

(3) Failure of a disinfection process,

(4) Failure of a coagulation process,

(5) Failure of a filtration process,

(6) Failure of a reverse osmosis process, and

(7) Any other specific process failure for which warning is required by the Washington Departments of Health and Ecology.

(b) All required alarms shall be independent of the normal power supply of the reclamation plant.

(c) The person to be warned shall be the plant operator, superintendent, or other responsible person designated by the management of the reclamation plant and capable of taking prompt corrective action.

(d) Individual alarms may be connected to a master alarm to sound at a location where it can be conveniently observed by the attendant. Where the reclamation plant is not attended full time, the alarm(s) shall be connected to sound at a police station, fire station or other full-time service unit with which arrangements have been made to alert the person in charge at times that the reclamation plant is unattended.

Section 3. Power Supply

The power supply shall be provided with one of the following reliability features:

(1) Alarm and standby power source.

(2) Alarm and automatically actuated short-term storage or disposal provisions as specified in Article 7, Section 1(a).

(3) Automatically actuated long-term storage or disposal provisions as specified in Article 7, Section 1(b).

Section 4. Storage, Where No Approved Alternative Disposal System Exists

(a) Where no alternative disposal system is permitted, system storage or other acceptable means shall be provided to assure the retention of reclaimed water at times when recharge is precluded.

(b) At a minimum, system storage capacity shall be the volume equal to three times that portion of the average daily flow of reuse capacity for which no alternative reuse or disposal system is permitted.

Article 7. Alternative Reliability Requirements

Section 1. Emergency Storage or Disposal

(a) Where short-term storage or disposal provisions are used as a reliability feature, these shall consist of facilities reserved for the purpose of storing or disposing of untreated or partially treated wastewater for at least a 24-hour period. The facilities shall include all the necessary diversion works, provisions for odor control, conduits, and pumping and pump back equipment. All of the equipment

other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(b) Where long-term storage or disposal provisions are used as a reliability feature, these shall consist of ponds, reservoirs, percolation areas, downstream sewers leading to other treatment or disposal facilities or any other facilities reserved for the purpose of emergency storage or disposal of untreated or partially treated wastewater. These facilities shall be of sufficient capacity to provide disposal or storage of wastewater for at least 20 days, and shall include all the necessary diversion works, provisions for odor and nuisance control, conduits, and pumping and pump back equipment. All of the equipment other than the pump back equipment shall be either independent of the normal power supply or provided with a standby power source.

(c) Diversion to a different type of reuse is an acceptable alternative to emergency disposal of partially treated wastewater provided that the quality of the partially treated wastewater is suitable for that type of reuse.

(d) Subject to prior approval by the Washington Departments of Ecology and Health, diversion to a discharge point where the wastewater meets all discharge requirements is an acceptable alternative to emergency disposal of partially treated wastewater.

(e) Automatically actuated short-term storage or disposal provisions and automatically actuated long-term storage or disposal provisions shall include, in addition to provisions of (a), (b), (c), or (d) of this section, all the necessary sensors, instruments, valves, and other devices to enable fully automatic diversion of untreated or partially treated wastewater to approved emergency storage or disposal in the event of failure of the treatment process, and a manual reset to prevent automatic restart until the failure is corrected.

Section 2. Biological Treatment

All biological treatment unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple biological treatment units capable of producing oxidized wastewater with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions; or

(4) Automatically actuated long-term storage or disposal provisions.

Section 3. Secondary Sedimentation

All secondary sedimentation unit processes shall be provided with one of the following reliability features:

(1) Multiple sedimentation units capable of treating the entire flow with one unit not in operation;

(2) Standby sedimentation unit process; or

(3) long-term storage or disposal provisions.

Section 4. Coagulation

(a) All coagulation unit processes shall be provided with the following features for uninterrupted chemical feed:

(1) Standby feeders;

(2) Adequate chemical storage and conveyance facilities;

(3) Adequate reserve chemical supply; and

(4) Automatic dosage control.

