

2017

City of Nanaimo Water System Emergency Plan



Water Resources Section
8/24/2017

Record of Revisions and Distributions

Revision Date	Title	By Whom	Provided to Holder No.		
			To	Paper Copy	Electronic
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2012-Apr	CoN Emergency Response and Recovery Plan	CoN – Water Resources			
2015-Mar	CoN Water System Emergency Response Plan	CoN – Water Resources			
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***Please note that Appendices
will not be published due to security and privacy reasons***

1.0 THE PLAN

Purpose

This **Water System Emergency Response Plan** has been prepared to guide the City of Nanaimo and response agencies in responding to an emergency of the City's water system.

Objectives

The objectives of this Emergency Response Plan are to:

- Provide the earliest response to an emergency condition.
- Ensure that water quality and public health are not compromised.
- Ensure that water for fire-fighting is available.
- Restore normal water system operation.
- Protect the natural environment from impacts associated with the system operation in the event of an emergency.

Scope

This plan guides response to the City of Nanaimo's water system including the South Nanaimo River Watershed and storage reservoirs, the water transmission (pipe) systems from source to balancing reservoirs (tanks) inside the City, pump stations, PRV stations and the South Fork Water Treatment Plant.

This plan is intended for use by City of Nanaimo staff in responding to emergency scenarios related to the City's water system serving the City of Nanaimo, and bulk water supply to the Southwest Extension Improvement District and Snuneymuxw First Nation Reserves No. 1, 2 and 4. This plan is an internal document for City staff implementation and use only. *This document serves as informational purposes only to the external plan holders.*

1.1 How to Use the Plan

The Water System Emergency Response Plan is meant to act as a guide in the event of a water system emergency. This is important because the plan is written to act as a reference rather than an explicit set of instructions. The more familiar everyone is with the format and information within the plan the more helpful it will be in the event of a real emergency.

In order for this Plan to be effective in its use, it is imperative that each Plan Holder read the Plan in advance

Within the section labeled 'Action List' several potential water system emergencies are listed. Each potential emergency contains a guide for the persons involved to reference in an attempt to avert further damage. It is essential that this section be reviewed in advance because the lists are intended to act as *only* a reference for guiding one through the respective emergency. It is crucial to have a pre-determined plan for how your department, company or organization will react when faced with such emergencies and not rely solely on these sets of recommendations. You will notice that at the end of each Action List there is a set of suggested contacts. Contacts for organizations that are referenced and located in other sections throughout the document can be found in the **Emergency Contact List (Appendix A)**.

Another vital component of the plan is post emergency response. We ask that an internal document referred to as the **Post Incident Report (Appendix C)** be filled out after each water system emergency. This should typically be prepared by the Manager, Water Resources. However, to allow this process to be as straightforward as possible, we ask that those who carry out the actions in the Action Lists, for example the technicians involved, please fill out an **Incident Form** at the time they execute their actions. This form asks the individual to list out each of the actions taken along with the time and date the action was executed. The form also provides space for post-incident comments.

After the incident has been alleviated, it is asked that the form be given to the Manager, Water Resources so that the information can be considered in future updates of the document. This requirement allows participants the chance to provide comments and recommendations about the emergency Action List in which they followed while allowing the City to retain a detailed account of the actions taken to alleviate the water system emergency. Filling out the Incident Form and finally the Post Incident Report thereby marks the first steps in improving emergency response for the following year. Incorporating techniques that worked better and eliminating those that did not work, allows the City to improve the water system emergency action strategy.

In addition, annual tabletop exercises and regular updates are recommended. We ask all plan holders to attend meetings and participate in regards to offering input and recommendations so that this document can become more effective and thorough. It is important to note that an emergency response plan such as this is of little or no value if individuals do not review it, know how to use it, or participate in its creation and evolution.

1.2 Updates to the Plan

1.2.1 Registration

The City of Nanaimo will distribute a copy of the Water System Emergency Response Plan to those listed in Section 2 - HOLDERS OF THE WATER SYSTEM EMERGENCY RESPONSE MANUAL.

1.2.2 Updates

The City of Nanaimo should review, update and distribute the plan to those on the distribution list, at least every three (3) years.

1.3 What is the Water System?

1.3.1 The System

At all times, the City of Nanaimo (City) aspires to provide an adequate supply of clean and safe water to its' citizens which meets the Ministry of Health Drinking Water Protection Regulation and Canadian Drinking Water Guidelines.

Disruptions in water quality and delivery may result from emergencies such as significant weather events, natural disasters, accidents, vandalisms or terrorism. If prepared in advanced, the City will be more effective at responding to and recovering from such emergencies and disasters. A goal of the City is to minimize all adverse impacts resulting from disruptions in the water system. This is best achieved through sound emergency planning and effective communication.

The City of Nanaimo provides potable water to citizens of Nanaimo within the City boundary, Snuneymuxw First Nation Reserves #1, #2 and #4, and Southwest Extension Improvement District. In future, the District of Lantzville may also be provided with water from the City. The operation and maintenance of each individual water distribution system remains the responsibility of the purveyor of each jurisdiction.

The City operates a single surface water source at the headwaters on the south arm of the Nanaimo River. The watershed area is approximately 23,000 hectares with two water storage dams. The water is transported from the watershed by two primary supply mains (750mm and 1200mm dia.) to the City.

Within the City are nine (9) storage reservoirs (balancing tanks), pump stations, pressure reducing stations, and water distribution mains which govern the supply of water to the end users.

1.3.2 Primary Supply System

The City's bulk water supply is provided by two water supply dams. The upper dam, Jump Lake Dam, was constructed in 1974 and impounds almost 17 million cubic meters of water. Jump Lake Dam is used to store water which is gradually released to the lower

South Fork Dam to balance water consumption and meet the Department of Fisheries flow requirements. The transmission water supply mains carry water for 20 km or more to the City's water distribution system and the end users.

1.3.3 Water Treatment

The City's raw water intake is located at South Fork dam on the south fork of the Nanaimo River. Raw water is then piped (by gravity) to the City's South Fork Water Treatment Plant. This facility then uses GEWater ultrafiltration membrane technology to filter the raw water and the potable water receives disinfection using ultra violet irradiation and chlorine gas injection methods. The South Fork Water Treatment Plant commenced water production and came on line on December 4th, 2015.

The City's Water Operators also ensure a minimum residual disinfection of 0.05 mg/L (ppm) free chlorine is provided at all ends of the distribution system.

1.3.4 Secondary Supply Mains and Balancing Reservoirs

Once water is transported to the City's main balancing storage reservoirs (Reservoir No.1, Reservoirs 3A and 3B, Reservoir No.8), secondary large diameter supply mains are used to carry water to other storage reservoirs which are strategically located throughout the City. The balancing reservoirs ensure the water supply and distribution system are able to accommodate fire and peak flows.

The secondary supply mains are configured to ensure redundancy of supply and permit only larger connections to the many pressure zone areas of the City. Policy excludes individual service connections to supply mains.

1.3.5 Pump Stations

There are currently seven (7) pump stations (Towers, College Park x 2, Labieux, Lost Lake, Pryde Ave., Duke Point) in the City's water system which are used to either pump water to higher elevations or meet peak summer demands and fire flow requirements as required.

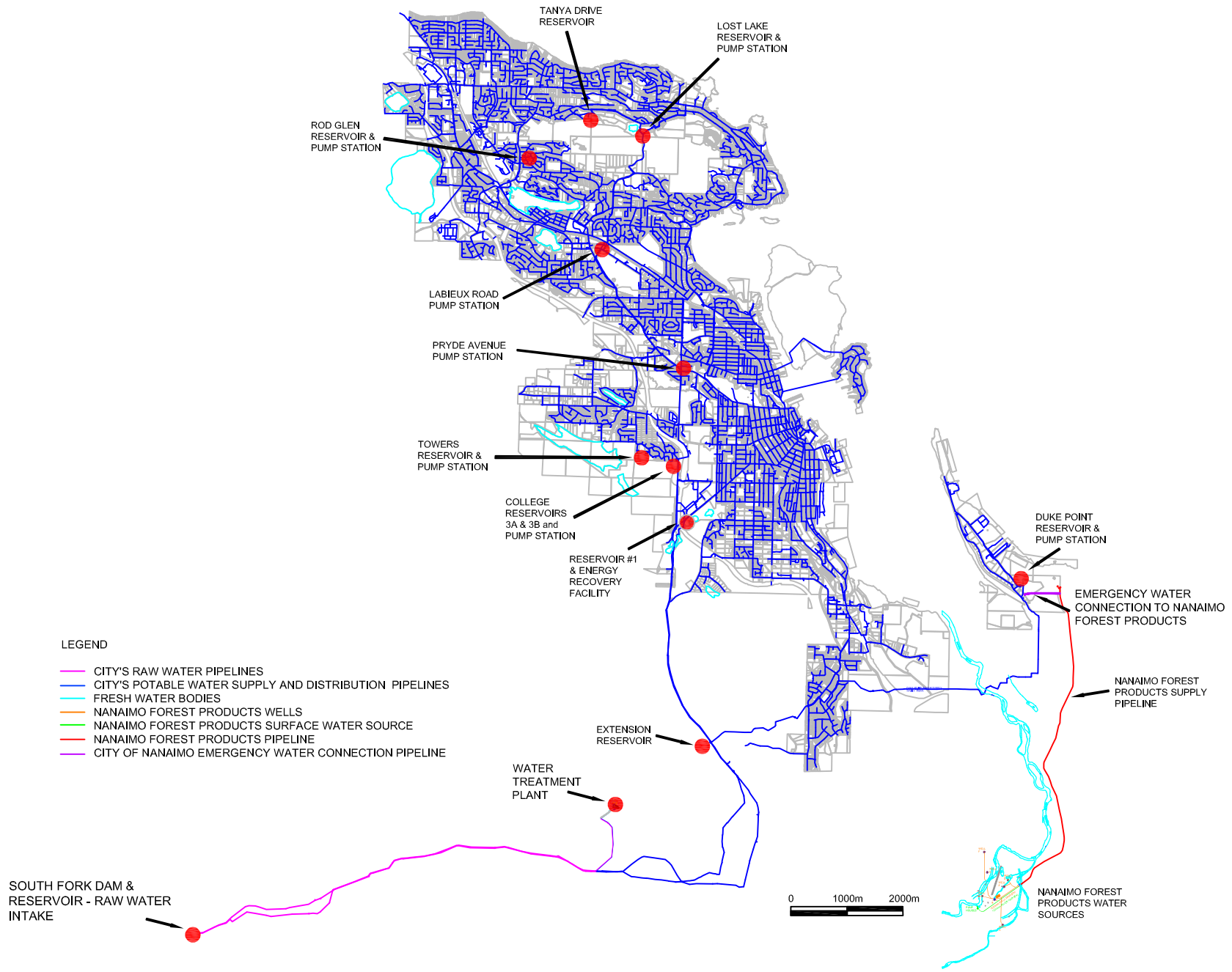
1.3.6 Pressure Reducing Valves (PRV's)

The City's incoming water supply mains can have an operating pressure up to 200 psi. This has allowed the City to deliver 75% of the water to its customers by gravity. Once the supply enters the distribution system approximately 300 pressure reducing and relief valves are installed to provide safe and appropriate pressure to individual users.

1.3.7 Water Meters

The system supplies over 25,000 residential and approximately 1,500 Industrial, Commercial and Institutional connections which use water meters to measure consumption. Snuneymuxw First Nation Reserve Lands 1, 2 and 4, and the Extension Improvement District are provided water through bulk meters. The District of Lantzville, North Cedar Improvement District and Nanaimo Forest Products (Harmac Pulp

Operations) also have a connection to the City of Nanaimo water system for emergency purposes, which are also metered.



2.0 HOLDERS OF THE WATER SYSTEM EMERGENCY RESPONSE PLAN

2.1 Internal Plan Holders

Plan No.	Name	City Department	Mailing Address	Telephone
0	Water Resources Section	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-758-5222
1	Chief Operations Officer	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-755-4418
2	Manager, Water Resources	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-756-5302
3	Senior Manager of Public Works	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-756-5305
4	General Foreman - Waterworks	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-756-5324
5	Public Works – Clerk/Dispatch	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-758-5222
6	Emergency Program Mgr.	Emergency Management	666 Fitzwilliam Street Nanaimo, BC	250-755-4572
7	Fire Chief	Nanaimo Fire Rescue	666 Fitzwilliam Street Nanaimo, BC	250-755-4557
8	Water Works Unit	Engineering and Public Works	2020 Labieux Road, Nanaimo, BC, V9T 6J9	250-758-5222

2.2 External Plan Holders

Plan No.	Name	Agency	Mailing Address	Telephone
9	Environmental Health Officer (Drinking Water Officer)	Vancouver Island Health Authority, Health Protection & Environmental Services	6475 Metral Dr., 3rd Floor Nanaimo, BC, V9T 2L9	250-755-6215
10	Medical Health Officer	Vancouver Island Health Authority, Health Protection & Environmental Services	6475 Metral Dr., 3rd Floor Nanaimo, BC, V9T 2L9	250-739-6304

3.0 COMMUNICATION AND COMMAND

3.1 Incident Command System

Direct and open lines of communication will help ensure that the health and safety of consumers are preserved throughout water emergency incidents, that effective action is taken to resolve problems, and that there is quick response minimizing any harm resulting from the emergency. This includes not only resource and internal communication but also informative and timely communication with the public.

The **Incident Command System (ICS)** was developed in the 1970's after a series of fires struck California near the boundaries between urban authorities, leaving many injured or dead. When retrospect analysis was conducted in regards to the incident, it was found that incident failures during the fires were due to a lack of adequate management and communication rather than a lack of resources or failure of tactics. In response ICS was created as a standardized, on-scene, all-risk incident management concept that would confer considerable internal flexibility and could grow or shrink to meet different needs. ICS is now a proven managerial system based on successful cost effective business practices that can be applied to incidents of any magnitude.

The City of Nanaimo has adopted the Incident Command System (ICS). Therefore, the communication flow and titles of those delegated authority during water related incidents in the current document will be referred to as those proposed in ICS planning and practice.

Routine Watermain Breaks

The Public Works Waterworks General Foreman should be provided with a situation report of the water main break and the Senior Manager of Public Works should then be informed. The Senior Manager of Public Works will activate the Public Works Departmental Operations Centre (DOC) depending on the severity of the break and impact to the home(s) or area.

If the water main break has a neighbourhood or community impact that is beyond the capacity for Public Works staff and their resources to manage, the Senior Manager of Public Works should contact the City's Emergency Program Manager with a request to activate the City's Emergency Co-ordination Centre (ECC). Communications from the site would channel into the ECC and the Public Works DOC would ensure the rest of the City is maintaining service. The procedures, roles, responsibilities and activities identified in the City's *Emergency Response and Recovery Plan* will be followed upon activation of the ECC.

