

 Madison Water Utility	STANDARD OPERATION MANUAL	SOP #:	XX-XXXX
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		Creation Date:	03/05/08
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SOP Owner: Madison Water Utility	Section: WQ/WS/Engr	Updated:	03/05/08
Unit Well 10 – Criteria for Emergency Use			

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1. Purpose/Background	<p>Unit well 10 produces water with elevated levels of iron and manganese making the water unsuitable for distribution into the public water system.</p> <p>In the event of a catastrophic burden threatening the reliability of the infrastructure necessary to protect public safety, emergency water reserves from Unit Well 10 may be required to enter the distribution system.</p> <p>Unit Well 10 is currently operated during the peak demand season from approximately June to September, strictly in a reserve supply capacity to protect system redundancy during water emergencies.</p>
2. Scope	<p>This procedure establishes the criteria to pump water from Unit Well 10 into the distribution system.</p>
3. Guidelines	<p>3.1 <u>Emergency Criteria Situations and Declaration</u></p> <p>Emergency conditions that could threaten the integrity of the Southwest Pressure Zone include:</p> <ul style="list-style-type: none"> • Severe fire emergency with intense system demands • Natural disaster with intense system demands • Unit Well 12 removed from service • Unit Well 20 removed from service • The Smith Reservoir (20) has insufficient water supply capacity • Booster Pump 106 removed from service • The High Service Reservoir (106) has insufficient water supply capacity • The Northwest Pressure Zone (8) has insufficient water supply capacity <p>It is highly unlikely that the occurrence of any single emergency event would create a system demand requiring the deployment of Unit Well 10. The Madison Water Utility's system infrastructure is designed with several levels of system redundancy to minimize vulnerability during critical conditions or events. Unit Well 10 is to be operated as a last resort to sustain adequate redundancy in the Southwest Pressure Zone (7).</p> <p>The Southwest Pressure Zone (7) is primarily supplied by Unit Well 12, and Unit Well 20. The deep well at Unit Well 12 pumps into a 150,000-gallon reservoir with a booster pump to supply the water to the distribution system. Unit Well 20 is an independent deep well pumping directly to the Smith Reservoir (20), which contains up to 4.2 million gallons of water delivered by gravity to the distribution system. Alternately, water may enter the Southwest Pressure Zone (7) through Booster Pump 106 which pumps from the 6 million gallon High Service Reservoir (106) of the Main Pressure Zone (6). Water may also enter the reservoir from the Northwest Pressure Zone (8) due to differences in water pressure, which is accomplished through opening closed valves on the pressure zone boundary (see Attachment 2, Page 14).</p> <p>Under normal operating conditions Unit Well 12 and Unit Well 20 together are able to meet the demand of the Southwest Pressure Zone (7). Projected water demand increases will trigger water conservation requests from the Water</p>

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3. Guidelines

Utility to help maintain operability without engaging emergency response criteria. Only if an emergency condition or combination of conditions resulted in a pressure loss that could not be safely mitigated by Unit Well 12, Unit Well 20, Booster Pump 106, and water transfer from the Northwest Pressure Zone (8), the possibility of initiating the emergency supply from Unit Well 10 could become necessary.

In the case of severe drought or projected intense system demands the Madison Water Utility will request or mandate conservation measures to water customers in order to minimize the risk of conditions escalating into a water emergency event.

The Madison Water Utility shall follow the procedures indicated in the 'Southwest Pressure Zone Operational Process' flow chart (See Attachment 1, page 13) to establish the mitigation process of critical system demands placed upon the Southwest Pressure Zone (7).

3.2 Equipment

A thorough working knowledge of the following equipment is required for emergency supply operation of Unit Well 10.