(b) All coagulation unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple coagulation units capable of treating the entire flow with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and standby coagulation unit process.

Section 5. Filtration

All filtration unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple filter units capable of treating the entire flow with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and standby filtration unit process.

Section 6. Reverse Osmosis

All reverse osmosis unit processes shall be provided with one of the following reliability features:

(1) Alarm and multiple reverse osmosis units capable of treating the entire flow with one unit not in operation;

(2) Alarm, short-term storage or disposal provisions and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and standby reverse osmosis unit process.

Section 7. Disinfection

(a) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with the following features for uninterrupted chlorine feed:

(1) Standby chlorinator;

(2) Standby chlorine supply;

(3) Manifold systems to connect chlorine cylinders;

(4) Chlorine scales;

(5) Automatic switchover to full chlorine cylinders; and

(6) Continuous measuring and recording of chlorine residual.

(b) All disinfection unit processes where chlorine is used as the disinfectant shall be provided with one of the following reliability features:

(1) Alarm and standby chlorinator;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions; or

(5) Alarm and multiple point chlorination. Each point of chlorination shall have an independent power source, separate chlorinator, and separate chlorine supply.

(c) All other disinfection unit processes shall be provided with one of the following reliability features:

(1) Alarm and standby disinfection unit capable of treating the design flow rate with the largest operating unit out of service;

(2) Alarm, short-term storage or disposal provisions, and standby replacement equipment;

(3) Alarm and long-term storage or disposal provisions;

(4) Automatically actuated long-term storage or disposal provisions.

Section 8. Other Alternatives to Reliability Requirements

Other alternatives to reliability requirements set forth in Articles 6 and 7 may be accepted if the applicant demonstrates to the satisfaction of the Washington Departments of Ecology and Health that the proposed alternative will assure an equal degree of reliability.

Article 8. Reclaimed Water Transmission and Distribution System Requirements

Section 1. General

(a) Except as approved by the Washington Departments of Ecology and Health, reclaimed water shall be confined to the designated and approved use area in accordance with the state discharge permit.

(b) Maximum attainable separation between reclaimed water lines and potable water lines shall be practiced. A minimum horizontal separation of 10 feet shall be maintained between reclaimed water lines and potable water lines. When crossing, a minimum vertical separation of 18 inches shall be maintained between reclaimed water lines and potable water lines in accordance with the 1985 Edition of Criteria for Sewage Works Design (or as amended), Washington Department of Ecology, and the potable water line shall be above the reclaimed water line unless otherwise approved by the Washington Departments of Ecology and Health.

(c) All reclaimed water valves, storage facilities, and outlets shall be tagged or labeled to warn the public or employees that the water is not intended for drinking. The signage or advisory notification shall be colored purple with white or black lettering [Pantone 522 or 512 or other shades of purple acceptable to review agencies]. Signs or notification should read “Reclaimed Water — Do Not Drink” or other advisory or educational language acceptable to Health or Ecology.

(d) All reclaimed water piping, valves, outlets, and other appurtenances shall be color-coded purple [Pantone 522 or other shades of purple acceptable to review agencies], taped purple [Pantone 512 or other shades of purple acceptable to review agencies], or otherwise marked to identify the source of the water as being reclaimed water.

(1) All reclaimed water piping and appurtenances shall be either colored purple [Pantone 522 or other shades of purple acceptable to review agencies] and embossed or integrally stamped or marked “CAUTION: RECLAIMED WATER — DO NOT DRINK” or be installed with a purple [Pantone 512 or other shades of purple acceptable to review

agencies] identification tape or polyethylene vinyl wrap. The warning shall be stamped on opposite sides of the pipe and repeated every three feet or less.

(2) Identification tape shall be at least three inches wide and have white or black lettering on a purple [Pantone 512 or other shades of purple acceptable to review agencies] field stating "CAUTION: RECLAIMED WATER - DO NOT DRINK." Identification tape shall be installed on top of reclaimed water pipelines, fastened at least every ten feet to each pipe length, and run continuously the entire length of the pipe.