3.2 What is the Line of Communication?

Incident Commander

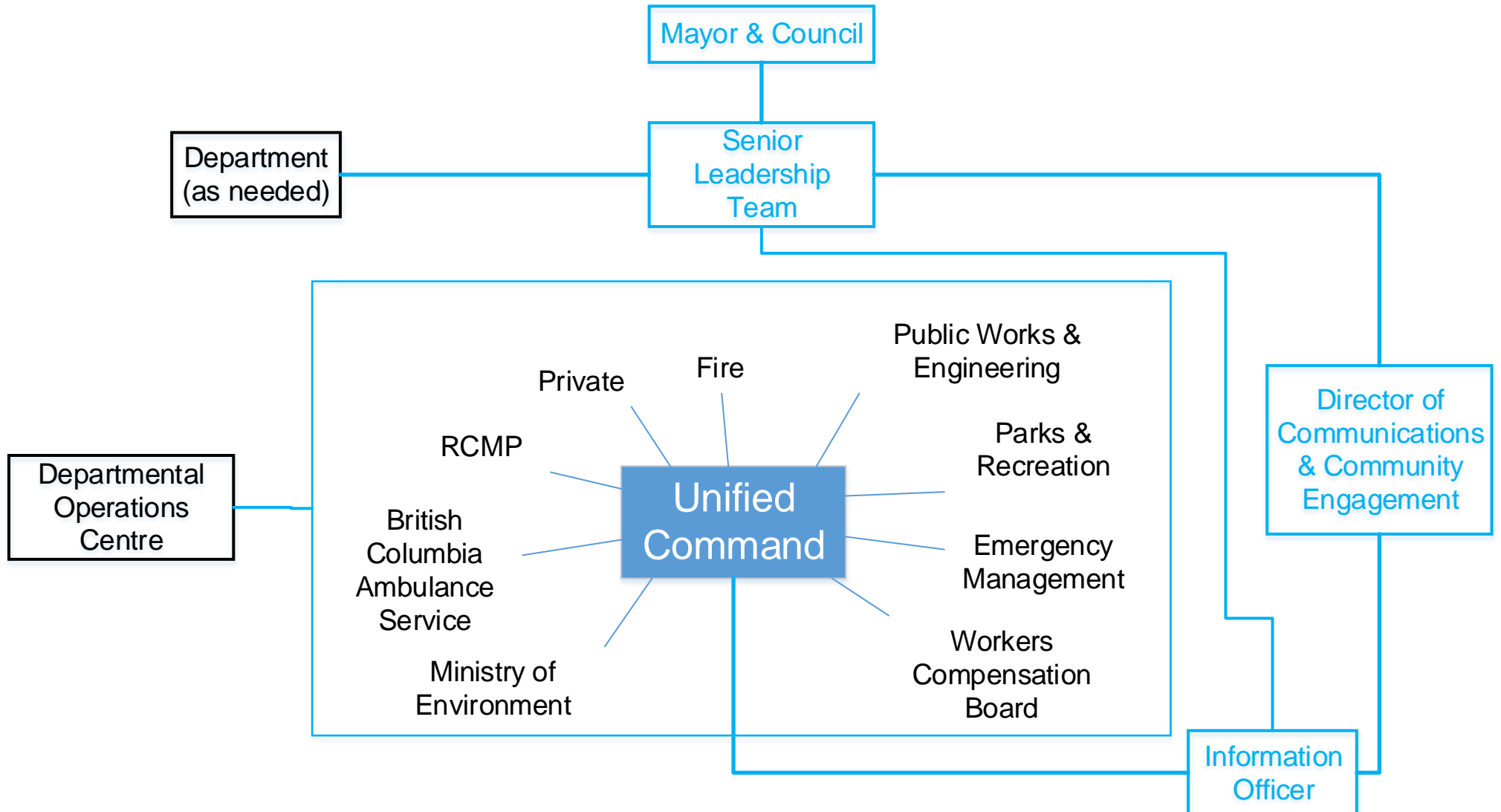
Upon notification of the emergency, **the Chief Operations Officer** or the most senior Manager contacted from that Department **will assume position of Incident Commander**. This individual will be responsible for contacting and assembling the Command Staff and General Staff *as required*. The primary responsibility of the Incident Commander is to ensure effective overall management of the incident. This involves ensuring incident safety for all of those involved, providing information services to external and internal stakeholders and maintaining liaison with other agencies involved with the incident. Until authority has been delegated to positions within General and Command Staff, the Incident Commander has direct control over all aspects of the emergency. It is also likely that with small emergencies the Incident Commander will feel it unnecessary to give out all or any of the subsequent positions and may solve the incident independently.

Command Staff

Upon notification of the emergency, the acting Incident Commander will assign positions of Command Staff and Operations Staff. The role of the Command Staff is to provide information, safety, and liaison services for the entire organization. There are three (3) such positions to be delegated as required, the Public Information Officer, Safety Officer, and Liaison Officer. Fortunately for the City the magnitude of any single water related emergency will most likely not require all three positions but instead focus primarily on the Information Officer who will serve as a conduit for information to the internal and external stakeholders, including the media and/or any other organizations seeking information. The structure of the Command Staff is outlined in the Communication Flow Chart more thoroughly.

Unified Command Communication Flow Chart

City Event Only
Multiple Departments Affected



The Information Officer is the only line of communication between the Incident Commander and all other City agencies and/or media outlets requiring information on the emergency. This individual is expected to supply updates at regular intervals regarding the emergency situation that will be provided to all of the inquiring agencies. It is the responsibility of the Information Officer to intercept and provide direction to non-critical parties as to ensure that the 'Emergency Action Teams' set up under various Sections can concentrate on the incident at hand.

In addition, it is the responsibility of the Incident Commander to contact all coordinating and governmental agencies as required unless this task has been delegated to the Information Officer. It is the priority of the individual in charge to work with the Vancouver Island Health Authority to mitigate any dangers to public health. The Incident Commander in consultation with Vancouver Island Health Authority and others will determine and issue any boil water or water restriction notices necessary. Depending on the size of the emergency such actions may be delegated out otherwise, if not, such actions remain the responsibility of the Incident Commander.

Call Centers

The Information Officer will provide updates at regular intervals on the current emergency situation. It is important that these centers deal directly with concerned individuals and not transfer these calls unless warranted, enabling Section Chiefs to work on resolving the emergency without interference. The public should be assured that all possible resources are being allocated to restore normal operations and be advised where to access situation updates.

Should the situation allow for an unmanned response, recorded messages providing an update may be used. If the emergency is severe, 24-hour emergency access lines will be set in place. In addition, it is important that the Information Officer send out an emergency information email to all City Employees that informs them of the situation and enables them to deal with any public inquiries.

General Staff

Upon notification of the emergency, the acting Incident Commander will also assign the positions of General Staff. The General Staff will consist of one or more Sections; Operations, Planning, Logistics and/or Finance/Administration as required. The scope of the majority of water related emergencies occurring within the City of Nanaimo would likely only require an Operations Section. The Operations Section Chief will likely be a senior Manager of Public Works in the majority of water system emergencies, but in situations deemed more severe or requiring special training may require other agencies such as the Fire Department. The Operations Section function is to support all the tactile fieldwork necessary to help alleviate the incident. The Operations Section will be divided into branches of task forces that will be segregated and labeled based on functionality or

response unit. This can be visualized more accurately on the Communication Flow Chart.

Initial Emergency Meeting

Once an emergency has been identified, the Incident Commander must meet with whomever they feel will be the most relevant individuals and agencies to discuss the situation and assign responsibility. At this meeting the Incident Commander is responsible for delegating out authority while adhering to the structure and planning initiatives outlined by ICS. Immediate action may have already gone underway prior to this meeting but it is imperative that duties and responsibilities be formally assigned to manage the emergency as effectively as possible. This meeting does not have to be held in person and can be facilitated by telephone conference if the situation is warranted. If authority is not assigned the Incident Commander will remain the primary body in charge of all aspects related to emergency situation.

Objectives

- a. Identify who will be taking the following responsibilities:
- b. Incident Commander.
- c. Information Officer and Operations Section Chief.
- d. Additional Section Chiefs (Operations, Planning, Logistics and Finance/Administration Chiefs) assigned as required.
- e. Discuss the emergency response strategy including:
- f. The level of emergency.
- g. Extent of affected area.
- h. Need for external resources.
- i. Response strategy and initial Incident Action Plan.
- j. Communications/media relations strategy.
- k. Communications update schedule/frequency.
- l. When the next emergency meeting will be?

3.3 Internal Communications

Protocol

1. The Information Officer will be responsible for sending an internal email or telephone call to all call centers that identifies:
 - a. What the emergency is?
 - b. When it began?
 - c. Where it is?
 - d. Who is affected by the emergency?
 - e. What is being done to correct the situation?
 - f. How long it is expected to last if known?

- g. What information to provide to the public?
 - h. Where they can direct calls that require more information?
 - i. When they will be receiving the next update?
2. The call centers that require this email/phone call are:
 - a. Administration Front Counter/Main Switchboard
 - b. Public Works Front Counter
 - c. Fire Department/ After Hours Emergency Line
 - d. RCMP
 - e. Others as required
 3. Emergency updates must be provided to these call centers:
 - a. as soon as new information becomes available or
 - b. at the frequency decided in the initial emergency meeting or
 - c. at least twice a day
 4. If the emergency is expected to continue after regular business hours have concluded then an example telephone message should be provided to all call centers a half hour before the end of the business day; however, if the emergency is deemed severe call centers may be accessed 24 hours. See the attached example for external greeting.
 5. It may also be warranted to provide an email to all domains to help facilitate accurate dissemination of information. This will be decided by key management during an emergency meeting.

3.4 External Emergency Message

Example

You have reached the (call center name) after hours message system on (current date).

Description of emergency and area affected.

Instructions for affected residents.

The City is working to resolve the problem and will be providing further information on the situation as it becomes available. Further information can be obtained from our website at www.nanaimo.ca.

If you require immediate assistance, please dial 250-758-1311 for the after-hours emergency line. If you would like to leave a message, please do so after the tone and we will return your call as soon as possible. Thank you for patience and cooperation.

3.5 Phone Broadcasting

The City of Nanaimo subscribes to **VoiceReach**, an automated message delivery system which can send a **pre-recorded voice message** to multiple telephones, simultaneously.

The City may, as one method of contacting the public, use this system to quickly send off a pre-recorded message to all citizens, businesses, organizations, schools, care facilities, hospitals, etc. included in Nanaimo's white and yellow pages phone directory to communicate emergency or water advisories or notices.

Advanced features of this system are:

- The VoiceReach platform supports 1000's simultaneous call attempts for outbound connections, including Voice Mail detection procedure and 120 concurrent incoming connections.
- The VoiceReach platform is able to distinguish between the following scenarios:
 1. The VoiceReach platform calls a telephone subscriber and the subscriber answers.
 2. The VoiceReach platform calls a telephone subscriber and the subscriber does not answer the phone. In such an event, the VoiceReach platform will call the subscriber again, at a different time.
 3. The VoiceReach platform calls a telephone subscriber and it's greeted by Voice Mail. In such an event, the VoiceReach platform is able to detect the voice mail service and it will terminate the call. The VoiceReach platform will call the telephone subscriber again, at a different time or,
 4. The Voice Reach platform can play a certain voice file to a human response and a different voice file that will be kept as a message with the voice mail.
- Each call that was made from the platform to a telephone subscriber will be logged and accounted for. No need for monitoring and keeping track of protocols.
- Upon the reception of an incoming call, the system will correlate the incoming call to an outgoing call - for reporting and statistics purposes. If no outgoing call can be correlated, the incoming call is deemed as a random access user, and is reported as such.

3.6 Voice Broadcast Scripts for Nanaimo Water Supply System

The following scripts are to be used on the Voice Reach System, depending on the circumstance:

High Turbidity: Boil Water Advisory Issued by the City of Nanaimo

SCRIPT: Please be advised that the City has issued a Boil Water Advisory for the City of Nanaimo. A failure in the City of Nanaimo's Water Treatment Plant has resulted in increased turbidity in Nanaimo's drinking water. As a precaution, water users are advised to boil their drinking water for one minute at a rolling boil. The public will be advised as soon as the turbidity issues are resolved and the advisory is lifted. For more information, please refer to the City of Nanaimo's [webpage](http://www.nanaimo.ca) www.nanaimo.ca, tune into the [Wave radio at 102.3](#) or call [250-758-1311](tel:250-758-1311).

In the event that the water supply is suspected of being contaminated and unfit for human consumption, the following script shall be used.

***Do Not Consume Water Advisory Ordered
by Vancouver Island Health Authority Office***

SCRIPT: This is the City of Nanaimo Emergency Alert system. Due to possible water contamination, the City of Nanaimo has issued a "Do Not Consume Water" Advisory for the City of Nanaimo Water System. Please tune to [102.3 FM](#) for further information and updates or phone [250-758-1311](tel:250-758-1311).

3.7 Communication during Power, TV, Telephone Outages

In the event of a major emergency or prolonged outages of power, television and/or telephone, the City may have to use sign boards at key locations around the City, deliver notices door-to-door, and use radio to provide information to the public on the state of the water delivery system.

Sign boards are stored at the City Public Works Yard.

If phones/radios are not working, designate meeting locations and times for staff to communicate.

4.0 DEFINING TYPES OF EMERGENCIES

This section defines many of the potential problems that could affect water quality or quantity in the water supply and distribution system. Each type of event can cause different types of damage to the systems' components and may require a specific solution.

Emergency Incidents usually have a wide range of severity. In this plan, categories of severity are defined as Alert Condition, Emergency Condition, Potential Disaster Condition and Disaster Condition, each of which aides in determining appropriate response actions. Examples of each condition are as follows:

Alert Condition: are considered to be routine emergencies like a distribution watermain break, short power outage, or minor mechanical condition failure.

Emergency Condition: are considered to be more significant emergencies like disruption of the main water supply system; complete loss of chlorination equipment system; reservoir contamination; or water quality degradation due to things like high turbidity or a positive E-coli detection. These types of issues usually require a Boil Water Advisory or Water Use Restriction Notice to protect the public.

Potential Disaster Condition: are situations like imminent break of a dam due to excessive high water level in the reservoir. Appropriate precautions must be taken to mitigate downstream losses, notify and protect the public.

Disaster Condition: are emergency situations like failure of a dam releasing source water, large forest fire within the watershed, acts of terrorism or hazardous chemical spill in the watershed. These types of emergencies constitute a catastrophic disaster/major emergency which requires immediate notification of law enforcement and local emergency management services. These events often take anywhere from several days to months to resolve before the system returns to normal operation.

In the event of a potable water emergency, it is the responsibility of the water purveyor to take action immediately even if the Drinking Water Officer at VIHA cannot be reached.

The following lists the possible types of emergencies and refer to those sections for detailed description and response plan.

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Others information that are also significant or relevant in assisting with the responses are included in the Appendices such as contacts, forms, procedures, and external Emergency Response Plan. Summary of Appendices are listed below.

Appendix A Emergency Contact List

Appendix B Water Advisory

Appendix C Post Incident report – Incident Form

Appendix D Lessons Learned from Previous Events

Appendix E Long Term Care Facility Water Quality Notification

Appendix F Health Link BC: Preventing Water-Borne Infections for People with Weakened Immune Systems

Appendix G How to Download Watershed Precipitation Data

Appendix H Island Timberlands Management System – Emergency Preparedness and Response Plan

Appendix I Vancouver Island Health Authority - Permit for Water Supply System

4.1 Returning to Normal Operations

Each type of emergency will require unique remediation measures and returning to normal operation may be simple or quite complicated depending on the emergency.

1. As necessary, plans should be developed for neutralizing, flushing, disinfecting tanks, pump stations, supply and distribution piping systems.
2. Water system management team should verify water quality sampling results.
3. Senior staff responsible for the City's water system operation will confer with VIHA regarding return to normal operation notification to the public.

EMERGENCY EVALUATION

(Include areas of strength and recommendations for improvement)

Emergency Action Team Response Evaluation:

Communications Response Evaluation:

Recommendations:

Suggested Amendments to the Emergency Response Plan:

4.2 Bacteriological Contamination of the Distribution System

Type of Emergency: (See below)

This emergency would arise in the event of a positive bacteria result from distribution sampling. Vancouver Island Health Authority receives all test results from regular distribution sampling and will contact the utility in the event of a positive result. Sub-divisions or construction projects may not know to contact Vancouver Island Health Authority and may contact the utility directly.

Conditions:

1. A total coliform or non-coliform background count over 200 CFU/100ml requires re-sampling to verify if there truly is a problem. This is NOT an Emergency Condition.
2. **An e-coli count over 1 CFU/100ml is an Emergency Condition** and the Drinking Water Officer at Vancouver Island Health Authority must be contacted.
CFU = colony-forming unit; MPN = Most Probable Number
3. Record free and total chlorine levels
4. Flush the distribution system in the area.
5. Resample the area for bacterial analysis.
6. Try to determine why a positive count occurred.

