

**Recycled Water Use Plan**  
**For**  
**<Permittee Name>**  
**<NPDES/WPCF> Permit No. <number>**  
**File No. <number>**

**Facility:**

**<Legal Name>**  
**<Common Name>**

**Physical Address**

**<Address>**  
**<City> <State> <Zip>**

**Mailing Address (if different)**

**<Address>**  
**<City> <State> <Zip>**

**Contact: <Name>**

**Phone: <XXX.XXX.XXXX>**

**Email: <name@facility>**

**<Month> <Year>**

**INTRODUCTION**

Provide an introduction to facility and the recycled water program. Also include the following information:

- A statement that the current RWUP supersedes any previously plans
- A brief description of the lines of authority and communication within the recycled water program, including the recycled water user(s); and
- Contact information of parties responsible for various aspects of environmental compliance.

**BENEFICIAL PURPOSES**

Beneficial purposes lie at the core of the recycled water use program and can influence wastewater treatment, monitoring, as well as public health and environmental concerns. Beneficial purposes must be identified in the RWUP [OAR 340-055-0025(1)(c)]. Include:

- A list or table of beneficial purposes and the Class(es) of water. Ex:

Beneficial Purpose	Class of Water	Quantity (mgd)	Frequency
<Beneficial Purpose 1>	Class <A, B, C, D>	<number>	<April - October>
<Beneficial Purpose 2>	Class <A, B, C, D>	<number>	<Year Round>
<etc.>	<etc.>	<etc.>	<etc.>

- The name, address, and phone number of the owner(s) and user(s) of each site receiving recycled water

**WASTEWATER TREATMENT**

The RWUP must describe wastewater treatment operations at the treatment facility [OAR 340-055-0025(1)(a)]. The description should include information on the quantity and quality of both wastewater treated and recycled water produced. If the wastewater treatment system operations are described in other documents, those documents may be referenced in the RWUP. Current copies of those documents must be readily available to the Department and should have been approved. The following information is pertinent to describing the wastewater treatment system:

- A general description of the treatment system, including treatment efficiency capability(an overall flow diagram showing the entire treatment and reuse process recommended);
- A brief description of the quantity (gpd), and origin (% domestic, % commercial, % industrial) of wastewaters processed in the treatment facility;
- The operating volumes (gallons) of each component of the wastewater processing stream (diagram recommended);
- A detailed, step-by-step description of the unit processes used to a specific class of recycled water [OAR 340-055-0025(1)(b)];
- A summary of the quantity of recycled water produced;
- A description of any blending operations, including the source of the water, estimates of the blending ratios;
- A summary of the recycled water quality supplied to each beneficial purpose. The exact data needed to characterize the recycled water may vary based on the specific end use(s), but may include the following common parameters: *E. coli*, total coliform, turbidity, BOD, TSS, TKN, NH<sub>4</sub>-N, NO<sub>3</sub>-N, total P, K, Ca, Mg, Na, pH, TDS, etc.<sup>1</sup>

<sup>1</sup> Recycled water quality information should generally include at a minimum the basic physical parameters, bacteria, and nutrients. Additional information such a mineral or metals concentrations (e.g., Ca, Mg, TDS, Fe, Mn, etc. ) may be necessary for specific end uses, such as boiler water, agricultural irrigation, or other beneficial purposes that may be sensitive to recycled water quality.

## RECYCLED WATER MONITORING AND SAMPLING

The RWUP must describe monitoring and sampling procedures [OAR 340-055-0025(1)(e)]. Monitoring and sampling applies to both recycled water quantity and quality. DEQ, WRD [OAR 340-055-0025(1)(h)], or other agencies may specify monitoring requirements. Since monitoring and sampling may vary based upon the Class of water and/or the beneficial purpose, monitoring and sampling procedures must provided the relevant level of detail. For each Class of Water-Beneficial Purpose combination, provide the following information:

- Recycled water quantity:
  - Estimate of quantity of recycled water produced;
  - Measurement techniques (e.g., flowmeters, flumes);
  - Frequency (e.g., weekly, monthly, seasonal);
  - Location (i.e., at a point representative of recycled water volume sent to distribution systems);
  