(e) All reclaimed water valves and outlets shall be of a type, or secured in a manner, that permits operation only by authorized personnel.

(f) Except as authorized by the Washington Departments of Ecology and Health, hose bibs on reclaimed water lines are prohibited.

(g) Reclaimed water storage ponds shall not result in contamination of ground water that is used as, or suitable to be used as, a source of water supply for domestic purposes. Reclaimed water storage ponds that are not lined or sealed to prevent seepage are acceptable if it is demonstrated to the satisfaction of the Washington Departments of Ecology and Health that such contamination will not occur.

Section 2. Cross-Connection Control

(a) There shall be no cross-connections between the reclaimed water and potable water systems. The permittee or person(s) who distributes reclaimed water or owns or otherwise maintains control over the injection facilities shall establish and obtain approval from the Washington Department of Health for a cross-connection control and inspection program pursuant to chapter 246-290-490 WAC.

(b) Where both reclaimed water and potable water are supplied to a reclaimed water injection well, a reduced pressure principle backflow prevention device or an approved air gap separation shall be installed at the potable water service connection to the use area.

(c) Where potable water is used to supplement a reclaimed water system, there shall be an air gap separation, approved and regularly inspected by the potable water supplier, between the potable water and reclaimed water.

Section 3. Setback Distances

(a) For reclaimed water used for direct recharge, the following setback distances shall apply:

(1) There shall be a minimum of 50 feet between any reclaimed water pipeline and potable water supply well.

(2) Where reclaimed water is used for a storage pond that is not lined or sealed to prevent measurable seepage, there shall be a minimum of 500 feet between the perimeter of the storage pond and any potable water supply well.

(3) Where reclaimed water is used for a storage pond that is lined or sealed to prevent measurable seepage, there shall be a minimum of 100 feet between the perimeter of the storage pond and any potable water supply well.

(b) Exceptions to the setback distances noted in Article 8, Section 3(a), may be approved by the Washington Departments of Ecology and Health if lesser setback distances can be demonstrated to the satisfaction of the Departments to assure an equal degree of public health protection.

Article 9. Engineering Report

Section 1. Engineering Report

(a) No person shall produce or supply reclaimed water for direct recharge unless he files an engineering report with the Washington Departments of Ecology and Health.

(b) The report shall be prepared by an engineer registered in Washington and experienced in the field of wastewater treatment, and shall contain a description of the design of the proposed reclamation system. The report shall clearly indicate the means for compliance with these standards and any other reclamation requirements specified by the Washington Departments of Health and Ecology. The engineering report shall also meet the regulatory requirements found within chapter 173-240-060 WAC (Submission of Plans and reports for Construction of Wastewater Facilities) and applicable sections of chapter 246-290 WAC (Group A Public Water Systems).

(c) For all direct recharge projects, the engineering report shall contain but not be limited to the following elements:

(1) Description of the operational and management personnel, their qualifications, experience, and responsibilities.

(2) Process description and diagram that delineates the treatment processes, transmission facilities, direct recharge facilities, monitoring well facilities, and reliability features and controls.

(3) Identification of the basis for design predicated on such sources as pilot plant results, recognized design standards published by industry professional organizations, accepted engineering design and operation references, USEPA, state regulatory agencies or site specific experience and operations data.

(4) Description and results of any pilot plant studies undertaken to assess the applicability of selected and alternative treatment processes and used to define unit design and operations parameters.

(5) Reliability assessment of complete treatment trains, unit processes, major and/or significant equipment and/or components.

(6) Engineering design calculations for the reclamation process that include: disinfection contact time, coagulation process, filtration process, and reverse osmosis process (if required). Design approaches shall be consistent with accepted engineering practice as defined by Water Environment Federation, American Society of Civil Engineers, American Water Works Association, USEPA, USDA, Soil Conservation Service and recognized engineering references.