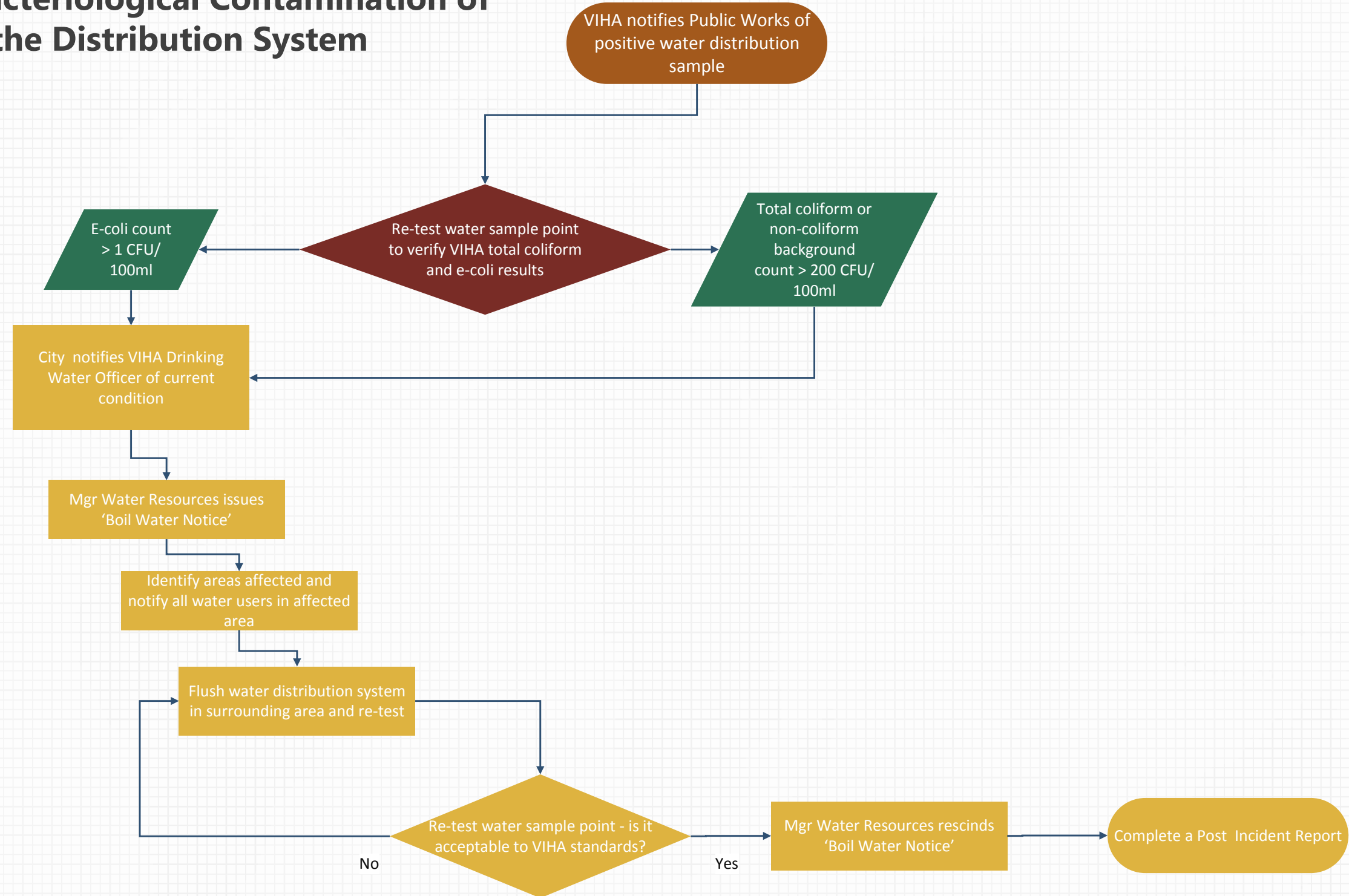
If bacterial contamination still exists:

1. Initiate emergency meeting with senior Water Operations staff and the critical management team.
2. Contact the Vancouver Island Health Authority Drinking Water Officer to discuss next steps.
3. If requested by VIHA, Issue a “Boil Water Advisory” (See Appendix B).
4. Identify the areas affected and use the Emergency Water Notification plan and maps to notify all users in the identified area.
5. Flush the distribution system in the area.
6. Take water samples for bacterial analysis.
7. Once results for all three criteria are acceptable to the Vancouver Island Health Authority Drinking Water Officer, meaning: Once the water system has returned to normal operations, three consecutive (three days in a row) bacteria tests must be taken and sent to Vancouver Island Health Authority, Health Protection and Environmental Services.
8. Only then can the “Boil Water Advisory” be rescinded (See Appendix B).
9. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- Vancouver Island Health Authority
- Snuneymuxw First Nation
- Radio & Media
- Southwest Extension Improvement District
- List of vulnerable populations and critical sites, Long Term Care Facilities (Appendix E)

4.2 Bacteriological Contamination of the Distribution System



4.2 Bacteriological Contamination of the Distribution System

4.3 Water Treatment Plant High Turbidity Readings

Type of Emergency: Emergency Condition

This event would only occur with failure beyond the control of the Water Treatment Plant operations. Precipitation data for this watershed is monitored at the Landalt weather station. Instructions for downloading this weather data are located in Appendix G.

The City of Nanaimo, Permit for a Water Supply System stipulates the following required performance standards:

The Water System Owner (City of Nanaimo) shall ensure the ultrafiltration membranes and disinfection system at the water treatment plant is in good working order and provides the following:

- Turbidity must be recorded on a continuous basis and the **average monthly turbidity levels are not to exceed 0.1 NTU 99% of the time as measured at the South Fork Water Treatment Plant (SFWTP).**
- **A Boil Water Advisory must be issued if the average daily turbidity level exceeds 1 NTU leaving the South Fork Water Treatment Plant.** Typically, only abnormal conditions result in turbidity greater than 1 NTU.

South Fork Water Treatment Plant Operations staff use the SCADA system at the plant to verify the average daily turbidity of finished water leaving the SFWTP. If possible, the calibration of the turbidity sensors should be checked prior to significant storm events to ensure accuracy of the readings.

The following provides general guidance for monitoring abnormal turbidity excursions.

Operating Condition: assumes < 0.1 NTU at South Fork Water Treatment Plant (SFWTP).

- a. If the measured water turbidity leaving the clearwell at South Fork Water Treatment Plant is > 1 NTU, an ALARM will activate in SCADA. The Senior Water Treatment Plant Operator and Manager, Water Resources should be notified.
- b. The Manager, Water Resources should NOTIFY the Drinking Water Officer reporting the current situation and trending. A 'Boil Water Advisory' should be issued.
- c. Thereafter the turbidity trend at South Fork Water Treatment Plant should be monitored and once it falls below the acceptable limit, undertake testing and continue to monitor.
- d. Once testing is within acceptable VIHA drinking water quality standards, rescind the 'Boil Water Advisory'.

Principles behind this operation:

- Recognition that there exists an increased probability of risk to health, when turbidity rises.
- Application of experience of weather trends, incoming flows from watershed.
- Judgment applied with respect to flows, weather, chlorine residual, turbidity trend at source, weather, reservoir levels and system demands.

- If severe weather forecasted, water and turbidity levels at South Fork dam and SFWTP will be monitored during working hours. Judgment to be applied as to the likelihood of early detection of potential excursions.
- Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

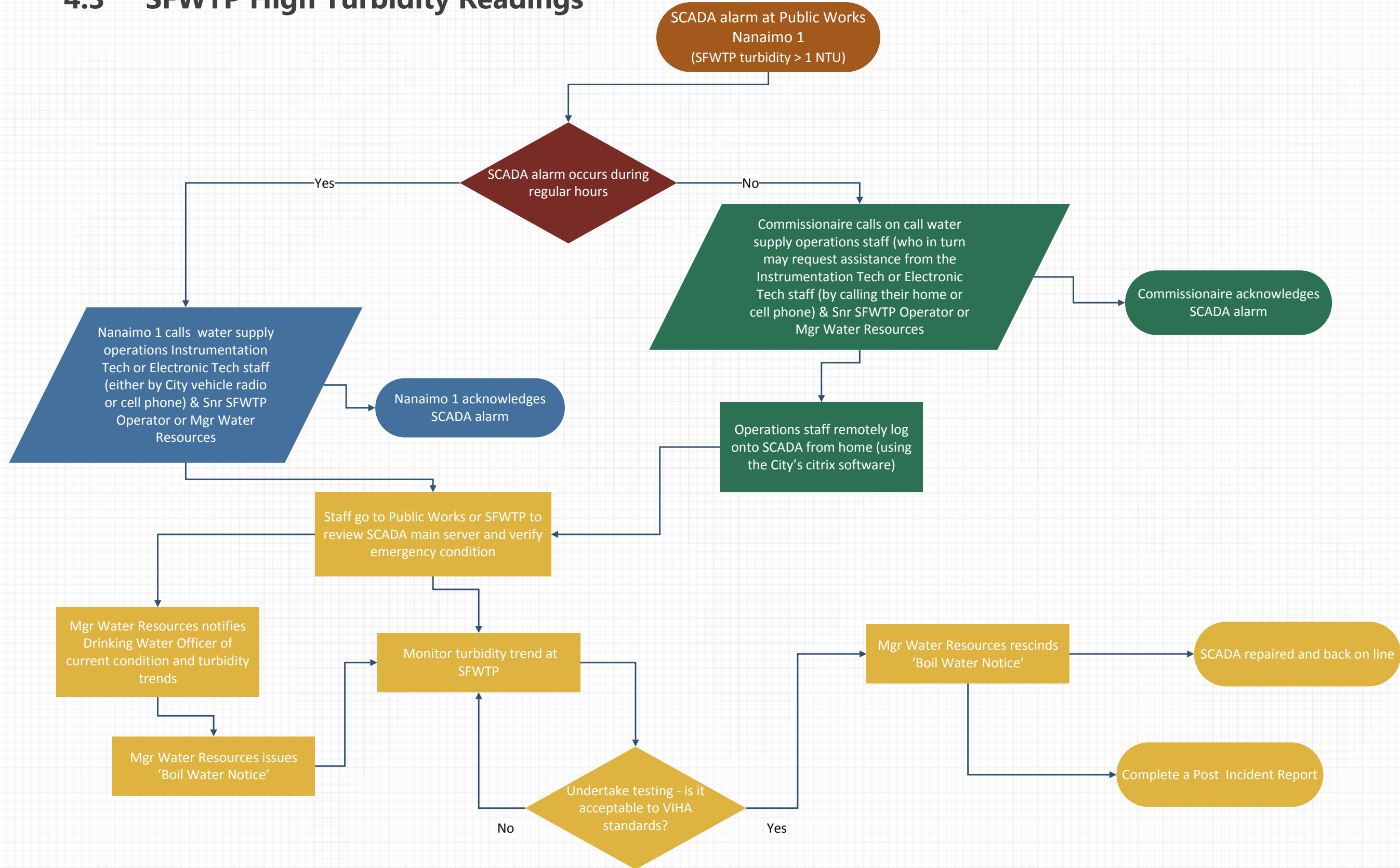
- Vancouver Island Health Authority
- Radio
- Media
- Southwest Extension Improvement District
- Snuneymuxw First Nation
- Manager, Water Resources
- Senior Water Treatment Plant Operator
- Water Treatment Plant Operators
- List of vulnerable populations and critical sites, Long Term Care Facilities (Appendix E)

Communications:

See Voice Broadcast scripts, 3.4.

Press release samples are located in Appendix B.

4.3 SFWTP High Turbidity Readings



4.3 SFWTP High Turbidity Readings

4.4 Supply Main Failure

Type of Emergency: Emergency Condition

In the event of a supply main failure there will be the potential for loss of water to residents, backflow in the system and flooding of properties.

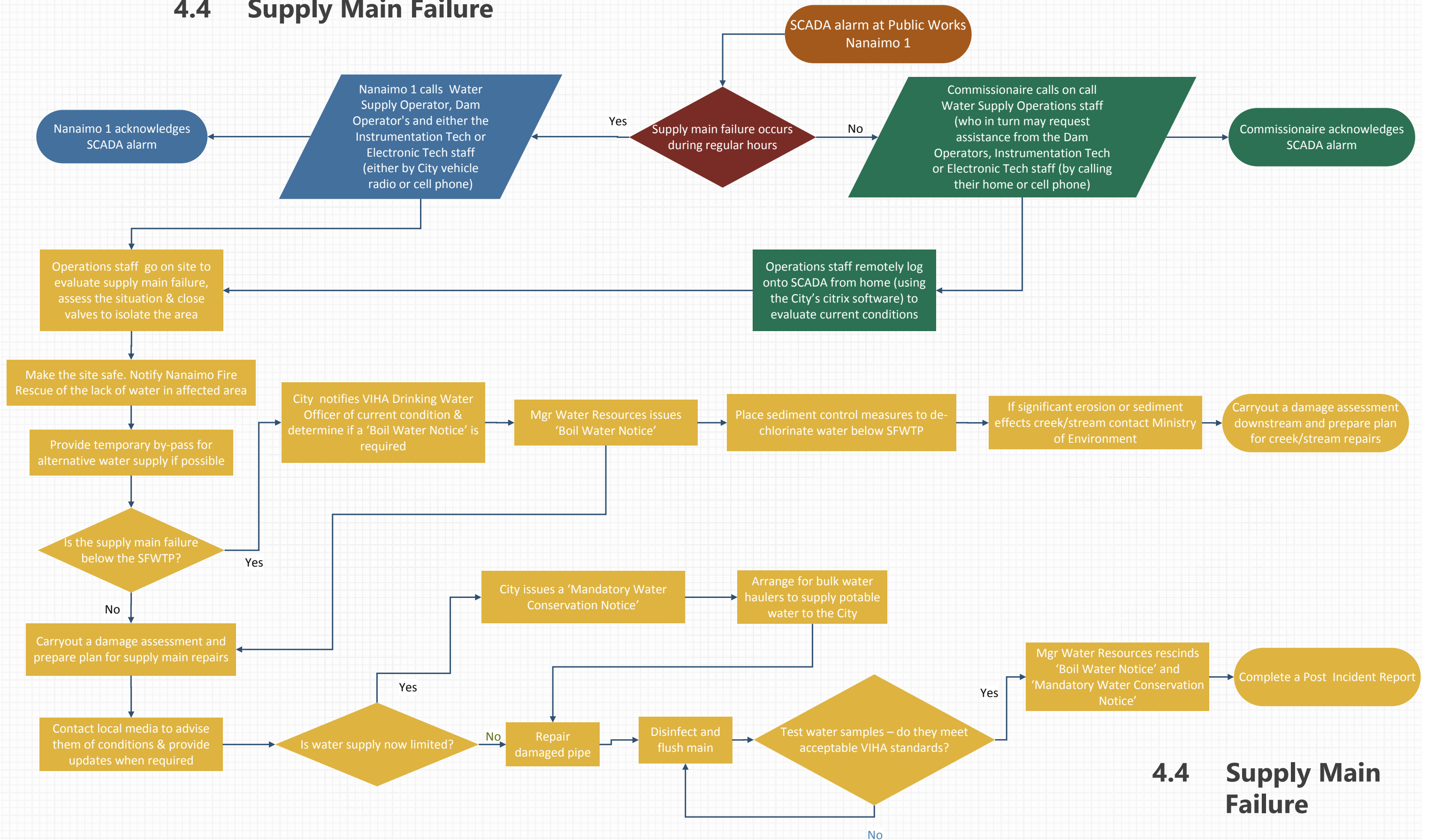
Potential Actions:

1. Initiate emergency meeting with senior Water Operations staff and the critical management team.
2. Stop the flow of water by closing valves on all sides of the problem area.
3. Make the site safe. Notify Fire Department of affected area for Fire Prevention.
4. Provide a temporary bypass or alternative supply line, if possible.
5. If there is the potential that the system has been contaminated, contact Vancouver Island Health Authority's Drinking Water Officer and determine if a "Boil Water Advisory" is required (See Appendix B). This will only apply if the problem is below South Fork Water Treatment Plant.
6. Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
7. Place sediment control measures in place and de-chlorinate the water released if below South Fork Water Treatment Plant, if possible.
8. If there will be significant erosion and sediment effect on streams, notify Ministry of Environment. *Please note that if any chlorinated water is released in a fish bearing stream or body of water Emergency Management BC must be notified immediately.*
9. Assess downstream damage and prepare a plan and schedule to remediate the situation.
10. Contact the local media to advise them of the condition and provide regular updates of the situation.
11. If the failure results in limited water supply, issue a "Mandatory Water Conservation Advisory" (See Appendix B). *Note if a Boil Water Advisory is issued after making repairs and disinfection of the main monitoring of free chorine residuals, turbidity and bacteriological water quality to facilitate rescinding BWA should occur.*
12. Arrange for a bulk water supplier to haul potable water to the City if necessary.
13. Repair the damage and disinfect the affected main section.
14. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- Vancouver Island Health Authority
- Media & Radio
- Senior Manager of Public Works
- Wastewater General Foreman
- Southwest Extension Improvement District
- Snuneymuxw First Nation (SFN)
- Waterworks General Foreman
- Drainage Foreman

4.4 Supply Main Failure



4.4 Supply Main Failure

4.5 Distribution Water Main Break

Type of Emergency: Emergency Condition

In the event of a distribution main failure there will be the potential for loss of water to residents, backflow in the system and flooding of properties.