- Recycled water quality:
  - Parameters and estimated concentrations (e.g., E. coli, total coliform, turbidity, BOD, TSS, TKN, NH<sub>4</sub>-N, NO<sub>3</sub>-N, total P, K, Ca, Mg, Na, pH, TDS, etc.); Actual data from previous monitoring operations may be provided.
  - Sample type (e.g., continuous, grab, composite);
  - Sampling methods (e.g., autosampler, bailer);
  - Frequency (e.g., weekly, monthly);
  - Location (i.e., a point that is representative of the recycled water entering the distribution systems; a diagram or schematic is recommended);
  - Analytical methods (e.g., Standard Analytical Methods, DEQ approved methods);
  - Field Quality Assurance / Quality Control (QA/QC) procedures (e.g., field equipment calibration, field equipment decontamination, sample duplicates, field blanks, rinse water blanks, trip blanks);
  - Laboratory QA/QC procedures ;

## SYSTEM MAINTENANCE AND CONTINGENCY PROCEDURES

The RWUP must include a maintenance plan that describes how the wastewater treatment system equipment and facility processes will be maintained [OAR 340-055-0025(1)(f)], as well as a description of contingency procedures [OAR 340-055-0025(1)(d)].

- The facility's operations and maintenance plan may be included by reference in the information is provided in another document. However, the referenced document must be readily available to DEQ and should have been previously approved by the Department.
- A description of the alarm devices or equipment that will be furnished pr provide warning of loss of power, and/or failure of processing equipment essential to the generation of recycled water <sup>2</sup>
- A description of the standby power systems used to ensure that all essential processes operate during interruptions <sup>3</sup>

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<sup>2</sup> OAR 340-055-0030(2) Alarm devices. Alarm devices are required to provide warning of power loss and failure of process equipment essential to the proper operation of the wastewater treatment system and compliance with this division.

<sup>3</sup> OAR 340-055-0030(3) Standby power. Unless otherwise approved in writing by the department, a wastewater treatment system providing recycled water for use must have sufficient standby power to fully

- A description of the redundant treatment systems that will be furnished to provide warning of loss of power and/or failure of process equipment essential to the recycled water generation <sup>4</sup>

### **RECYCLED WATER TRANSMISSION, STORAGE, DISTRIBUTION, AND PLUMBING**

The RWUP should include a description of the recycled water transmission, storage, and distributions systems, including plumbing considerations to avoid cross connections.

- A characterization of all proposed recycled water storage facilities (short-term, long-term, and emergency), including: facility location(s), dimensions (feet), operating capacity (gallons), and pollution controls (e.g., liners, barriers, or other controls to prevent spills, overflows, or other upsets);
- A description of the recycled water transmission system used to move recycled water from the treatment facility to storage facilities, satellite facilities, or reuse site(s), including labelling or other identification mechanisms used to prevent cross connections with other systems; and
- A description of how all piping, valves, and other portions of the recycled water distribution and plumbing systems will be constructed and marked to prevent cross-connection with potable systems
- A description of measures (e.g., chlorine residual, filtration) used to control water quality, if any, during recycled water transmission, storage, or distribution.

### **PUBLIC HEALTH AND ENVIRONMENTAL CONTROLS**

For each identified beneficial purpose, the RWUP should identify potential public health and environmental concerns as well as the measures taken to control adverse effects on public health and the environment. The RWUP must include a description of public and personnel notification procedures in the reuse area (when required) [OAR 340-055-0025(1)(g)]. For each Beneficial Purpose, provide the following information:

- Identify any public health (e.g., aerosols, direct contact) and environmental concerns (e.g., groundwater, surface water)
- A detailed description of an access and exposure controls employed at reuse sites, such as fences, windbreaks, etc.
- A description of personnel and public notification procedures, including samples of any written materials
- A map Identifying the reuse site and setbacks to property lines, water supply sources, and food preparation/drinking fountains (these features should be identified on the map)
- Specific site management practices used at reuse sites designed to protect public health and the environment, including
  - o Signage
  - o Irrigation scheduling, when appropriate
  - o Grazing, crop, and/or harvest restrictions, when appropriate

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operate all essential treatment processes. The department may grant an exception to this section only if the wastewater treatment system owner demonstrates that power failure will not result in inadequately treated water being provided for use and will not result in any violation of an NPDES or WPCF permit limit or condition or Oregon Administrative Rule.

