

## 4. Municipal Water Curtailment Element

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*This section satisfies the requirements of OAR 690-086-0160.*

*This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.*

### Introduction

Curtailment planning is the development of proactive measures to reduce demand during supply shortages as the result of prolonged drought or system failure from unanticipated events including catastrophic events (flooding, landslides, earthquakes and contamination), mechanical or electrical equipment failure, or events not under control of the City (e.g., localized or area-wide power outages and intentional malevolent acts).

The curtailment plan presented in this section is based on City Ordinance No. 2517, contained in **Appendix C**.

### History of System Curtailment Episodes

#### *OAR 690-086-0160(1)*

Within the last decade, the City has not experienced water shortages resulting from a constrained source of supply. The City has experienced short duration interruptions to normal service delivery as a result of mechanical or electrical malfunction of pumps and related electrical equipment at its intake and water treatment plant, and local electric utility outages. The City also has experienced interruption of treated water supply because of a blocked intake screen and a localized joint failure in a treated water transmission main. When these events occurred, the City issued press releases to local media outlets, posted alerts on its web page and contacted its wholesale customers to inform them of the situation and ask that nonessential water use be reduced until repairs were made and normal water service delivery was restored. These service disruptions have been short-lived and have not required sustained curtailment measures because the City has adequate distribution system storage volumes.

### Curtailment Event Triggers

#### *OAR 690-086-0160(3)*

Between 2001 and 2008, the City's ADD ranged from 6.1 to 7.4 mgd, with an average of 6.4 mgd. The City's MDD ranged from 12.1 to 16.9 mgd, and averaged 14.9 mgd, during the same period. Since 2001, the 3-day MDD has ranged from 11.2 to 16.6 mgd, and has averaged approximately 92 percent of the one-day MDD. This means that if the MDD equals 16 mgd, the City can be expected to experience 3 consecutive days with an average demand of 14.7 mgd each day.

The City's critical water system facilities include its water supply intake on the Clackamas River (located approximately 0.8 miles upstream of the confluence with the Willamette River), its water treatment plant located in the neighboring City of West Linn, and its raw and finished water transmission mains. These systems are now more than 40 years old. During the peak season, these critical facilities operate 24 hours per day, 7 days per week at maximum capacity. Analysis of these systems during an update of the City's water master plan conducted in 2001 indicates that to meet peak demands, all systems must operate at maximum installed capacity. This analysis also showed that firm capacity (i.e., actual delivery capacity with the largest pump out of service) was at or below peak demands as follows:

- The firm pumping capacity of the raw water intake is 13.5 mgd.
- The firm pumping capacity of the treated water pump station is 12.2 mgd.
- The water treatment plant cannot meet regulatory disinfection contact time requirements in the plant and must rely on portions of the treated water transmission main to achieve compliance.
- When water temperatures fall below 10° C., which is typical of winter conditions, the WTP cannot meet the contact time requirements at its full capacity of 16 mgd and must be operated at a reduced capacity.
- Both the raw and finished water transmission mains transmit water during peak demand periods at higher than an optimal, 5 feet per second, velocity.

During non-peak demand periods, curtailment triggers are unlikely to be met unless a catastrophic natural disaster impacts multiple elements of the City's source of supply. Absent a trigger of this magnitude, the City is well-positioned to meet its non-peak season customer demands for the following reasons:

- The City has seismically hardened its water intake structure to current *Uniform Building Code* (UBC) design codes.
- The City has seismically hardened its water treatment plant to remain operational after a seismic event exceeding current UBC design codes.
- The City has 27 MG of distribution system storage: enough to meet ADDs for 3 to 4 days. Enacting curtailment measures could extend this supply further.
- Of the City's 27 MG of storage, all but 1.7 MG is fully or partially buried, providing resistance to seismic events and deterring sabotage. In the last decade, the City has added an additional 11.5 MG of new, buried storage reservoirs designed to withstand seismic forces exceeding current UBC design codes.
- If the Clackamas River becomes unusable, the City maintains intersystem connections with the Cities of Portland, Tigard, and Tualatin.
- Existing firm pumping capacity in its intake and WTP exceed annual ADDs.

During the peak summer demand period from June through September, when the system is operating at or near its maximum capacity, interruption of supply because of a natural disaster, mechanical failure, terrorist act, or loss of source could present significant challenges to the

City. Therefore, the triggers and related curtailment stages in this curtailment plan are based primarily on events occurring during this time period.

## Curtailment Stages

### *OAR 690-086-0160(2)*

Depending on the nature of the event that results in a water supply shortage and considering predecessor and successor conditions, this curtailment plan for the City is designed to be initiated and implemented in progressive stages.