Potential Actions:

The Public Works Water Distribution system departmental procedure for water main break at site level to be followed:-

1. Public Works Nanaimo One dispatch (or Commissionaires after normal business hours) calls Water Distribution Foreman (or Night Patrol after normal business hours) to investigate the water main break or leak after receiving the initial call.
2. As soon as possible staff isolate water main break by closing valves in the surrounding area.
3. After the initial inspection a site assessment is made and the following activities should be carried out:-
 - Make the site safe. (Make safe the localized water main break area with cones and road barriers for road and sidewalk closures, if required).
 - Organize traffic control, if required.
 - Organize a BC One 'dial before you dig' emergency call to ensure workers safety prior to undertaking any excavation works.
 - If required, additional staff are called to assist on site (after normal working hours the Commissionaire will contact 'on-call' water staff from weekly on-call list).
4. Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
 - Staff evaluates damage to City infrastructure (road, sidewalk & pipes etc.).
 - Staff evaluates damage to adjacent utilities i.e. FortisBC gas and BC Hydro. Emergency calls made to other utilities if their infrastructure is damaged.
 - Staff evaluates damage to adjacent private property.
 - If there is the potential that the adjacent water distribution system has been contaminated, contact Vancouver Island Health Authority's Drinking Water Officer and determine if a "Boil Water Advisory" is required.
5. The Incident Commander determines if evacuation of residents is required
 - Dependent on the size and the scope of break, it may be necessary to evacuate residents. An assessment should be completed on affected home(s) and if support is required in the form of evacuation, contact should be made with City emergency response personnel, Nanaimo Fire Rescue, Nanaimo RCMP and the Emergency Program Manager. At this point a unified command would be established with Public Works and other City responding agencies as they arrive to facilitate support for the operations.
6. If there will be significant erosion and sediment effect on streams, notify Ministry of Environment. *Please note that if any chlorinated water, maximum concentration*

100ug/L (100 micrograms per litre), is released in a fish bearing stream or body of water Emergency Management BC must be notified immediately.

7. Staff organizes personnel, equipment, machinery, materials and parts to repair the water main break.
8. Staff repairs the water main and re-open valves to check repair is watertight.
9. Staff organizes for reinstatement of excavation (if emergency repair carried out at night, the excavation reinstatement occurs the following day).
10. Reinstatement works carried out and traffic control measures removed.
11. Assess potential downstream creek damage and prepare a plan and schedule to remediate the situation (to be completed by Storm Drainage Section).

The Public Works Waterworks General Foreman should be provided with a situation report of the water main break and the Senior Manager of Public Works should then be informed. The Senior Manager of Public Works will activate the Public Works Departmental Operations Centre (DOC) depending on the severity of the break and impact to the home(s) or area.

If the water main break has a neighbourhood or community impact that is beyond the capacity for Public Works staff and their resources to manage, the Senior Manager of Public Works should contact the City's Emergency Program Manager with a request to activate the City's Emergency Co-ordination Centre (ECC). Communications from the site would channel into the ECC and the Public Works DOC would ensure the rest of the City is maintaining service. The procedures, roles, responsibilities and activities identified in the City's *Emergency Response and Recovery Plan* will be followed upon activation of the ECC.

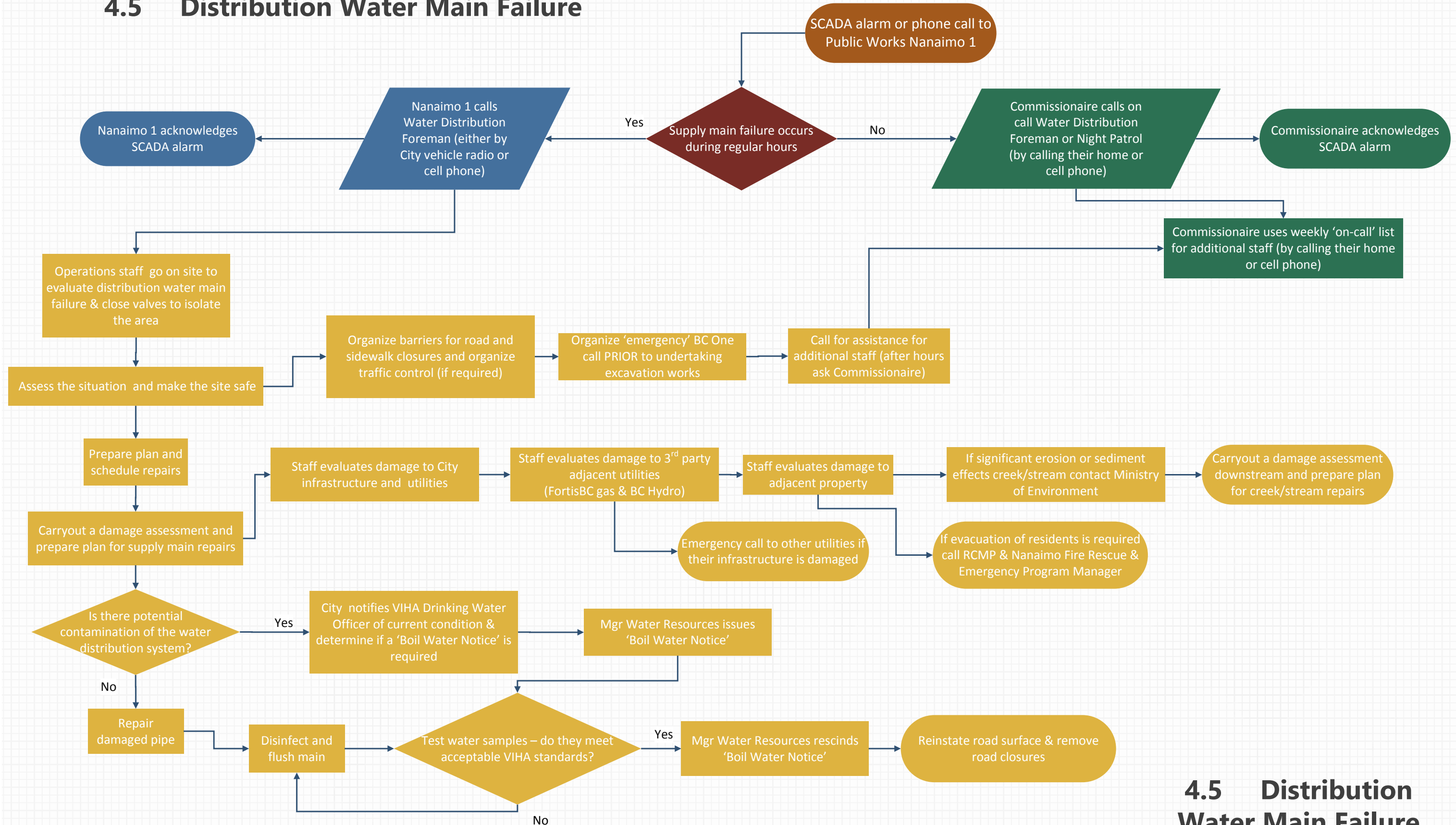
Contacts:

- Nanaimo One Dispatch
- Commissionaires
- Night Patrol
- Water Distribution Foreman
- Water Distribution Operators
- Vactor Truck & Operators
- Backhoe & Operator
- Tandem Truck & Driver
- Waterworks General Foreman
- Senior Manager of Public Works
- Emergency Program Manager
- Wastewater General Foreman
- Drainage Foreman

Communications:

- BC Hydro
- FortisBC
- Vancouver Island Health Authority
- Media
- Radio
- Snuneymuxw First Nation
- Ministry of Environment

4.5 Distribution Water Main Failure



4.5 Distribution Water Main Failure

4.6 Failure of the Chlorination System at the South Fork Water Treatment Plant

Type of Emergency: Emergency Condition

There should always be a minimum of 0.05 mg/L of free or total chlorine, and not to exceed 4 mg/L free chlorine, throughout the distribution system. Dosing rates vary due to the flow rate. The main chlorination room in the water treatment plant has three chlorinators feeding off four chlorine tanks. The permeate lines to the clearwell tank have two chlorine injector lines disinfecting the potable water. A failure can occur on one or more of the chlorinators or injector lines.

Potential Actions:

1. If one system is non-operational then divert water through adjustment of valves to chlorine operational lines.
2. Adjust the chlorine dosage accordingly.
3. If both systems are inoperable then contact the Senior Operator of the WTP to discuss possible solutions.
4. If no alternative solutions can be found quickly, contact the Vancouver Island Health Authority Drinking Water Officer.
5. Issue a "Boil Water Advisory" (See Appendix B)
6. Review options for flushing un-chlorinated water from the system.
7. Identify, assess and correct the problem.
8. Ensure chlorine dosage is adequate to provide a minimum of 0.20 mg/L free chlorine throughout the distribution system (See permit in Appendix I).
9. Take water samples throughout the main distribution system for bacterial analysis.
10. Once normal equipment operation resumes, contact the Vancouver Island Health Authority Drinking Water Officer to discuss rescinding the "Boil Water Advisory."
11. Complete Post-Incident Report (See Appendix C).

Available Documentation

- City of Nanaimo Safe Work Procedure for chlorine gas
- City of Nanaimo Standard Operating Procedures for the safe delivery and handling of chlorine gas
- City of Nanaimo Emergency Response Procedures for a chlorine gas leak
- *Workers Compensation Board (WCB) Chlorine Safe Work Practices* publication

All the aforementioned documentation can be reviewed at the following City of Nanaimo computer network drive: \\Tent\E&PW\Utilities\Water\Resources\Treatment Plant\Operations\Safe Work Procedures\Safe Work Procedures Manual\17. Hazardous Materials\C. Chlorine

Contacts:

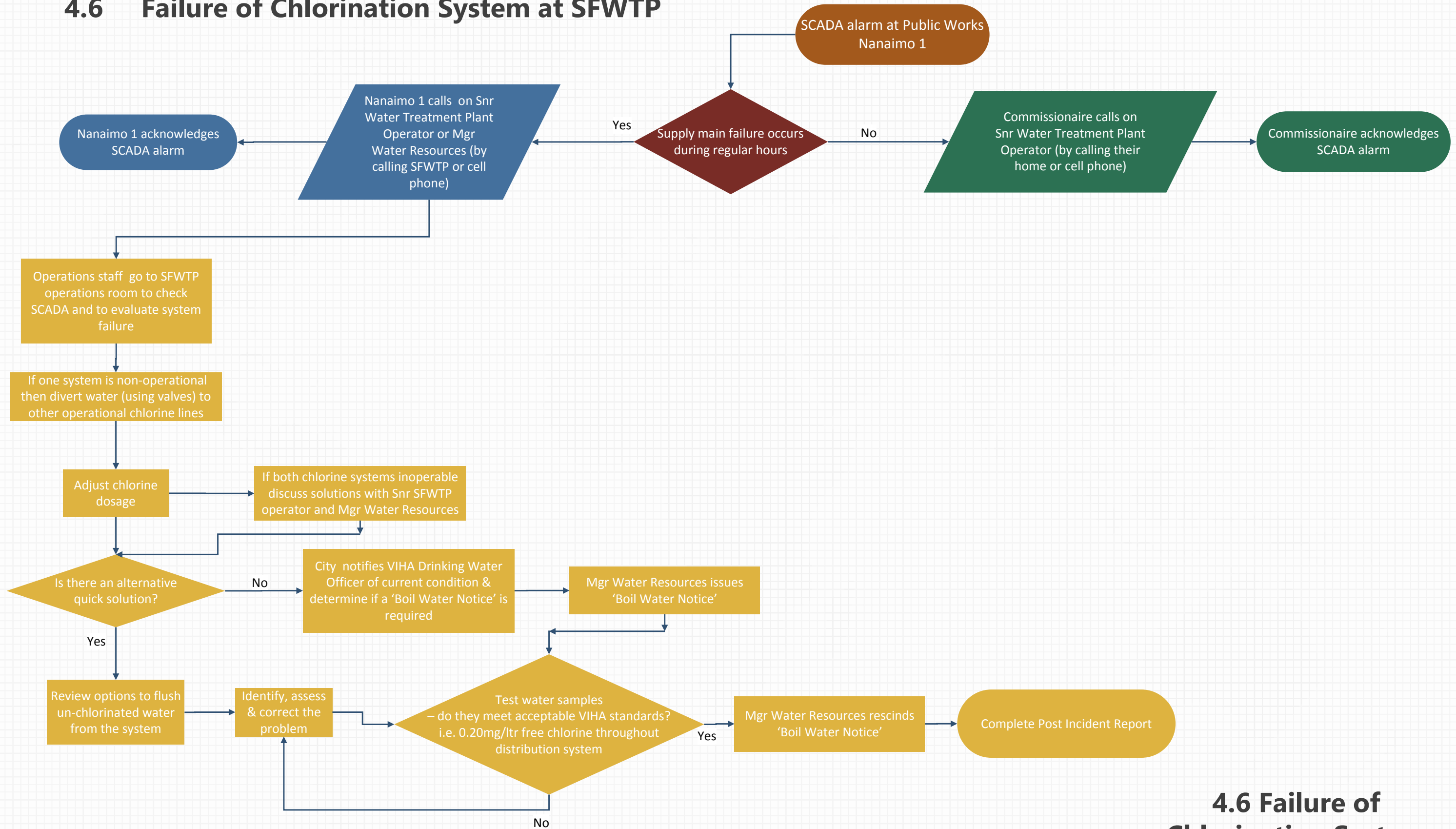
- Senior Water Treatment Plant Operator
- Water Treatment Plant Operators (4)

Communications:

- Vancouver Island Health Authority Drinking Water Officer
- Media & Radio

- Manager, Water Resources
- Snuneymuxw First Nation
- Southwest Extension Improvement Distri

4.6 Failure of Chlorination System at SFWTP



4.6 Failure of Chlorination System at SFWTP

4.7 Chlorine Leak at the South Fork Water Treatment Plant

Initiated by a chlorine alarm sensor inside the South Fork Water Treatment Plant

Type of Emergency: Emergency Condition

Entry to the chlorine tank room automatically turns on the fans which discharge approximately 3 meters above the roof. In the event that one of the two chlorine sensors detects a leak, both interior and exterior blue warning lights will turn on and a general audible alarm will be called out. Once the chlorine sensor is tripped, the discharge fan system will be disabled to contain any chlorine gas within the building.

Potential Actions:

1. In the event of a leak, an Alarm is received at Public Works Yard through the SCADA system. The City's Water Treatment Plant Operations staff, who are all trained in safe handling of chlorine, should follow chlorine safe work procedures, carefully assess the situation and isolate the leak.
2. If it has been determined that the chlorine leak has escaped from the building, the Senior Water Treatment Plant Operator (or in his absence the Manager of Water Resources) and Emergency Program Manager should be contacted immediately and informed of the conditions so that appropriate actions can be taken.
3. Complete Post-Incident Report (See Appendix C).

Emergency Equipment Location:

The City's self-contained breathing apparatus (SCBA), safety suits and chlorine leak repair kit are stored at the South Fork Water Treatment Plant.

Available Documentation

- City of Nanaimo - Safe Work Procedure for Chlorine Gas
- City of Nanaimo - Standard Operating Procedures for the Safe Delivery and Handling of Chlorine Gas
- City of Nanaimo - Emergency Response Procedures for a Chlorine Gas Leak
- Workers Compensation Board (WCB) - Chlorine Safe Work Practices publication

All the aforementioned documentation can be reviewed at the following City of Nanaimo computer network drive:-

\\Tent\E&PW G:\G:\Utilities\Water\Resources\Treatment Plant\Operations\Safe Work Procedures\Safe Work Procedures Manual\17. Hazardous Materials\C. Chlorine\IV. Chlorine Gas Leak ERP.docx

- There should always be a minimum of 0.2 mg/L of residual disinfectant, measured as free chlorine, for water entering the distribution system. At any point in the distribution system there should be at least 0.05mg/L of residual disinfectant, measured as free chlorine. The maximum residual disinfectant, measured as free chlorine, for water

anywhere in the distribution system shall not to exceed 4 mg/L (except during installation, repairs or maintenance of watermains or reservoirs)

- There are two chlorine injector lines: one for each permeate header north and south side of clearwell.