<sup>4</sup> OAR 340-055-0030(4) Redundancy. A wastewater treatment system that provides recycled water for use must have a sufficient level of redundant treatment facilities and monitoring equipment to prevent inadequately treated recycled water from being used or discharged to public waters.

- Stormwater control measures, when appropriate
- Overflow control measures, when appropriate
- Decontamination procedures for equipment, facilities, or vehicles that contact recycled water.
- A reference to (or description of) groundwater monitoring activities, if required

***For Class B, C, D, or nondisinfected water used for irrigation ONLY.***

**LAND APPLICATION PLAN**

When Class B, C, or D water is used for irrigation, the RWUP must also address various aspects of the land application program, including characterization of the land application site, the irrigation system, the soils and crops, site management practices, and public access control or notification [OAR 340-055-0025(2)(a)-(e)]. Although a Land Application Plan is not required for irrigation with Class A waters, many of the operational considerations are applicable to higher level of treatment and the permittee/applicant should be encouraged to develop an operations plans. Unless a plan for irrigation with Class A water is identified in Schedule D of the permit to protect public health or the environment (e.g., to comply with a GWMA Action Plan), the Department cannot require development of a Land Application Plan for Class A recycled water. A separate land application plan should be submitted for each irrigation system/project. (Multiple land application plans may be included in a single RWUP.) This section may be omitted of the RWUP if irrigation is not an identified beneficial purpose.

Site Description. The RWUP must identify and describe the land application site(s), which should include the following information:

- Zoning of the irrigation site and neighboring properties;
- A site map with setbacks, location(s) of and distances to property boundaries, water supply sources, food preparation or drinking fountains, and nearest developed property
- Street address (if any) and legal descriptions (i.e., county, township, range, section, tax lot) of each site receiving recycled water
- Location(s) of fields irrigated with recycled water
- A map(s) identifying:
  - o field acreage;
  - o the location of any drinking water wells, agricultural dry wells, drainage ditches, surface water features, etc.,
  - o the locations of pump station(s), storage lagoon(s), surge basin(s), irrigation distribution system(s), etc.
- A Land Use Compatibility assessment, such as
  - o Zoning
  - o Historical land use
  - o Present land use
  - o Future land use
  - o Adjacent land uses

***Site Characterization.***

The RWUP must provide a site characterization, including a description of soils and crops (or vegetation) at the land application site. A full site characterization should also include information on topography, hydrology, geology, and climate:

- USGS topographic map
- A description of topographical characteristics of the sites, including slope, landform (i.e., convex, concave), and site landscape position (i.e., upland, terrace, side slope, etc.)

- The locations of any perennial or seasonal drainages
- NRCS soil maps and soil series descriptions
- Descriptions of soils<sup>5</sup>, including: soil texture; structure; rooting abundance and depth; color; presence, depth, and distribution of mottling; drainage class; pore size, continuity and abundance; coarse fragment content (percent by volume); depth to groundwater (both permanent and seasonal); depth to and identification of any restrictive layers (i.e., bedrock, hardpan, fragipan, etc.);
- An estimate of or actual information on the soil infiltration rate (e.g., saturated hydraulic conductivity, Ksat), permeability, and available water holding capacity, AWHC
- Regional and local hydrogeology, when required (see AR section for contents)
- Climatic information including, mean annual and monthly precipitation, evaporation and temperature; the average length of the growing season; average dates of first and last frost; the number of days the mean temperature drops below 32 F; stormwater runoff potential; and prevailing wind direction and intensity