(7) A hydrogeologic study of the ground water aquifer proposed to receive the reclaimed water shall:

(i) describe the impact of the direct recharge project on potable ground water;

(ii) describe the source, area of recharge, quality, hydrostratigraphy, aquifer characteristics, and ground water flow patterns for all ground water within the ground water basin receiving recharged reclaimed water;

(iii) identify all wells or areas that will be affected by the proposed project and describe the ground water quality in the aquifer receiving the reclaimed water;

(iv) identify the well(s) subject to the highest reclaimed water contribution and shortest reclaimed water retention time in the underground;

(v) assess the possibility of premature discharge of ground water to the surface, landslides, or other slope failures resulting from the proposed project; and

(vi) include quantitative descriptions of the soil, soil layers, aquifer transmissivity, aquifer hydraulic conductivity, rate and direction of flow, aquifer boundaries, historic ground water levels, and aquifer storage capacity of the aquifer.

(8) Identification of the agency responsible for preventing the withdrawal of potable ground water within certain areas pursuant to Article 5, Section (6)(d).

(9) Description of the methods of determination and results for minimum retention time in the underground and minimum horizontal separation between the point of direct recharge and withdrawal of potable ground water.

(10) The number and location of monitoring wells.

(11) A water quality monitoring plan for treated wastewater, reclaimed water and ground water withdrawn from monitoring wells.

(d) A summary checklist should be submitted that outlines if each article within the standard was addressed in the report or why a particular section(s) were omitted.

(e) The report shall contain a contingency plan which will assure that no untreated or inadequately-treated wastewater will be recharged.

(f) The report shall discuss cross-connection control issues and detail the water purveyors program for cross-connection control and whom will be responsible for compliance and testing of cross-connection control activities.

Article 10. Pilot Plant Study

Section 1. Pilot Plant Study

(a) A pilot plant study shall be performed prior to implementation of direct recharge into a potable ground water aquifer. A study protocol shall be submitted to the Departments of Ecology and Health for review and approval prior to pilot plant testing. The protocol shall, as a minimum, include a description of all equipment and facilities to be used during the study, treatment capacity of the pilot plant, operation and maintenance procedures, constituents to be monitored, monitoring frequency, sampling techniques, analytical methods, and length of study.

(1) The pilot plant study shall evaluate the efficacy of the selected treatment process train to reliably meet all reclaimed water quality requirements pursuant to Article 3, Section 1. The study shall evaluate the effect direct recharge of reclaimed water would have on the ground water aquifer, including the capability to meet ground water quality criteria required by the department.

(2) The reclaimed water shall be subjected to microbiological testing to evaluate the efficacy of the selected treatment process train to produce reclaimed water that does not contain measurable levels of pathogenic bacteria, parasites, and viruses.

(3) Toxicological testing of the reclaimed water may be required to evaluate health risks related to human consumption of the water.

(4) Direct recharge of reclaimed water into a potable ground water aquifer shall not occur during the pilot plant study.

(b) A pilot plant study is not required prior to implementation of direct recharge into a nonpotable ground water aquifer unless specified by Ecology or Health.

(1) If a pilot plant study is required, a study protocol shall be submitted to Ecology and Health for review and approval prior to pilot plant testing. The protocol should include a description of all equipment and facilities to be used during the study, treatment capacity of the pilot plant, operation and maintenance procedures, constituents to be monitored, monitoring frequency, sampling techniques, analytical methods, and length of study.

(2) Direct recharge of reclaimed water into a nonpotable ground water aquifer shall not occur during a pilot plant study unless authorized by Ecology and Health.

(3) If direct recharge of reclaimed water into a nonpotable ground water aquifer during a pilot plant study is authorized by Ecology and Health, the Departments may require that the reclaimed water be subjected to microbiological testing prior to recharge to evaluate the efficacy of the selected treatment process train to produce reclaimed water that does not contain measurable levels of pathogenic bacteria, parasites, and viruses.