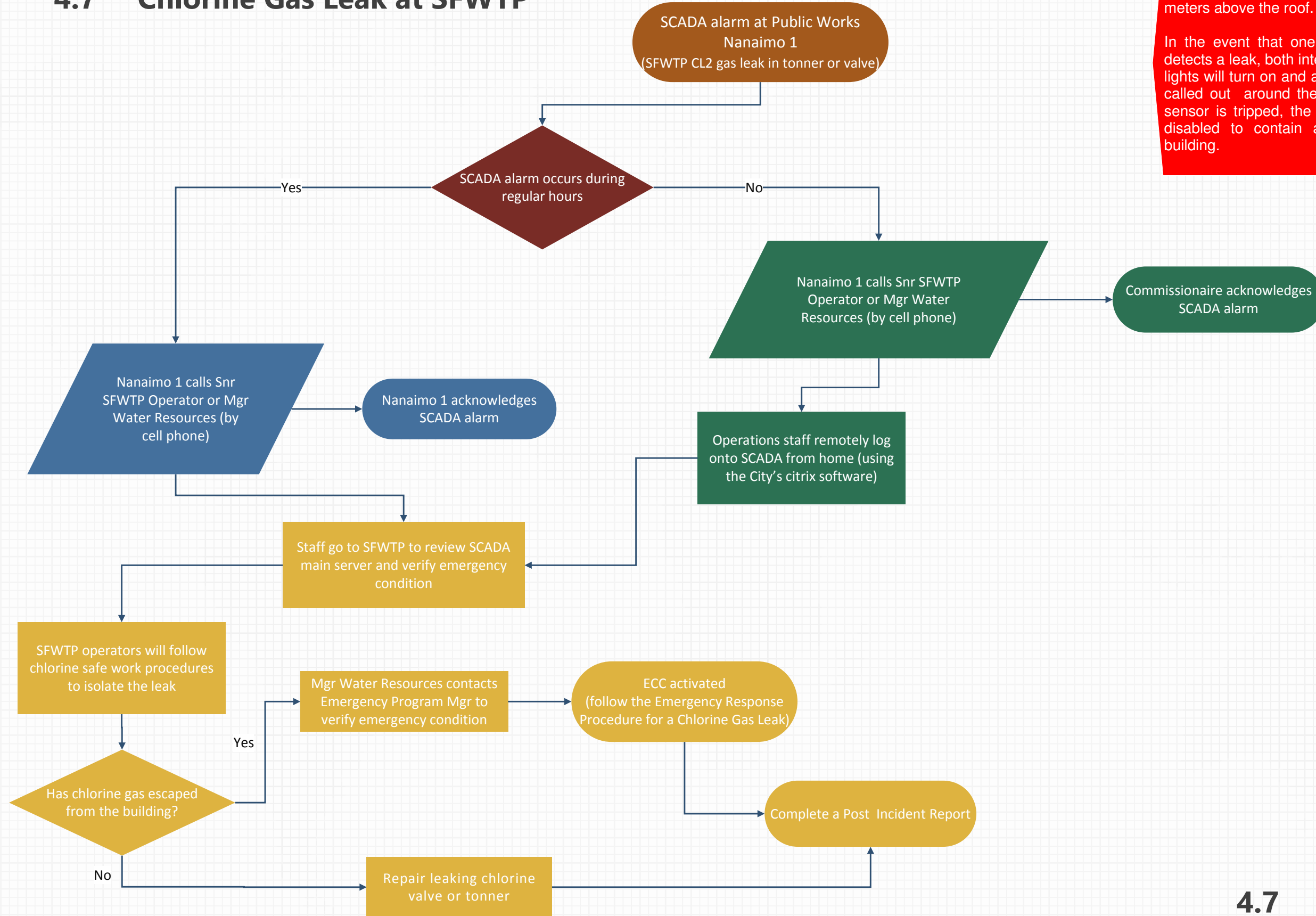
Contacts (certified and trained in handling chlorine):

- Senior Water Treatment Plant Operator
- Water Treatment Plant Operators (4)
- Instrument and Telemetry Technologist
- Electronics Instrumentation Technologist
- Senior Water Technician
- Water Technician

Other

- Manager, Water Resources
- Senior Manager of Public Works

4.7 Chlorine Gas Leak at SFWTP



Entry to the SFWTP chlorine tank room automatically turns on the fans which discharge approximately 3 meters above the roof.

In the event that one of the two chlorine sensors detects a leak, both interior and exterior blue warning lights will turn on and a general audible alarm will be called out around the SFWTP. Once the chlorine sensor is tripped, the discharge fan system will be disabled to contain any chlorine gas within the building.

4.7 Chlorine Gas Leak at SFWTP

4.8 Chemical Spill – at South Fork Water Treatment Plant

Type of Emergency: Alert Condition

There is a possibility of a chemical spill at the South Fork Water Treatment Plant that could cause serious injuries, burns and release of poisonous gases that would be detrimental to the health and safety of the water operations staff. There is also a potential contamination of the city's drinking water supply.

Potential Actions:

1. When handling any chemicals operations staff should follow the Material Safety Data Sheet (MSDS) provided for that chemical.
2. The appropriate personal protective equipment (PPE) must be used at all times when handling any chemicals in the plant.
3. A chemical spill safe work procedure is in place and this should be initiated and followed in the event of a chemical spill at the plant.
4. If there is a chemical spill at the plant the operator should immediately inform the Senior Water Operator or the Manager, Water Resources in his absence.
5. Water Operators will initiate and follow the Emergency Response Procedure for chemical spills.
7. If possible, contain the spill to ensure that no concentrated chemicals reach open water sources.
8. If the chemical spill cannot be contained or isolated call 911 and ask for assistance from Nanaimo Fire Rescue
9. If the spilled chemicals come into contact with open water sources within the water treatment plant, contact the Vancouver Island Health Authority Drinking Water Officer.
10. Issue a "Do Not Consume Water Notice" (See Appendix B)
11. Review options for flushing contaminated water from the system.
12. Identify, assess and correct the problem.
13. Ensure chlorine dosage is adequate to provide a minimum of 0.20 mg/L free chlorine throughout the distribution system.
14. Take water samples throughout the main distribution system for bacterial analysis.
15. Once normal equipment operation resumes, contact the Vancouver Island Health Authority Drinking Water Officer to discuss rescinding the "Do Not Consume Water Notice".
16. Complete Post-Incident Report (See Appendix C).

Available Documentation

- City of Nanaimo Emergency Response Procedure for General Chemical Spill
- City of Nanaimo Safe Work Procedures for the safe delivery and handling of specific chemicals
- Chemical specific Material Safety Data Sheet (MSDS)
- Workplace WHIMIS labels

All the aforementioned documentation can be reviewed at the following City of Nanaimo computer network drive:

\\Tent\E&PW\Utilities\Water\Resources\Treatment Plant\Operations\Safe Work Procedures\Safe Work Procedures Manual\17. A. General Chemical Spill ERP.doc

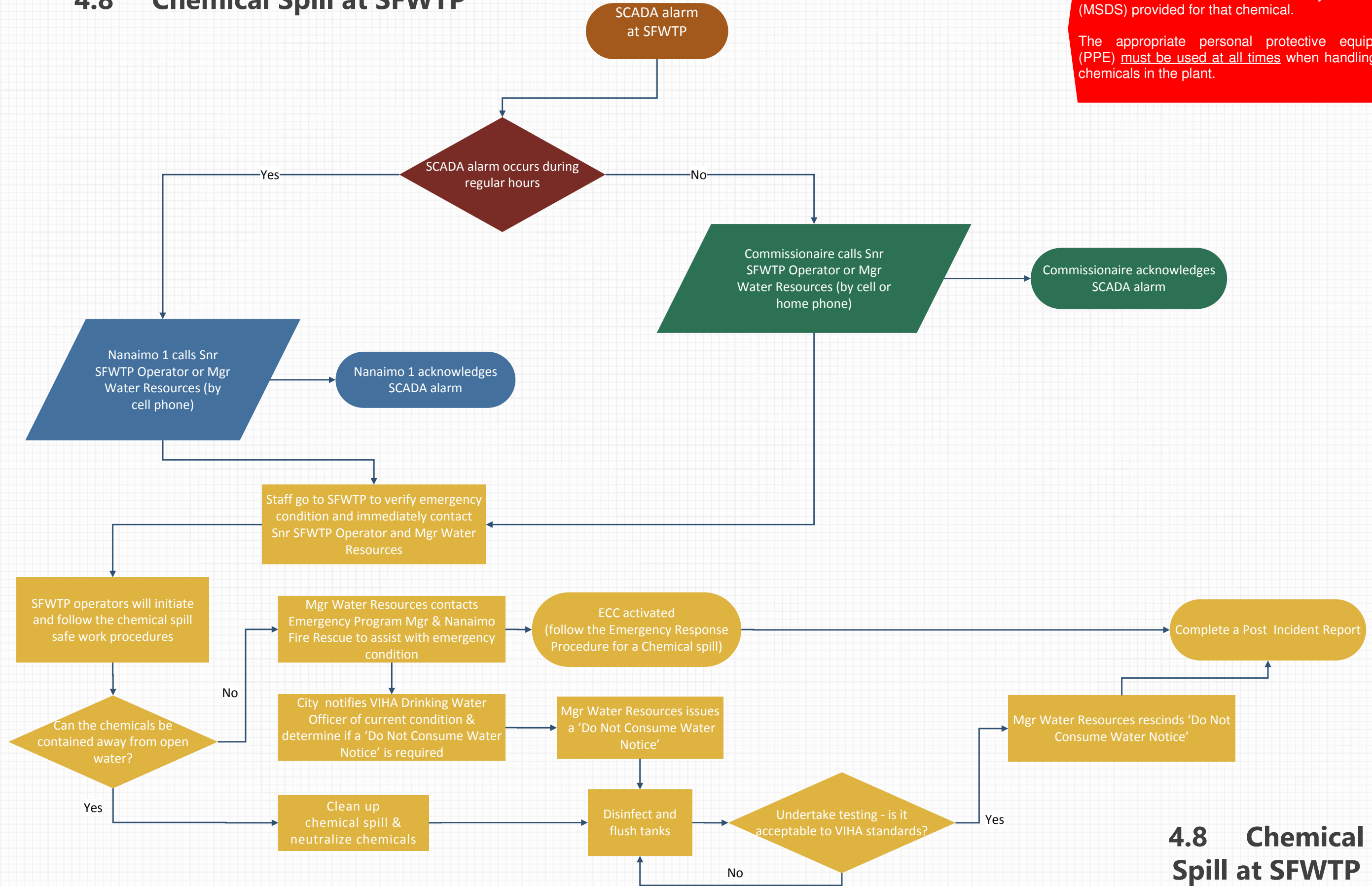
Contacts:

- Senior Water Treatment Plant Operator
- Water Treatment Plant Operators (4)
- Manager, Water Resources

Communications:

- Vancouver Island Health Authority Drinking Water Officer
- Media & Radio
- Snuneymuxw First Nation
- Southwest Extension Improvement District
- Regional District of Nanaimo Emergency Coordinator

4.8 Chemical Spill at SFWTP



When handling any chemicals SFWTP operations staff should follow the Material Safety Data Sheet (MSDS) provided for that chemical.

The appropriate personal protective equipment (PPE) must be used at all times when handling any chemicals in the plant.

4.8 Chemical Spill at SFWTP

4.9 Failure of the SCADA (*Supervisory Control and Data Acquisition System*)

Type of Emergency: Alert Condition

The SCADA system is used to collect data, process alarms and in some cases provides remote set points to PLC's that provide local control at the South Fork Water Treatment Plant, dams, pump stations and reservoirs. The severity and cause of a loss of either of these systems will need to be assessed in each situation.

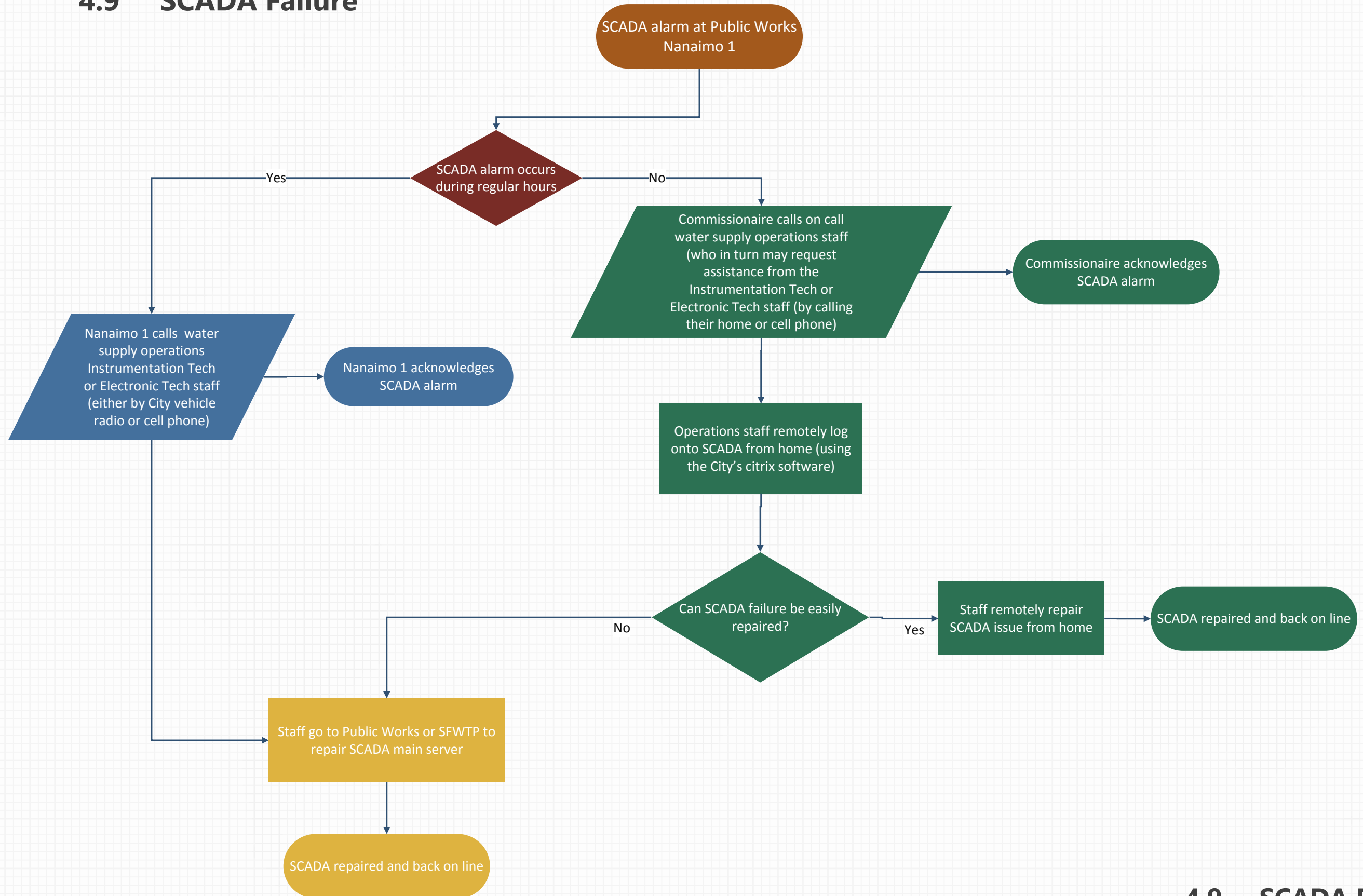
Potential Actions:

1. Contact senior Water Operations staff and the Instrument and Telemetry Technologist or the Electronics Instrumentation Technologist to assess and rectify the situation.
2. The primary SCADA server is located in the Public Works locked computer room. Two redundant, virtual back-up servers are located inside the IT Server Room at the SARC building.

Contacts (See Appendix A):

- Instrument and Telemetry Technologist
- Electronics Instrumentation Technologist

4.9 SCADA Failure



4.10 Failure of Outstation PLC (*Programmable Logic Controller*)

Type of Emergency: Alert Condition

Programmable Logic Controllers (PLCs) provide automated control of various processes including chlorination, water treatment, pump station, reservoir, and energy recovery system operations. The severity and cause of a loss of either of these systems will need to be assessed in each situation, and corrected as soon as possible.