### ***Crops.***

A description of particular crops grown on the land application sites (fields), which should include the following information and may be provided in a table:

- List of proposed crops (e.g., all and everything that is planning on growing on land application sites),
- Projected harvest (e.g., bu/ac, number of cuttings, protein content, etc.)
- Current OSU Fertilizer Guides (FG)/other approved agronomic rates (e.g., identified FG guides , or submitted scientific literature to be approved with the RWUP),
- Crop fertilizer needs—specifically N and P (e.g., OSU total nitrogen numbers, site-specific crop needs that are under the OSU FG, nitrogen numbers according to submitted scientific literature),
- Any crop sensitivities to water quality (e.g., salts, B, chloride, etc.)
- Crop specific typical rooting depths of crops selected,
- Monthly and Annual projected crop water needs (e.g., OSU irrigation planning guide, historic localized crops specific water needs),
- Timing of application (e.g., spring, summer, fall, winter irrigation amounts for seen to be applied),
- Double Cropping (e.g., whether or not the concept to be optimized under land application program),
- List any harvest restrictions due to pathogen issues in the wastewater or wastewater solids (i.e. reclaimed water).

### ***Irrigation System.***

The RWUP must include a description of the irrigation system which should include:

- A description and plot of the irrigation system layout and controls, including but not limited to (engineering plans and specifications recommended):
  - o Storage;
  - o distributions methods,

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<sup>5</sup> Although general soil characteristics can be gathered from the NRCS soil survey, actual soil characteristics can vary widely from those mapped or described. An actual field investigation by a soil scientist is strongly, especially for projects in sensitive areas (e.g., GWMA, TMDL limited watersheds, etc.). Field investigations should include soil examination to a depth of 5-feet. The actual number of soil pits or bore holes will depend upon the irrigation site characteristics, such as total area and site variability.

- application methods;
- start up procedures;
- typical daily operations (e.g., draining distribution lines to minimize potential odors during startup on the following day);
- shutoff procedures;
- nozzle design
- A description of irrigation system operations, including how loading and resting rates will be managed and monitoring in irrigation areas to assure that excess soil saturation, groundwater contamination, and runoff will not occur (e.g., moisture monitoring);
- A description and plot of the drainage system layout and controls, including the locations of and connections to surface water features;
- An irrigation system maintenance plan;

### ***Application Rates and Irrigation Scheduling.***

In order to protect groundwater and surface water, the land application plan needs to address the irrigation scheduling, including consideration for both water application and nutrient application:

- An estimated irrigation schedule, including monthly budget calculations:
  - A summary of the recycled water quality before and after any blending delivered to the irrigation site, BOD, TSS, TKN NO<sub>3</sub>-N, NH<sub>4</sub>-N, total P, K, Ca, Mg, Na, SAR, pH TDS
  - The quantity of recycled water required to meet the crop nutrient needs, including the methods (assumptions and equations) used to calculate the agronomic rate
  - Estimated monthly and annual water application rates that account for crop irrigation requirement, leaching fractions, and irrigation efficiency
  - The methods (i.e., assumptions and equations) used to calculate water application rates (i.e., hydraulic loading calculations and agronomic loading calculations), including accounting for leaching fraction, irrigation efficiency, moisture control, etc.;
  - An indication of which factor limits recycled water application, either the hydraulic loading rate or agronomic loading rate
- Supplemental Water. A description of the land applied supplemental fresh water should include both quantity and quality information.
- Precipitation. A description of the average natural precipitation quantities in the specific area that the land application sites are located should be included.
- Supplemental Fertilizer. A description of supplemental fertilizer (i.e., commercial, chemical, manure, etc.) applications to the land application sites should include both quantity applied and fertilizer type (quality).

### ***Site Monitoring Plan.***

The RWUP should include a description of water and nutrient loadings to the land application site.