Events causing this plan to be activated would include, but not be limited to, the following:

- Abnormal weather conditions preceding the peak summer supply season that present a high likelihood for below normal summer streamflows in the Clackamas River
- Declaration of a drought for Clackamas County by the Governor pursuant to ORS 536.720
- Catastrophic natural disaster that damages individual critical facilities or extensive portions of the City's distribution system
- Mechanical or electrical malfunction of critical pumping facilities at the City's intake or water treatment plant
- Interruption of local utility electrical service
- Terrorist act perpetrated on any of the City's critical facilities or storage reservoirs, or contamination of source water

The City’s curtailment plan has five distinct stages, each of which is triggered by one or more of the events listed above and is grouped as shown in **Exhibit 4-1**.

EXHIBIT 4-1  
Curtailment Stages 1 through 5

Curtailment Stages	Initiating Conditions
<b>Stage 1:</b> <b>Water Shortage Alert</b>	<ul style="list-style-type: none"> <li>• Forecasts of below-normal summer streamflows</li> <li>• Mechanical or electrical malfunction causing the loss of any two pumps at intake facility</li> <li>• Minor damage to raw or treated water transmission mains (e.g., leaking joint requiring repair)</li> </ul>
<b>Stage 2:</b> <b>Serious Water Shortage</b> <b>Demand Reduction</b> <b>Target:</b> <b>10 percent of MDD</b>	<ul style="list-style-type: none"> <li>• Declaration of drought by Governor pursuant to ORS 536.720</li> <li>• Continuation of hot dry weather predicted</li> <li>• Declining river levels</li> <li>• Mechanical or electrical malfunction causing the loss of the largest pump at intake</li> <li>• Extensive repairs needed on raw or treated water transmission mains</li> </ul>
<b>Stage 3:</b> <b>Severe Water Shortage</b> <b>Demand Reduction</b> <b>Target:</b> <b>20 percent of MDD</b>	<ul style="list-style-type: none"> <li>• Continuation of hot dry weather predicted</li> <li>• Clackamas River streamflows below 510 cubic feet per second (cfs) between July 1 and September 15 or below 750 cfs between September 16 and June 30<sup>1</sup></li> <li>• Loss of pump 1, 2, or 3 at water treatment plant (WTP)</li> <li>• Loss of utility electrical service at intake</li> <li>• Multiple failures in the joints of the raw or treated water transmission mains</li> </ul>
<b>Stage 4:</b> <b>Critical Water Shortage</b> <b>Demand Reduction</b> <b>Target:</b> <b>50 percent of MDD</b>	<ul style="list-style-type: none"> <li>• Clackamas River streamflows below 510 cfs between July 1 and September 15 or below 730 cfs between September 16 and June 30 impacting instream water rights<sup>2</sup></li> <li>• Severe drought conditions</li> <li>• Loss of utility electrical service at water treatment plant or intake</li> <li>• Major mechanical or electrical malfunctions causing loss of multiple pumps at intake or water treatment plant</li> <li>• Transmission main failures</li> <li>• Fire at intake or water treatment plant</li> <li>• Imminent terrorist threat against supply system</li> <li>• Contamination of source of supply</li> </ul>
<b>Stage 5:</b> <b>Emergency Water Shortage</b>	<ul style="list-style-type: none"> <li>• Continuation of severe drought conditions</li> <li>• Extensive damage to transmission, pumping, or treatment processes caused by natural disaster</li> <li>• Intentional acts or fire, contamination of source, or any other event resulting in an immediate, sustained deprivation of water supply</li> </ul>
<p><sup>1</sup> The approximate total of estimated current peak day withdrawals for the Clackamas River Water Users (107 cfs) and minimum in-stream flows between July 1 through September 15 (400 cfs) and between September 16 and June 30 (640 cfs), measured at U.S. Geological Survey gauging station 14211010 at the South Fork Water Board’s intake.</p> <p><sup>2</sup> Same as footnote 1, but reflects a 15 percent reduction in current peak day demands spread across all municipal water providers.</p>	

## Authority

The City Manager or City Engineer is authorized to declare a Water Curtailment Stage 1. Actions under Water Curtailment Stages 2 and 3 can be initiated only after the City Manager declares an emergency. Actions under Water Curtailment Stages 4 and 5 can be initiated only after the City Council declares an emergency.

Plan provisions will remain in effect until the emergency is declared ended by the initiating party, provided that the City Council may rescind an emergency declaration issued by the City Engineer or the City Manger upon a finding that demonstrates the emergency no longer exists, or that the original declaration was made in error.