- Valve turning key
- Wrenches
- Channel-lock pliers
- Water Utility Maintenance Padlock keys # D018 and # 2958
- Personal protective equipment
- Madison Water Utility Job Order Form
- Daily Report for high service pumping/deep well electric pumping
- Mechanical/Electrical control units
- Deep well pump
- Deep well starter
- Deep well solid state starter
- Deep well motor
- Deep well circuit breaker
- Centrifugal pump
- Centrifugal motor
- Centrifugal breaker
- Booster pump
- Booster pump circuit breaker
- Air compressor
- Air conditioning unit
- Reservoir
- Status gauges
- Chlorine tanks with digital dual cylinder scale
- Ammonia bottle
- Hydrofluorosilicic acid
- Pacemaker T68-Electric motor oil
- Fire extinguisher
- Emergency eye wash units
- Cleaning supplies

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<h3>3. Guidelines</h3>	<ul style="list-style-type: none"> • Clipboard and pen • Security camera • Security door pass <p>3.3 <u>Specific Training</u></p> <p>The following Madison Water Utility approved safety training courses must be taken to be a qualified responder to the emergency operation of Unit Well 10.</p> <ul style="list-style-type: none"> • Confined space entry training • Lock out tag out training • Personal Protective Equipment • Hazardous material training • Blood borne pathogen • CPR
<h3>4. Emergency Operation Procedure</h3>	<p><u>Prerequisites</u></p> <ul style="list-style-type: none"> • Under direction from the Water Utility General Manager, maintenance staff may be required to prepare the Unit Well without actually pumping as a prudent measure to reduce emergency response time. These preparations may include: having Water Utility staff ready on site, unlocking and resetting circuit breakers, and adjusting valve settings. <ul style="list-style-type: none"> ◦ If the projections leading to a Unit Well 10 preparation request allow at least 2 hours of lead-time at the Unit Well, a run-to-waste procedure may be requested to prepare Unit Well 10 in an effort to reduce or eliminate the initial elevated manganese and iron levels that are typically experienced during the first few hours of deep well pumping. ◦ See 'SOP # XX-XXX – Unit Well 10 – Reserve Supply Standard Operating Procedure' – Section 4.1 'Reserve Supply Procedure' for detailed instructions. • Emergency operation of Unit Well 10 to provide additional supply must be authorized by the Madison Water Utility General Manager in consultation with the Water Quality Manager and Principal Engineer. • Only with the occurrence of a qualifying situation according to the criteria defined in 'Attachment 1' of this operating procedure (page 13), would the Water Utility General Manager authorize the emergency operation of Unit Well 10. • Simultaneously as the Emergency Procedure Operation of Unit Well 10 begins, the public notification plan for Unit Well 10 must also commence.



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4. Emergency Operation Procedure

Unit Well 10 Public Notification Plan

- 4.1 Under the direction and management of the Water Quality Manager, the Public Information Officer shall implement the Unit Well 10 Public Notification Plan as follows:
 - 4.1.1 Upon declaration that the Unit Well 10 emergency supply water is going to be distributed into the public water supply system, the Madison Water Utility will issue a press release and post an announcement to the Water Quality Listserv and Water Utility website (www.madisonwater.org).
 - 4.1.2 Immediately schedule a public meeting to inform neighbors and address questions/concerns.
 - 4.1.3 Madison Water Utility is to call alders and neighborhood leaders in the impacted areas. Notices would also be mailed if the use of Unit Well 10 were expected to exceed 5 days of continuous use.
 - 4.1.4 Madison Water Utility maintains a call list for customers potentially impacted by Unit Well 10 water, such as those who have liver disease, no Internet access or media and also those requested to be placed on the list.
 - 4.1.5 Madison Water Utility will collect at least two samples daily from Unit Well 10 and post the result on the Madison Water Utility website.
 - 4.1.6 During the emergency operation of Unit Well 10, communication with affected neighborhoods and areas will propose and request conservation methods to minimize water use and subsequently, help eliminate the need to operate Unit Well 10.
 - 4.1.7 Provide the following information during notification:
 - 4.1.7.1 When Unit Well 10 water will be pumped into distribution system.
 - 4.1.7.2 How long Madison Water Utility expects to pump water from Unit Well into the distribution system.
 - 4.1.7.3 Information related to the manganese and iron levels in the water being pumped from Unit Well 10.
 - 4.1.7.4 A statement from the Public Health Department addressing the health implications of consuming water distributed from Unit Well 10.
 - 4.1.8 Following the emergency operation of Unit Well 10, public meetings will be scheduled to discuss the development of the emergency, the handling of the emergency event, and address public questions or concerns related to the event.