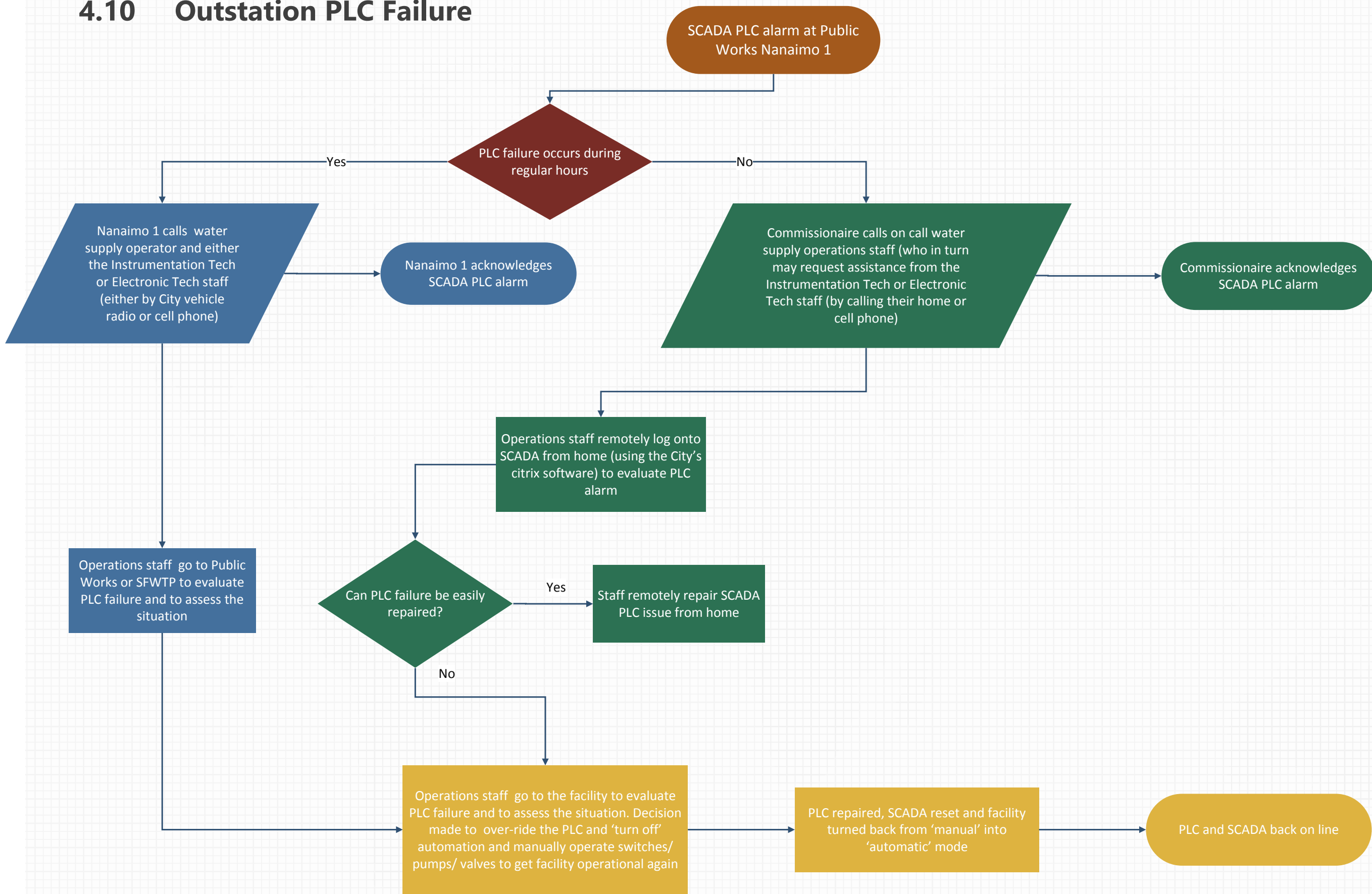
Potential Actions:

- Contact the senior Water Operations staff and the Instrument and Telemetry Technologist or the Electronics Instrumentation Technologist to assess the situation.
1. Switch the system to manual operation.
 2. Ensure that all equipment is running properly.
 3. Ensure chlorine dosage is adequate to provide a minimum of 0.20 mg/L free chlorine throughout the distribution system.
 4. Operate the system manually until PLCs are repaired or operational again.

Contacts (See Appendix A):

- Instrument and Telemetry Technologist
- Electronics Instrumentation Technologist

4.10 Outstation PLC Failure



4.11 Extended Loss of BC Hydro Power Supply

WARNING: Keep 10 metres away from any downed power lines

Type of Emergency: Alert Condition

The loss of BC Hydro power will automatically activate the standby power generator / diesel driven pump to provide emergency power/water as needed. The following table lists the type of generator and fuel capacity of each unit.

Component	Size of Unit	Runtime in hours with 100% load and full fuel tank	Full fuel tank Capacity
South Fork Water Treatment Plant Diesel Generator	750 kW Diesel (50% plant load)	32	500 liters
Rutherford Pump Station Diesel Pump	2500 usgpm (158 l/s)	20	1000 liters
Lost Lake Pump Station Diesel Pump	2500 usgpm (158 l/s)	19	970 liters
College Park Pump Station Diesel Pump	1000 usgpm (63 l/s)	24	320 liters
Jump Lake Dam Diesel generator		33*	50 liters

* Only run in spring and summer to adjust gates

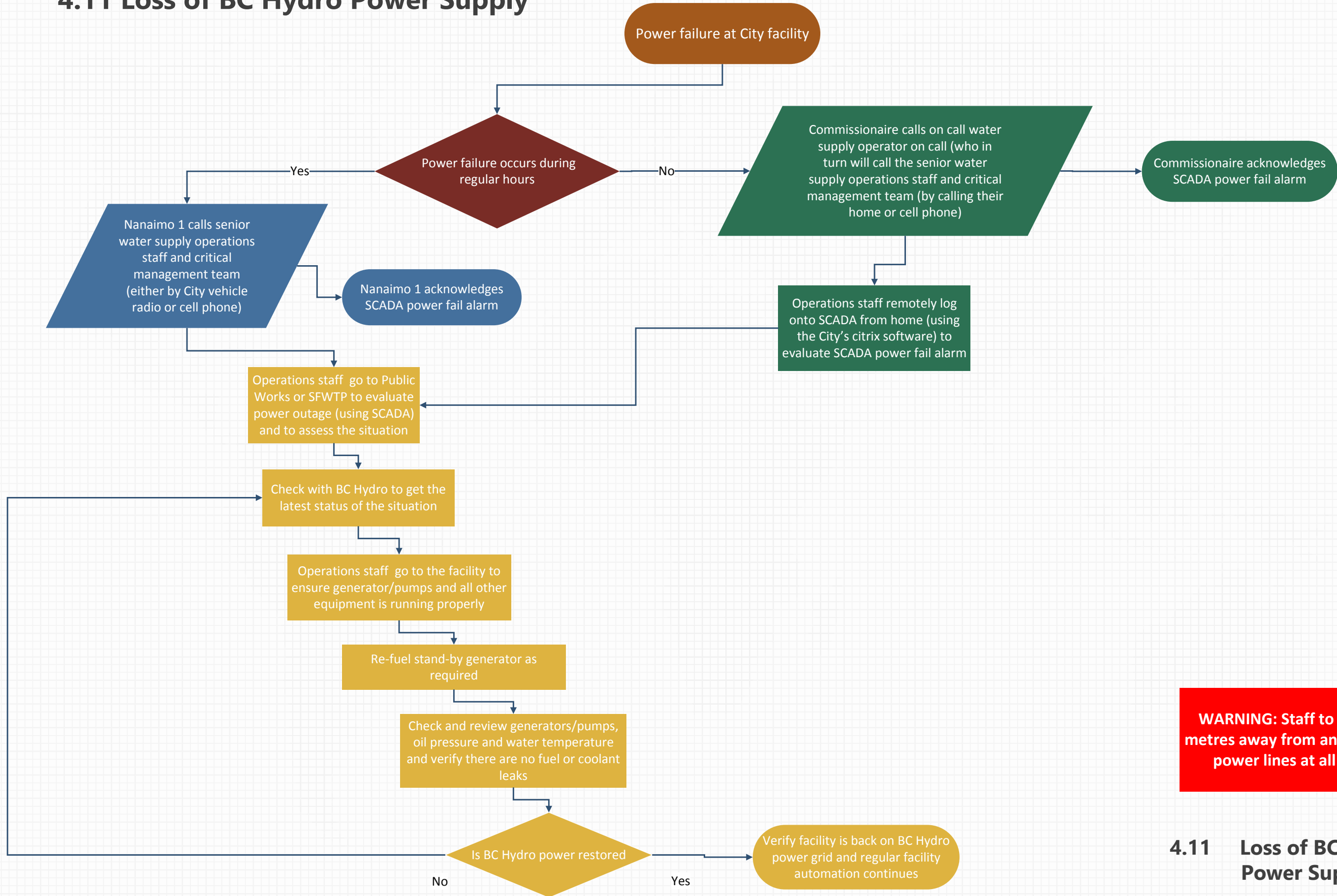
Potential Actions:

1. Initiate emergency meeting with senior Water Operations staff and critical management team.
2. Check with BC Hydro regarding status of the situation.
3. Ensure that generator(s)/pump(s) are running properly.
4. Ensure that all other equipment is running properly.
5. Re-fuel stand-by generator if the power loss is expected to last for an extended period.
6. Check the generator's/pump's oil pressure, water temperature and verify that there are no fuel or coolant leaks.
7. Once hydropower is regained, take the generator off line and refuel.
8. Additional information on the generator operation can be found in the station Operation and Maintenance Manual kept on site.

Contacts:

- Senior Water Treatment Plant Operator
- Instrument and Telemetry Technologist
- Senior Water Technician
- Manager, Water Resources
- Water Treatment Plant Operators (4)
- Electronics Instrumentation Technologist
- Water Technician

4.11 Loss of BC Hydro Power Supply



WARNING: Staff to keep 10 metres away from any downed power lines at all times

4.12 Reservoir Intrusion

Type of Emergency: Emergency Condition

This condition results in the event of unauthorized access to the site, the control building or the reservoir. A reservoir intrusion could be the result of intended or unintended contamination of the storage facility and distribution system.

Potential Actions:

1. Initiate an emergency meeting with senior Water Operations staff and management team.
2. Isolate the reservoir by closing valves.
3. If criminal activity is suspected, secure the site and protect any evidence.
4. Contact the RCMP.
5. Contact the Vancouver Island Health Authority Drinking Water Officer.
6. Isolate the downstream system.
7. Take samples from the reservoir and the downstream system. Test against regulated water quality requirements and the Guidelines for Canadian Drinking Water Quality.
8. Issue a "Boil Water Notice" if the reservoir potentially contains a bacterial contaminant and water has entered the distribution system (See Appendix B).
9. Issue a "Do Not Consume Water Notice" if the reservoir potentially contains a chemical contaminant and water has entered the distribution system (See Appendix B).
10. Identify the areas affected and use the Emergency Water Notification plan and maps to notify all users in the identified area.
11. Keep reservoir off-line until samples are deemed safe to drink.
12. If samples are not safe to drink, drain and repair any damage to the reservoir.
13. Rinse and disinfect the reservoir.
14. Once bacterial and chemical results from the distribution system are acceptable to Vancouver Island Health Authority, issue notification that the Drinking Water Problem has been corrected.
15. Once bacterial and chemical results from the reservoir are acceptable to Vancouver Island Health Authority, put the reservoir back on line.
16. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

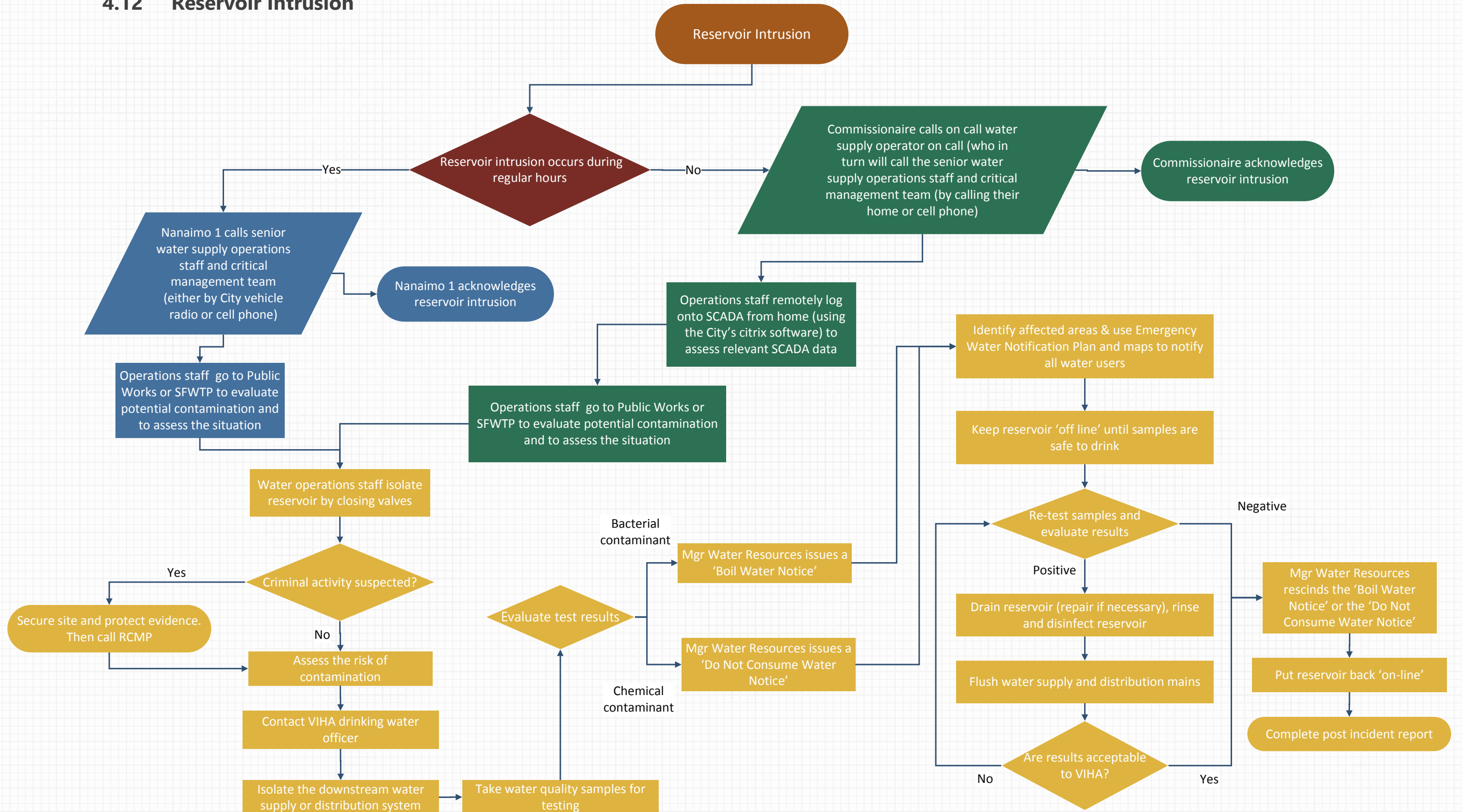
- Vancouver Island Health Authority
- Media / Radio
- Exova Labs or Maxxam Analytics (Labs for water testing)
- Snuneymuxw First Nation
- RCMP

Communications:

See Voice Broadcast scripts, 3.4.

Press release samples are located in Appendix B.

4.12 Reservoir Intrusion



4.13 Watershed Fire

Type of Emergency: Emergency Condition

This event can vary in severity depending on the location and size of the fire. Access roads for fire fighting, chemical fire retardants, debris and increased run-off entering the water can all effect water quality. Long-term effects may include excessive algal growth and increased turbidity.