The site monitoring plan may include information on:

- Soil Sampling. A description of any soil sampling and monitoring as needed as part of the nutrient balance and soil salinity tracking on land application sites regarding soil fertility and crop toxicity
- Soil Moisture Monitoring. A description of a particular soil moisture sampling and monitoring protocol, as part of the hydraulic balance and prescribed leaching fraction tracking/monitoring on land application sites
- Biomass (Crop) Sampling. A description of a particular biomass sampling and monitoring protocol, as part of the nutrient (nitrogen) balance and site-specific nutrient uptake tracking, and crop health on land application sites.

- Recycled Water Application Monitoring. A description of site-specific wastewater monitoring protocol out on the land application sites (fields) in regards to irrigation accounting of the wastewater, as part of the hydraulic balance, which in turn helps to determine nutrient (nitrogen) loadings

*For Class A water used for Artificial Groundwater Recharge ONLY.*

**ARTIFICIAL GROUNDWATER RECHARGE (AR) PLAN**

A detailed description of Artificial Groundwater Recharge operations is required when AR is an identified beneficial purpose. This section may be omitted from plans in which AR is not an identified use.

- A groundwater monitoring plan in accordance with OAR 340-040-0030(2). If a separate groundwater monitoring plan has been developed, it may be incorporated into the RWUP by reference.
- A map identifying the groundwater recharge area, groundwater flow direction, the location of any drinking water protection area, and the location of the nearest point of withdrawal.
- The estimated retention time of recycled water in the aquifer.
- General geology and hydrogeology, such as stratigraphy, structure, aquifers, aquitards and low permeability layers; groundwater quality.
- Uppermost aquifer characteristics such as:
  - Type (confined versus unconfined)
  - Material (alluvial, dunal, fractured, volcanic, or other)
  - Depth to uppermost aquifer
  - Depth to seasonal high water table
  - Hydraulic conductivity
  - Storage coefficient
  - Estimated porosity
  - Calculated hydraulic gradient
  - Fluctuations in groundwater flow and direction
  - Contour map of potentiometric surface (i.e., groundwater table)
  - Calculated groundwater flow velocities
  - Interconnection with surface water bodies or other aquifers
- AR site characteristics, including
  - USGS topographic map
  - A description of topographical characteristics of the sites, including slope, landform (i.e., convex, concave), and site landscape position (i.e., upland, terrace, side slope, etc.)
  - The locations of any perennial or seasonal drainages
  - NRCS soil maps and soil series descriptions
  - Descriptions of soils<sup>6</sup>, including: soil texture; structure; rooting abundance and depth; color; presence, depth, and distribution of mottling; drainage class; pore size, continuity and abundance; coarse fragment content (percent by volume); depth to groundwater (both permanent and seasonal); depth to and identification of any restrictive layers (i.e., bedrock, hardpan, fragipan, etc.);

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<sup>6</sup> Although general soil characteristics can be gathered from the NRCS soil survey, actual soil characteristics can vary widely from those mapped or described. An actual field investigation by a soil scientist is strongly, especially for projects in sensitive areas (e.g., GWMA, TMDL limited watersheds, etc.). Field investigations should include soil examination to a depth of 5-feet. The actual number of soil pits or bore holes will depend upon the irrigation site characteristics, such as total area and site variability.



- Information on the soil infiltration rate (e.g., saturated hydraulic conductivity, Ksat), permeability, and available water holding capacity, AWHC
  - Climatic information including, mean annual and monthly precipitation, evaporation and temperature; the average length of the growing season; average dates of first and last frost; the number of days the mean temperature drops below 32 F; stormwater runoff potential; and prevailing wind direction and intensity
  - Any other information requested by WRD
- Verification from WRD that a request for authorization for this use has been initiated.

### **RECORDS AND REPORTING**

RWUPs should contain information on the recycled water use program's record keeping and reporting requirements, including:

- A description of the types of records which will be maintained by the facility, such as: effluent quality monitoring; recycled water system performance; on-going system maintenance records; inspection reports; sources and quantities of supplemental water; quantity of recycled water generated; final use of recycled water generated; site monitoring records; irrigation records; etc.
- A description of the reporting procedures (i.e., annual report) such as: responsibility for reporting; report contents, date of report, etc.