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4. Emergency Operation Procedure

Open Throttled Deep Well Discharge Valve



Figure 4.1: Deep Well Pump

Upon the declaration that Unit Well 10 emergency supply water is going to be distributed to the public water supply system, the Water Utility General Manager will notify the Operator 2 at (608) 266-4667. The General Manager will also direct the Operations Department to dispatch a qualified maintenance worker to perform the following procedure at Unit Well 10 (if staff has not already been deployed to Unit Well 10).

- 4.1.9 The deep well is pump valve is throttled during reserve supply operations. In an emergency event the deep well valve (A) would need to be throttled and monitored to match the booster pump discharge rate (shown closed). This would ensure that there would be ample water to supply the booster without having the deep well pump cycling on and off causing unnecessary rises in the level of manganese and iron each time the well restarts.



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4. Emergency Operation Procedure

Open Unit Well To Distribution System



Figure 4.2: Unit Well 10 Aerial View

- 4.1.10 Using the valve turning key located behind the electrical control area along the west wall of the building, verify that valve (A) of the booster pump pipeline is open. If not, open valve (A) counterclockwise.
- 4.1.11 Verify that valve (B) to the distribution system is open. If not, open valve (B) counterclockwise.

Sending the Emergency Supply to the Distribution System

- 4.1.12 When the valves are prepared notify the Operator 2 at (608) 266-4667. The Operator 2 remotely controls the booster pump into the distribution system and can now engage the booster pump to pump into the distribution system



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4. Emergency Operation Procedure

Sampling Procedure While Unit Well 10 Water is Entering the Distribution System

Under the direction and management of the Water Quality Manager, take water samples at least two times daily as follows:

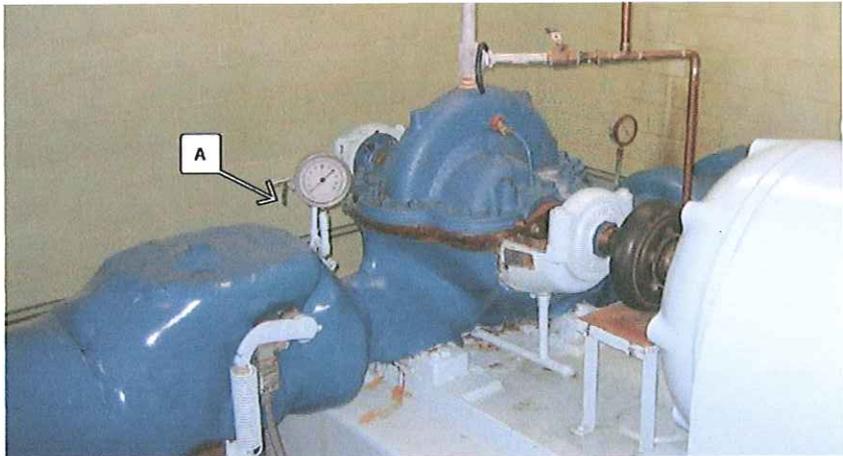


Figure 4.3: Booster Pump Sample Tap

- 4.1.13 Water quality test samples are to be taken from the booster pump sampling tap (A). The water from the sampling tap (A) shall run for two minutes prior to taking the sample. The samples are to be delivered to the Water Utility – Water Quality section, 119 East Olin Ave, Madison, WI 53713.
- 4.1.14 The sample will be split, with one sample being analyzed at the Water Utility and the second sample will be delivered to a certified laboratory.
- 4.1.15 The results are to be posted to the Madison Water Utility website in accordance with procedure step 4.1.5.