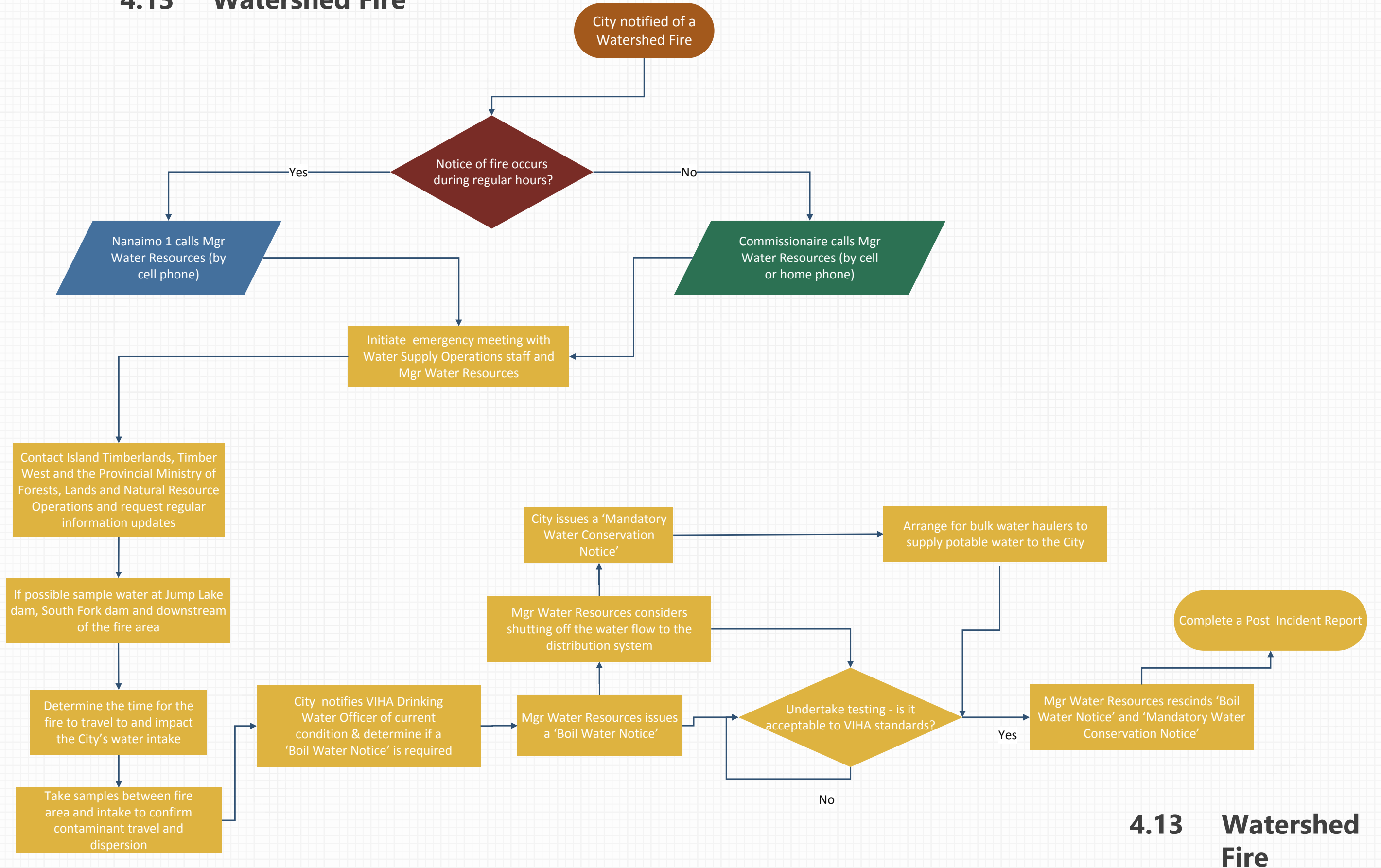
Potential Actions:

1. Initiate emergency meeting with senior Water Operations staff and the critical management team.
2. Contact the land owner and the Ministry of Forests, Lands & Natural Resource Operations. Request regular status information on the situation and possible water contamination.
3. Sample water at Jump Lake Dam, South Forks and downstream of the fire area.
4. Determine the travel time to, and/or the impact on the intake.
5. Take water samples between fire area and intake to confirm contaminant travel and dispersion.
6. Contact Vancouver Island Health Authority.
7. If necessary, issue a “Boil Water Advisory” (See Appendix B).
8. If necessary, consider shut off the flow to the distribution system.
9. Issue a “Water Use Advisory” (See Appendix B).
10. Arrange for a bulk water supplier to haul potable water to the City.
11. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- Island Timberlands
- Timberwest
- Ministry of Forests, Lands & Natural Resource Operations
- Vancouver Island Health Authority
- Bulk Water Supplier
- Snuneymuxw First Nation

4.13 Watershed Fire



4.14 Building Fire

DO NOT TRY TO PUT OUT A FIRE:

- If the fire is spreading beyond the spot where it started.
- If there is a potential for explosion.
- If the fire can block your escape.
- If the extinguisher proves to be ineffective.

Type of Emergency: Emergency Condition

This emergency would arise in the event of an internal or external fire at the South Fork Water Treatment Plant, in any pump stations or water utility buildings.

Actions:

1. Contact Nanaimo Fire Rescue if facility is within City Limits.
2. Ensure that all personnel are accounted for and clear of the building fire.
3. Advise Nanaimo Fire Rescue of any chemicals or hazardous gases stored on site.
4. If fire causes loss of chlorination, implement other options for disinfection immediately.
5. Complete Post-Incident Report.

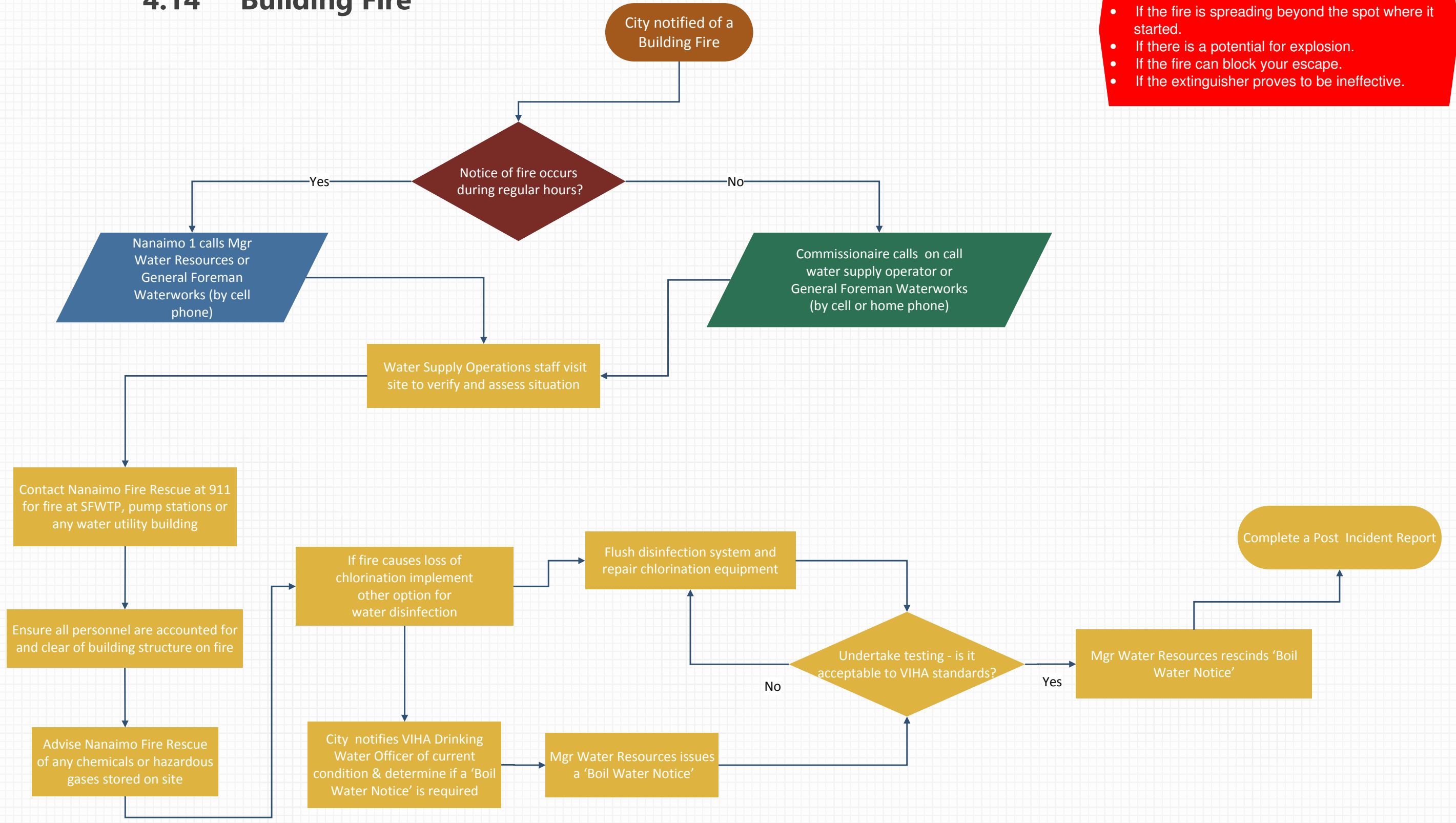
Contacts (See Appendix A):

- Nanaimo Fire Rescue

4.14 Building Fire

DO NOT TRY TO PUT OUT A FIRE:

- If the fire is spreading beyond the spot where it started.
- If there is a potential for explosion.
- If the fire can block your escape.
- If the extinguisher proves to be ineffective.



4.15 Plane Crash or Automobile Accident in Watershed

Type of Emergency: Emergency Condition

In the event of a plane crash, marine or automobile accident in the watershed, there is potential for contamination of the water supply from the release of hydrocarbons or other material in transport. The travel time from the north end of Jump Lake to the intake can range from one day to two days depending on the inflow/outflow rates.

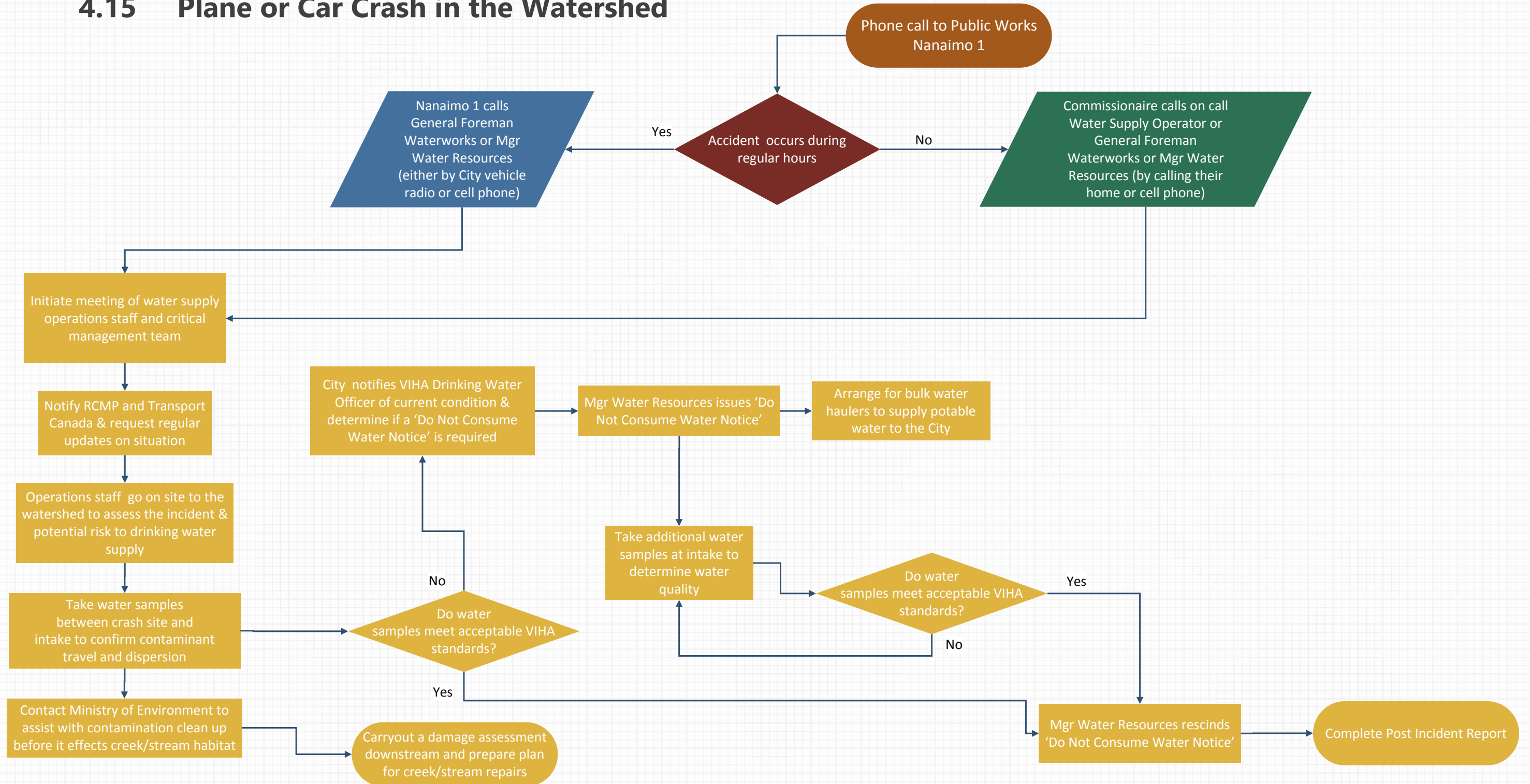
Potential Actions:

1. Initiate emergency meeting with critical management team and notify RCMP and Transport Canada.
2. Request regular status information on the situation and possible water contamination. Take water samples between crash site and intake to confirm contaminant travel and dispersion.
3. Contact Vancouver Island Health Authority to advise of situation and determine required actions and public notification processes to be implemented (Refer to VoiceReach broadcasting and Appendix B – ‘Do Not Consume Water Notice’).
4. Contact Ministry of Environment for assistance with contamination clean-up.
5. Arrange for bulk water suppliers to haul potable water if minimum water quality standards cannot be maintained.
6. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- RCMP
- Nanaimo Fire Rescue
- Vancouver Island Health Authority
- Radio
- Media
- Southwest Extension Improvement District
- Snuneymuxw First Nation
- Ministry of Forests, Lands & Natural Resource Operations
- Transport Safety Canada

4.15 Plane or Car Crash in the Watershed



4.15 Plane or Car Crash in the Watershed

4.16 Slope / Bank Failure in Watershed

Type of Emergency: Emergency Condition

Slope or bank failure in the watershed could potentially result in increased turbidity levels and bacterial contamination.