Actions may be applied to the entire system, or only to those water use sectors, or in those geographic areas that are directly affected by any water supply shortage.

The City Manager is responsible for execution of the curtailment plan provisions after an emergency has been declared.

## Curtailment Plan Implementation and Enforcement

### *OAR 690-086-0160(4)*

In implementing this curtailment plan, the City will work closely with the Clackamas River Water Providers to ensure consistent approaches to dealing with water shortages by coordinating stage designations, public notices, press releases, and other outreach activities.

Under the City's code, a violation of any provision of the City's code to implement its WMCP (38.08.110) is a civil violation and subject to fine. Upon request of the City Manger, the City Attorney may institute an appropriate action in court to enjoin any continuing violation of any provision of this section.

### *Stage 1: Water Shortage Alert*

Stage 1 status will activate a program to inform customers of the potential for drought or the need for temporary reductions in consumption because of reasons other than drought where there is potential for the system supply capacity to fall below the 3-day MDD. The City Manager will issue a general request for voluntary reductions in water use by all water users. The request will include a summary of the current water situation, the reasons for the requested reductions, and a warning that mandatory cutbacks will be required if voluntary measures do not sufficiently reduce water usage. Stage 1 public information program elements would include the following:

1. Contact local media outlets and request that the public be informed about the potential for summer water shortages or temporary interruptions to normal service delivery.
2. Post prepared public service announcements on the City's web page and in the City's Hello LO newsletter and LOdown Weekly News. Include prepared information regarding conservation tips.
3. Provide notice on water bills or through utility bill inserts.

4. Activate the water conservation hotline in the City's Citizens Information Center. Include pre-recorded message providing conservation tips. Update recording weekly to maintain current status of event trigger.
5. Initiate contact with senior operations staff at Cities of West Linn and Tigard regarding the potential need to activate intersystem connections for temporary water supply to Lake Oswego.
6. Contact wholesale customers notifying them of the existence or potential for water shortages. In certain circumstances it may be necessary to "lock-out" interties with wholesale customers as a means of reducing demand on the City's system.

### ***Stage 2: Serious Water Shortage***

Stage 2 status is similar to Stage 1 except that certain water uses will be prohibited. There will be more emphasis on the reduction of nonessential water use. Stage 2 is intended to respond to a Governor's drought declaration, equipment failures reducing system supply capacity below the 3-day MDD, continued hot dry weather, and a continued decline in streamflows in the Clackamas River. A demand reduction target of 10 percent of MDD will be communicated to the general public. In addition to Stage 1 voluntary measures, Stage 2 elements include:

1. Provide handouts to field personnel with direction to remind customers of voluntary measures and shortage status.
2. Encourage, through public service announcements, voluntary restrictions on outdoor irrigation and limit irrigation times to between the hours of 8 p.m. and 10 a.m.
3. Encourage customers to refrain from washing cars except at commercial washing establishments that recycle or reuse water. Offer free single-wash coupons to encourage compliance.
4. Prohibit filling of swimming pools and ponds.
5. Prohibit pressure washing roofs, decks, or home siding unless such uses were contracted before implementation of this curtailment action and are demonstrated to the City Manager's satisfaction to be necessary for painting, repair, remodeling, or reconstruction.
6. Prohibit using water to wash/clean sidewalks, driveways, and patios.
7. Prohibit using water for dust control unless it is shown to the City Manager's satisfaction that water used for dust control is needed to meet public health or safety requirements including, but not limited to, abatement of fire or sanitation hazards or to meet air quality standards mandated by the Oregon Department of Environmental Quality.

### ***Stage 3: Severe Water Shortage***

In addition to the actions included in Stage 2, Stage 3 will impose an expanded suite of mandatory prohibitions on nonessential water use with the goal of achieving reductions of 20 percent of MDD. Under Stage 3, the City would introduce the following mandatory water reduction measures:

1. Restrict outdoor landscape irrigation for residential customers to the following:
  - a. 8 p.m. Sundays until 10 a.m. Mondays
  - b. 8 p.m. Wednesdays until 10 a.m. Thursdays
  - c. 8 p.m. Fridays until 10 a.m. Saturdays
2. Restrict outdoor landscape irrigation for nonresidential customers to the following:
  - a. 8 p.m. Saturdays until 8 a.m. Sundays
  - b. 8 p.m. Mondays until 8 a.m. Tuesdays
  - c. 8 p.m. Tuesdays until 8 a.m. Wednesdays
  - d. 8 p.m. Thursdays until 8 a.m. Fridays
3. The following exemptions apply to the restrictions in measures 1 and 2 above:
  - a. Grass, turf, or landscaping is less than 1-year old.
  - b. Grass or turf is part of a commercial sod farm.
  - c. Grass or turf areas are within a “high use” athletic field used for organized play.
  - d. Grass or turf areas are used for golf tees or greens.
  - e. Grass or turf areas are part of a park or recreation area declared by the City Council by resolution to be of particular significance and value to the City.