Post-Operation

- When directed by the Water Utility General Manager, trip, tag, and padlock the circuit breakers to the deep well pump and booster pump when the emergency operation of Unit Well 10 is completed.
- If deemed necessary by the Water Utility General Manager, hydrant-flushing operations in affected areas may be requested to remove solids (such as iron and manganese) that would have been delivered to the distribution system during emergency operations.
- Upon conclusion of the emergency operation of Unit Well 10, the Water Utility General Manager will coordinate a post operation evaluation meeting with the employees involved with the emergency operation procedure. The meeting will begin to analyze performance of the handling of the emergency operation based on (but not limited to) the following topics:

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4. Emergency Operation Procedure

- o Emergency criteria development and emergency response.
- o The performance and timeliness of the public notification plan.
- o The effectiveness of the emergency mitigation procedures.
- o The emergency resolution activities.
- o Lessons learned from the event will be compiled and documented.
- o 'SOP XX-XXX Unit Well 10 – Criteria for Emergency Use' will be evaluated and improved if necessary.
- o Documentation required to compile the Emergency Operation of Unit Well 10 Report (see Section 7) will be identified.
- o A public meeting will be scheduled in accordance with procedure 4.1.8.

5. Roles & Responsibilities

- 5.1 General Manager
- Designate the emergency status resulting in the operation of Unit Well 10.
 - Work with the Public Information Officer to address public concerns and share with these issues with the mayor's office, public health department, the impacted area community, Madison Water Utility staff, Madison Water Utility board members and the general public
 - Responsible to provide status updates until the system is back to normal operating conditions.
- 5.2 Public Information Officer (PIO)
- Develop and coordinate the communication programs needed for the Water Utility regarding emergency operation of Unit Well 10.
 - Coordinate and maintain accountability of the public notification process for the emergency operation of Unit Well 10.
 - Serve as a primary contact for media and other public information agencies.
 - Meet with neighborhood and community groups to discuss the emergency operation activities.
- 5.3 Water Supply Manager
- Coordinate and monitor the safe delivery of the water to customers.
 - Develop and monitor standards and procedures relevant to the operation of Unit Well 10.
 - Respond to public complaints about the water supply issues through the PIO.
- 5.4 Water Quality Manager
- Coordinate and manage the water quality sampling procedure.
 - Maintain records of water quality data and public concerns.
 - Report the water quality results as they become available.
 - Respond to concerns about water quality issues through the PIO.
- 5.5 Principal Engineer
- Consult with General Manager and Water Quality Manager regarding emergency criteria declaration.
 - Coordinate and assign Water Utility support staff.
- 5.6 Water Utility Maintenance Supervisor/Water Utility Operations Manager
- Supervise and direct the Water Utility maintenance staff.
 - Instruct staff on the daily operation/management of Unit Well 10.

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5. Roles & Responsibilities		<p>5.7 <u>Rounder</u></p> <ul style="list-style-type: none"> • Monitor the facility. • Perform data collections daily from the pumping station, reservoir levels, and hydrant pressures in order to deliver an adequate and potable water supply at the proper pressure level for the distribution system. • Perform water-sampling tests as required. <p>5.8 <u>Operator II</u></p> <ul style="list-style-type: none"> • Operate and monitor the operation control room panels of the unit well, reservoir, and booster station, make any adjustment as necessary • Respond to general information requests from the public. <p>5.9 <u>Maintenance Worker</u></p> <ul style="list-style-type: none"> • Perform the unit well operation procedures on site. • Diagnose malfunctions of the unit well, reservoir, and booster pump and repair required equipment and the facility as necessary. • Respond to calls from Operator 2 to perform required tasks. • Maintain contact with Operator 2 as required during procedure. • Perform any necessary cleaning of the facility <p>5.10 <u>Water Quality Aide</u></p> <ul style="list-style-type: none"> • Collect water samples from the unit well. • Deliver water samples for testing as directed by the Water Quality Manager. • Report to Operator 2 and Water Quality Manager regarding quality concerns. 	
6. Monitoring Requirements		<p>The following criteria will be monitored during emergency operation of Unit Well 10:</p> <ul style="list-style-type: none"> • Daily water quality sampling tests occurring at least two times per day. • Water quality data will be collected and recorded in the Water Quality Database. • Monitor system for status changes resulting in the return of Unit Well 10 to reserve supply status. • Monitor the public notification process and distribute new information as it becomes available. 	
7. Record Management		<p>The following criteria will be monitored during emergency operation of Unit Well 10 and will be summarized as an Emergency Operation of Unit Well 10 Report:</p> <ul style="list-style-type: none"> • DNR Pumpage Reports: <ul style="list-style-type: none"> • DNR 2007 Pumpage Information for Unit Well 10 (F:\Wucommon\Pumpage\DNR07) • Customer Calls/Correspondence/Notification Plan Information <ul style="list-style-type: none"> • F:\Wucommon\Water Quality\Correspondence\Grande • F:\Wucommon\Water Quality\Neighborhood Meetings\Well 10 - 05032007 • Public Notification Report <ul style="list-style-type: none"> • External Communication Plan (www.cityofmadison.com/water/externalcommunication_plan) 	