Article 11. Summary of Standards

Section 1. Treatment and Water Quality Requirements

Provisions of Articles 2 through 10 of these standards shall govern the use of reclaimed water for direct recharge. Table 1 summarizes the treatment and quality requirements for direct recharge of reclaimed water. Table 1 is not intended to cite all of the requirements of the articles cited above in this section, nor to contain any requirement not specified in these standards.

Section 2. Monitoring Requirements

Provisions of Article 4 set forth the sampling and analysis requirements associated with the production and use of reclaimed water for direct recharge. Table 2 is not intended to indicate all of the monitoring requirements cited in these standards, nor to contain any requirement not specified in these standards.

Table 1.
Treatment/Quality Requirements for Direct Recharge with Reclaimed Water

Use	Treatment Requirements	Quality Requirements
Direct recharge into nonpotable ground water aquifers	Class A reclaimed water treatment	Class A reclaimed water quality requirements BOD ≤ 5 mg/L TSS ≤ 5 mg/L
Direct recharge into potable ground water aquifers	Oxidation Filtration Coagulation Reverse osmosis Disinfection	Class A reclaimed water quality requirements (except for total coliform organisms) Water quality criteria for primary contaminants (except nitrate), secondary contaminants, radionuclides, and carcinogens listed in Table 1 in chapter 173-200 WAC Other drinking water MCLs Turbidity ≤ 0.1 NTU Total nitrogen ≤ 10 mg/L (as N) TOC ≤ 1.0 mg/L

Table 2.
Monitoring Requirements for Direct Recharge with Reclaimed Water

Parameter	Sample Type & Frequency	Compliance Requirements
Oxidized Wastewater:		
BOD	24-hour composite, collected at least weekly	≤ 30 mg/L average determined monthly, based on arithmetic mean of all samples collected during the month
TSS	24-hour composite, collected at least daily	≤ 30 mg/L average determined monthly, based on arithmetic mean of all samples collected during the month
Dissolved oxygen	Grab, collected at least daily	Shall contain dissolved oxygen
Filtered Wastewater:		
Turbidity	Continuous recording turbidimeter	≤ 2 NTU average determined monthly; 5 NTU maximum
Reclaimed Water:		
BOD	24-hour composite, collected at least daily	≤ 5 mg/L average determined daily, based on arithmetic mean of all daily samples collected during last 7 days of operation
TSS	24-hour composite, collected at least daily	≤ 5 mg/L average determined daily, based on arithmetic mean of all daily samples collected during last 7 days of operation
Total coliforms	Grab, collected at least daily	1/100 mL median value determined daily based on bacteriological results of last 7 days for which analyses have been completed; 5/100 mL maximum
TOC	24-hour composite, collected at least daily	≤ 1.0 mg/L average determined daily, based on arithmetic mean of all samples collected during last 30 days of operation
Primary contaminants (except total coliforms and nitrate), secondary contaminants, radionuclides, and carcinogens listed in chapter 173-200 WAC	Grab or 24-hour composite, collected at least quarterly	Compliance with limits listed in Table 1 in chapter 173-200 WAC determined annually, based on arithmetic mean of all samples collected during previous 12 months
Total Nitrogen	Grab or 24-hour composite, collected at least weekly	≤ 10 mg/L (as N) average determined annually, based on arithmetic mean of all samples collected during previous 12 months

Table 2.
Monitoring Requirements for Direct Recharge with Reclaimed Water (Cont.)

Parameter	Sample Type & Frequency	Compliance Requirements
Potable Ground Water from Monitoring Wells:		
TOC	Grab, collected at least quarterly	No limit specified in these standards
Primary contaminants, secondary contaminants, radionuclides, and carcinogens listed in chapter 173-200 WAC	Grab, collected at least quarterly	No limits specified in these standards
Nonpotable Ground Water from Monitoring Wells:		
Case-by-case determination	Case-by-case determination	Case-by-case determination