Notwithstanding the exceptions and prohibitions noted above, any landscape irrigation will be limited to only that necessary to maintain plant health.

4. Prohibit hosing or washing of paved surfaces.
5. Prohibit applying water in a manner, rate, or quantity that it runs onto adjacent property, parking lots, or public rights-of-way, including streets, sidewalks, and pathways.
6. Prohibit washing of vehicles other than at a car washing facility that recycles water used in the car washing process.
7. Prohibit filling or adding any water to pools, ponds, fountains, or water features.
8. Prohibit persons to permit water leaks after reasonable opportunity to discover, investigate, and repair.
9. Prohibit operation of fountains except those using re-circulated water.
10. Prohibit washing of roofs, decks, or home siding unless such uses are solely to abate a fire hazard.
11. Activate intersystem connection with the Cities of Tigard or West Linn. If the severe water shortage was the result of an event not related to a shortage in the Clackamas River, either alternate system could be used. If the Clackamas River system is

constrained, the Tigard connection could be used to provide temporary supply from Portland's Bull Run or from the Joint Water Commission.

In addition, City staff would work with local industrial and commercial large water users to minimize their water use.

#### ***Stage 4: Critical Water Shortage***

Conditions causing Stage 4 curtailment measures are severe enough in terms of extent and duration that significant reductions in water use must be achieved as quickly as possible. Stage 4 builds on measures enacted in the previous stages. In Stage 4 curtailment, all landscape irrigation is prohibited and any exceptions noted above for outdoor water uses are rescinded. Stage 4 measures attempt to achieve reductions in residential and commercial demands of up to 50 percent of MDD. If water loss is the result of major damage to critical supply system facilities or local electrical utility systems, it may be necessary to go directly to Stage 5.

In addition to all requirements in Stages 2 and 3, Stage 4 will include:

1. Prohibit landscape irrigation.
2. Prohibit washing, wetting down, or sweeping sidewalks, walkways, driveways, parking lots, open ground, or other hard-surfaced areas with water.
3. Prohibit washing any vehicle, unless the City Council finds that the public health, safety, and welfare are contingent on frequent vehicle cleaning, such as solid waste transfer vehicles, vehicles that transport food and other perishables, or as otherwise required by law.

If such a critical water shortage takes place in the Clackamas Basin, (that is, plant power failures, transmission line breaks), additional restrictions and exemptions may be passed as necessary.

#### ***Stage 5: Emergency Water Shortage***

Stage 5 responds to events causing an immediate and sustained loss of the source of supply or major damage to critical treatment, transmission, and pumping systems. Examples include failure of a main transmission line, failure of the intake or water treatment plant, a chemical spill into the Clackamas River upstream of the intake, or a malevolent attack on the system that introduces a contaminant at some point in the system.

Under Stage 5, all water use may be prohibited, except uses necessary for human consumption and sanitation needs.

The City Council or City Manager also may activate the City's Emergency Operations Center (EOC) to mobilize sufficient resources to respond to the event(s) causing the need for Stage 5 action.

If the event renders water in the system unsafe to drink (e.g., chemical spill or intentional act against the system), the EOC will be activated and the Incident Commander will assume command and control of the City's response to the event. As the cause and severity of the event dictates, the Incident Commander will:

1. Implement the appropriate response protocols of the City's Emergency Response Plan

for the Lake Oswego Water System.

2. Activate the Code Red communications system.
3. Contact the Oregon Drinking Water Program, Department of Human Services, and request its assistance in response actions.
4. Notify the local news media, to solicit their assistance in notifying customers.
5. Contact county, state, and federal law enforcement officials, as appropriate.
6. Contact the County Public Health Officer and local hospitals, as appropriate for the nature of the event.
7. Contact the Regional Water Providers Consortium staff and seek use of portable water distribution systems as available.

The City will continue to investigate and develop specific back-up plans for a Stage 5 emergency. These plans may include purchasing water from the City of Portland via the City of Tigard, purchasing water from the South Fork Water Board (assuming this source is available), directing residents to a pre-designated water distribution location, and supplying bottled water.