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7. Record Management		<ul style="list-style-type: none"> • Water Utility Pump Report <ul style="list-style-type: none"> • Madison Water Utility Daily Reports (F:\Wucommon\Pumpage\Daily Reports) • Pump worksheet (F:\Wucommon\Pumpage) • Water Quality Documentation and Reporting (F:\Wucommon\Water Quality) • Media Responses 	
8. References		<ul style="list-style-type: none"> • Madison Water Utility External Communication Plan (http://www.cityofmadison.com/water/externalCommunicationPlan.cfm) • Emergency Response Plan (F:\Wucommon\ERP Document/) • Unit well checklist • Interim Standard Operating Procedure – Fluoride Levels • Chlorine Levels Procedure (06/19/2007) • Chlorinator Cylinder Changing Procedure (Pub. no 993-21) -Chemical Injection Tech, Inc., 1993 • 2006 Manganese Monitoring Report • Material Safety Data Sheets - Hydrite Chemical, Co for Chlorine and Hydrofluorosilicic acid • Valve Turning Procedure (January 8,2007) • REGAL gas chlorinator operation and specifications (Pub. no 598-3) – Chlorinator Inc, 1998 • Digital Dual Cylinder Scale operation and specifications – Scaleton Industries, LTD • Water Utility phone list • Unit well #10 fact list • Notification Plan for Well 10 Letter – June 2007 	
8.1 Standards		<ul style="list-style-type: none"> • Control of Hazardous Energy (Lock out/Tag out) – OSHA Standard – 29 CFR Part 1910.147 • Safety and Health Standards – OSHA Standard – 29 CFR Part 1910.1200 • Permit Required Confined Spaces – OSHA Standard – 29 CFR Part 1910.146 • Wisconsin DNR Codes 809, 811, 812 • AWWA Standards 	
8.2 Other SOP'S		<ul style="list-style-type: none"> • SOP: XX-XXXX – Unit Well 10 – Reserve Supply Standard Operating Procedure <p><u>Standard Operating Procedures currently in development:</u></p> <ul style="list-style-type: none"> • Water Sampling Standard Operating Procedure • Residual Chlorine Monitoring Standard Operating Procedure • Fluoride Standard Operating Procedure • Rounder Standard Operating Procedure 	

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8.3 Supplementary Documents	<ul style="list-style-type: none"> Daily Report – Madison Water Utility for High Service Pumping and Deep Well Electrical Pumping 		
9. Definitions	SOP = Standard Operating Procedure DNR = Department of Natural Resources AWWA = American Water Works Association PIO = Public Information Officer		
10. Updates	Madison Water Utility shall review and update this SOP annually. This review shall occur no later than the last day of the month to be inserted by the SOP owner each year.		



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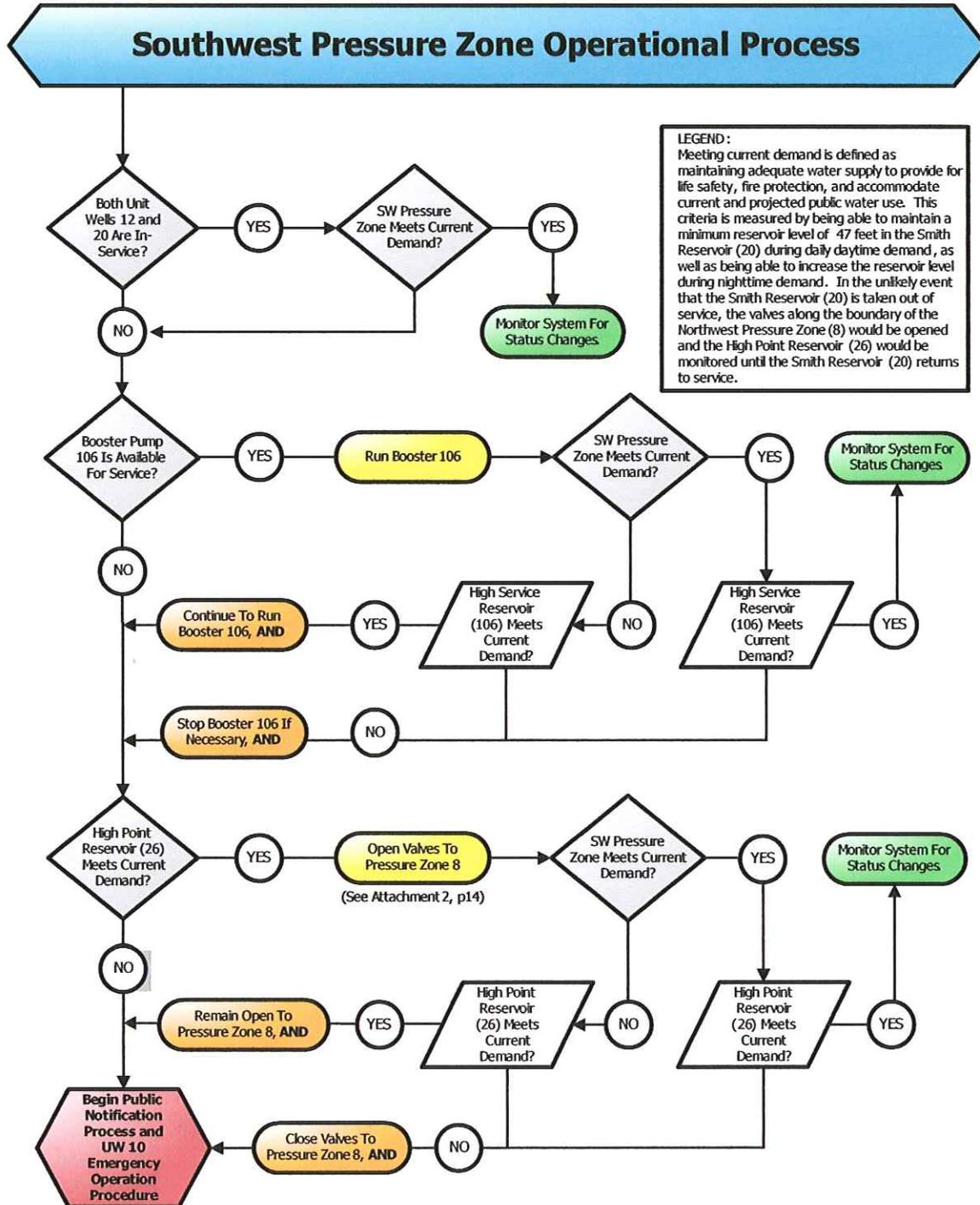
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Attachment 1:





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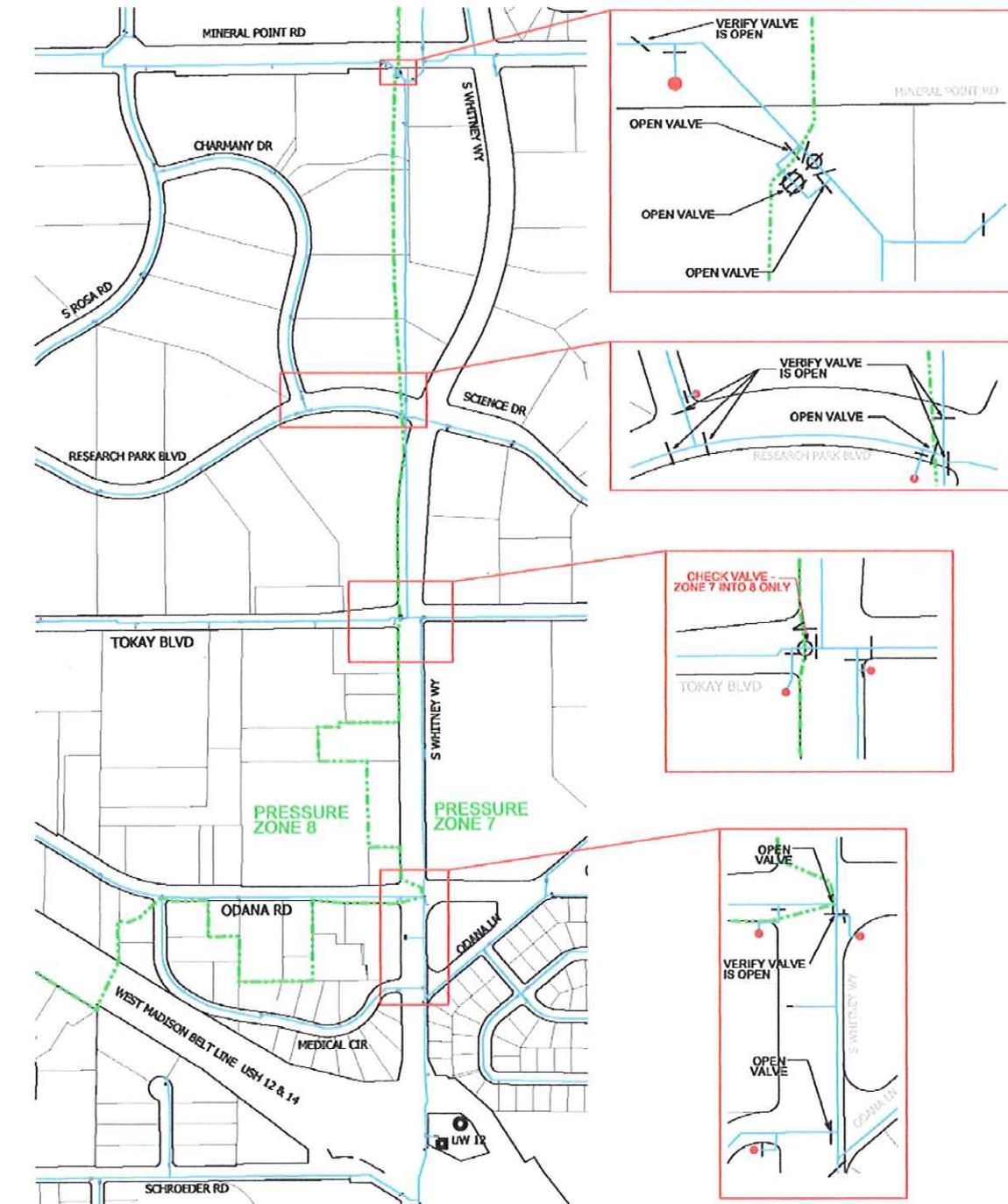
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Attachment 2:

OPENING VALVES TO PRESSURE ZONE 8

RECOMMENDED VALVE OPENING LOCATIONS ON BOUNDARY OF PRESSURE ZONES 7 AND 8 .
PROCEED UNDER THE DIRECTION OF WATER UTILITY GENERAL MANAGER AND OPERATOR I I.





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11. Approvals By:

Water Quality Section Head	Date
Water Supply Section Head	Date
Engineering Section Head	Date
General Manager	Date

Additional Approvals (as determined by General Manager):