Potential Actions:

1. Initiate emergency meeting with senior Water Operations staff and critical management team.
2. Contact the land owner to report findings and Ministry of Forests, Lands & Natural Resource Operations.
3. Request regular status information on the situation and possible water contamination.
4. Sample water at the downstream end of the slope failure and at the intake at South Forks Dam.
5. Determine the travel time to the intake.
6. Take water samples between slope failure and intake to confirm contaminant travel and dispersion.
7. Contact Vancouver Island Health Authority.
8. Issue a “Boil Water Advisory” (See Appendix B).
9. Issue a “Water Use Restriction” (See Appendix B).
10. If needed, arrange for a bulk water supplier to haul potable water to the City.
11. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

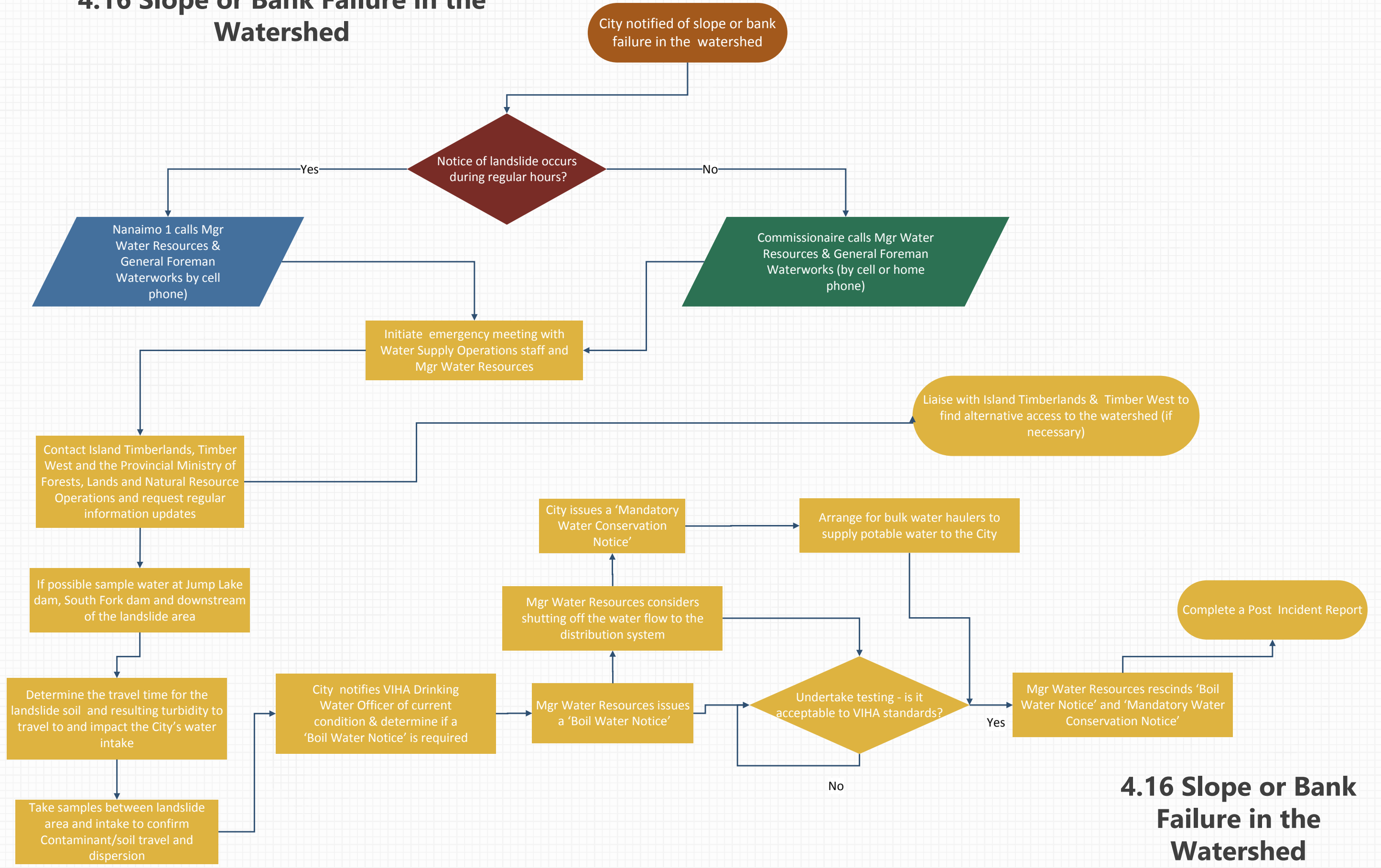
- Nanaimo Fire Rescue
- Vancouver Island Health Authority
- Southwest Extension Improvement District
- Radio
- Media
- Ministry of Forests, Lands & Natural Resource Operations
- Island Timberlands
- Timberwest
- Snuneymuxw First Nation

Communications:

See Voice Broadcast scripts, 3.4.

Press release samples are located in Appendix B.

4.16 Slope or Bank Failure in the Watershed



4.16 Slope or Bank Failure in the Watershed

4.17 Jump Lake Dam or South Fork Dam - Imminent Breach / Dam Breach

Type of Emergency: Disaster Condition

Should Jump Lake Dam breach, the supply of water to the City of Nanaimo would be severely compromised. It is likely that South Fork Dam would fill with mud and debris that would result in a total loss of supply.

Potential Actions:

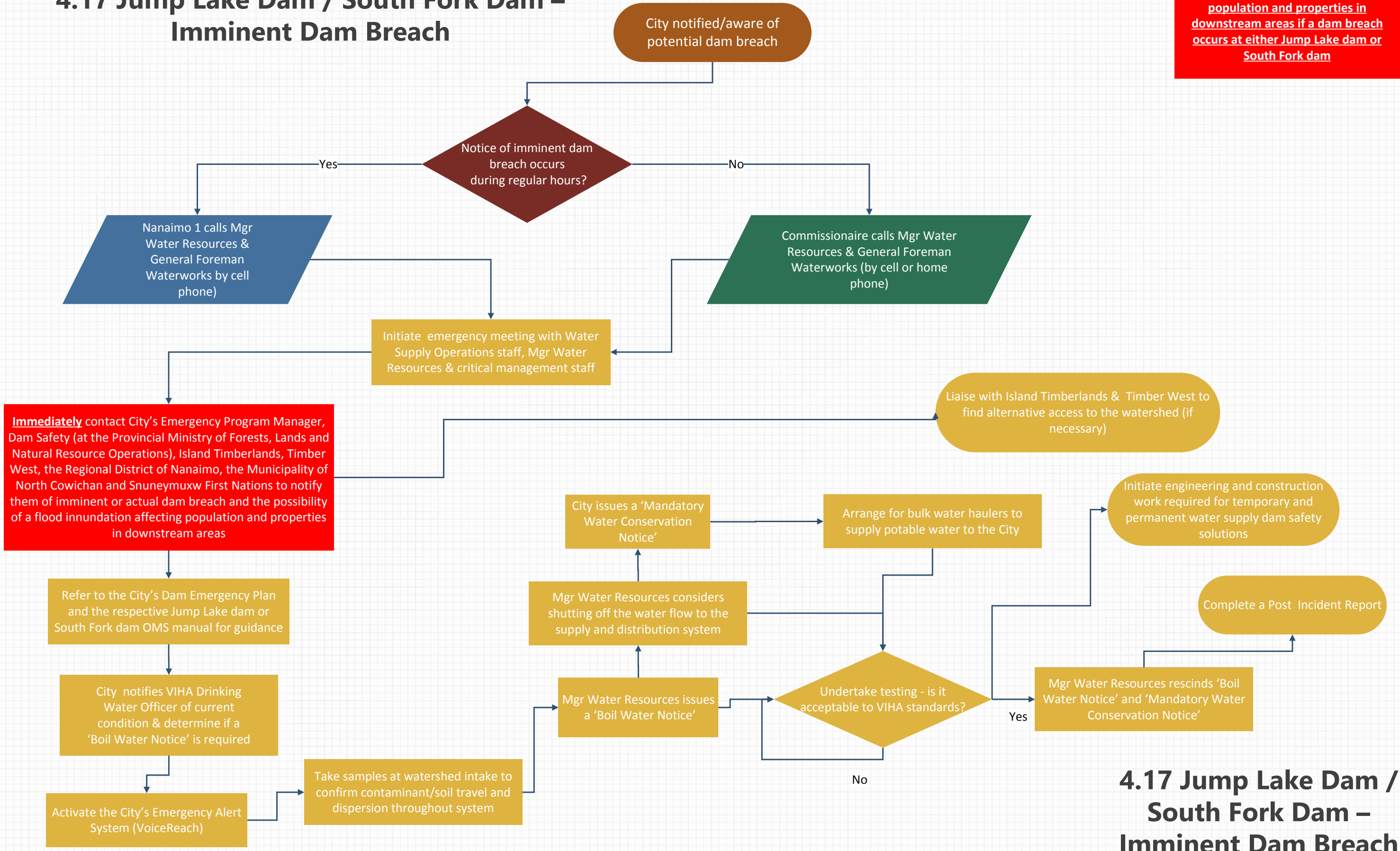
1. Initiate emergency meeting with senior Water Operations and the critical management team.
2. Immediately contact City's Emergency Program Manager, Dam Safety (Victoria), Emergency Management BC, the land owner, the RDN and SFN.
3. Refer to City of Nanaimo - Dam Emergency Plan and the respective dam Operation Maintenance and Surveillance Manual (OMS), for guidance.
4. Contact Vancouver Island Health Authority and inform of situation. As requested or ordered by Island Health, activate the appropriate Emergency Alert System (VoiceReach) with appropriate SCRIPT.
5. Set up Water Distribution points and issue Advisory as necessary.
6. Initiate Engineering/Construction work required to correct situation.
7. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- City of Nanaimo, Emergency Program Manager
- Dam Safety Section (Victoria), Water Management Branch, Min. of FLNRO.
- Emergency Management BC
- Land Owner(s)
- Bulk Potable Water Suppliers
- Southwest Extension Improvement District
- Snuneymuxw First Nation
- Regional District of Nanaimo
- Cowichan Valley Regional District
- Vancouver Island Health Authority

4.17 Jump Lake Dam / South Fork Dam – Imminent Dam Breach

Potential major consequences may arise directly affecting the local population and properties in downstream areas if a dam breach occurs at either Jump Lake dam or South Fork dam



4.17 Jump Lake Dam / South Fork Dam – Imminent Dam Breach

4.18 Major Earthquake

Type of Emergency: Disaster Condition

In the event of a major earthquake, potential damage to the City's dams or utilities may be a concern. Outstations like the South Fork water treatment plant, storage reservoirs/balancing tanks, pump stations, water supply mains and dams should have their condition assessed soon after the event. Because many other agencies will be involved it will be essential to coordinate all efforts to most effectively deal with the situation.

Potential Actions:

1. Send qualified staff to the following sites to confirm their status. Extreme caution should be exercised for safety reasons:
 - a. South Fork Water Treatment Plant (City's water treatment and disinfection facility)
 - b. Jump Lake Dam and South Fork Dam (inspect from above South Fork dam)
 - c. Reservoir #1 and Energy Recovery Building
 - d. College Park Reservoirs 3A & 3B and Pump Station
 - e. Extension Reservoir and Valve Station
 - f. Towers Reservoir and Pump Station
 - g. Labieux Booster Pump Station
 - h. Duke Point Reservoir and Valve Station
 - i. Lost Lake Reservoir and Pump Station
 - j. Tanya Drive Reservoir and Valve Station
 - k. Pryde Avenue Pump Station
 - l. Rod Glen Reservoir and Pump Station
 - m. Primary and secondary water supply mains.
2. Initiate emergency meeting with senior Water Operations staff and the critical management team.
3. If any critical concerns, contact City's Emergency Program Manager, Dam Safety (Victoria), Emergency Management BC, the RDN and SFN as necessary.
4. If the water supply system cannot supply adequate flow for any particular reason, consider issue a "Water Use Restriction" (See Appendix B).
5. If there was potential for backflow into the system, issue a "Boil Water Advisory" (See Appendix B).
6. Check the flows at the South Fork Water Treatment Plant and compare with historical values to determine if there is major water main damage.
7. Conduct a thorough inspection which includes:
 - a. An interior review of all facilities looking for spraying water indicating damaged pipes, cracked concrete floors, structural damage to the block walls and roof.
 - b. A review of all equipment and instrumentation to evaluate the status of the system.
 - c. A walk around the exterior of all buildings looking for structural damage.
8. Assess the extent of each damaged section and record findings.

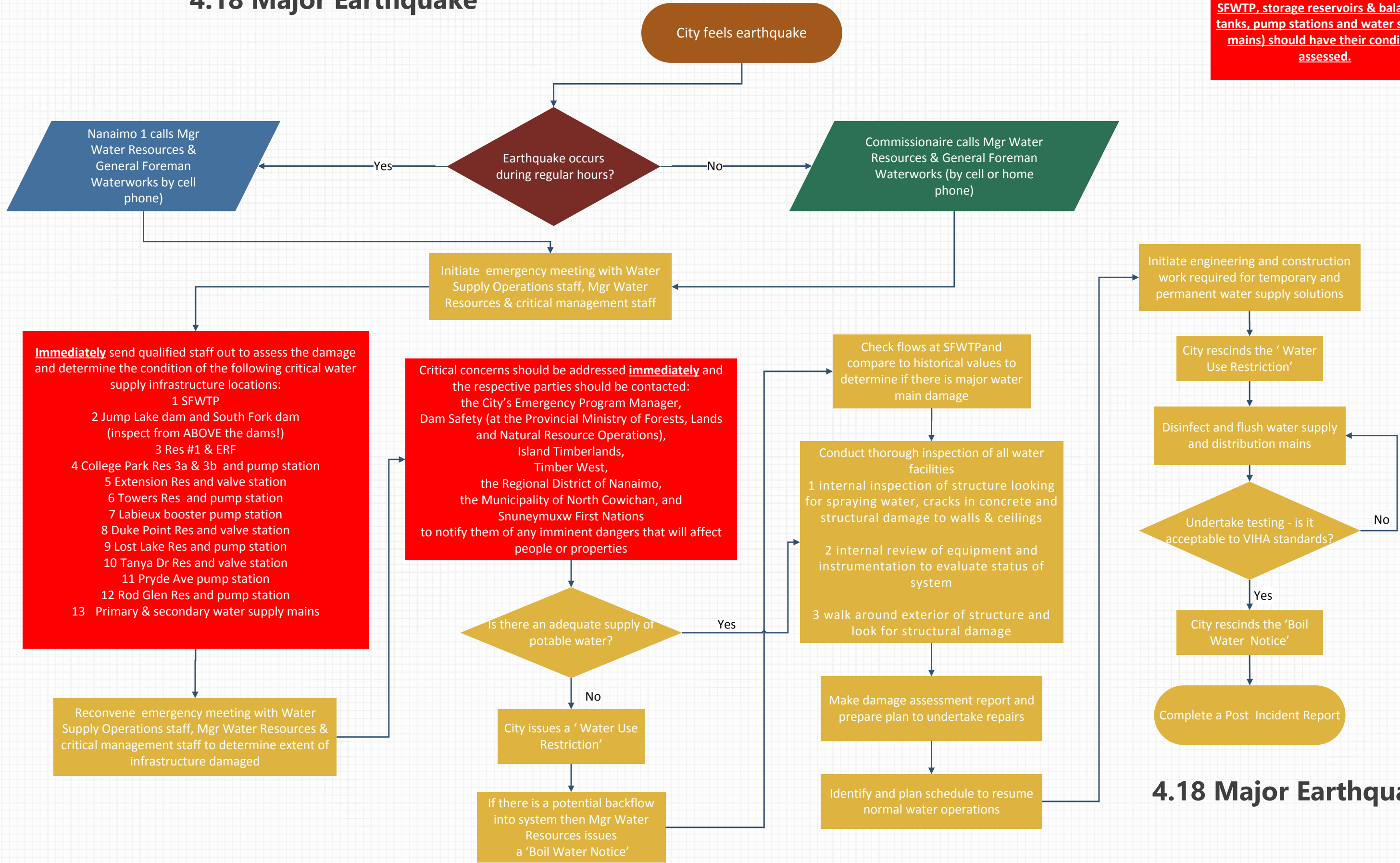
9. Make a damage assessment, prepare a plan to begin repairs and identify a schedule to resumption of normal operation.
10. Once adequate flow is restored, remove the “Water Use Restriction” (See Appendix B).
11. Once total and fecal coliform results are acceptable to Vancouver Island Health Authority, remove the “Boil Water Advisory” (See Appendix B).
12. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

- Dam Safety Branch
- Nanaimo Fire Rescue
- Emergency Management BC
- Vancouver Island Health Authority (VIHA)
- Southwest Extension Improvement District
- Snuneymuxw First Nation (SFN)
- Regional District of Nanaimo (RDN)
- Forest Lands and Natural Resource Operations (FLNRO)

4.18 Major Earthquake

Soon after a major earthquake water supply outstations (including all dams, SFWTP, storage reservoirs & balancing tanks, pump stations and water supply mains) should have their condition assessed.



4.18 Major Earthquake

4.19 Water Contamination at Source

Type of Emergency: Emergency Condition

In the event of contamination of a source, there is potential health hazard to downstream consumers.

Potential Actions:

1. Initiate emergency meeting with senior Water Operations staff and the critical management team.
2. After assessment of the situation, determine if isolating the source water is required.
3. Contact Vancouver Island Health Authority to inform of situation. As requested or ordered by Vancouver Island Health Authority, activate the appropriate Emergency Alert System (VoiceReach) with appropriate SCRIPT.
4. Take samples of contaminated water and submit to laboratory.
5. Also take water samples from downstream reservoirs and submit to laboratory.
6. Issue appropriate Drinking Water Advisory (See Appendix B).
7. If a source is contaminated, flush the lake and the downstream piping, re-sampling at intervals until the water is safe.
8. If reservoir is contaminated, drain the reservoir, clean, disinfect, refill and disinfect again. Re-sample the water. Flush and disinfect any affected downstream piping.
9. Complete Post-Incident Report (See Appendix C).

Contacts (See Appendix A):

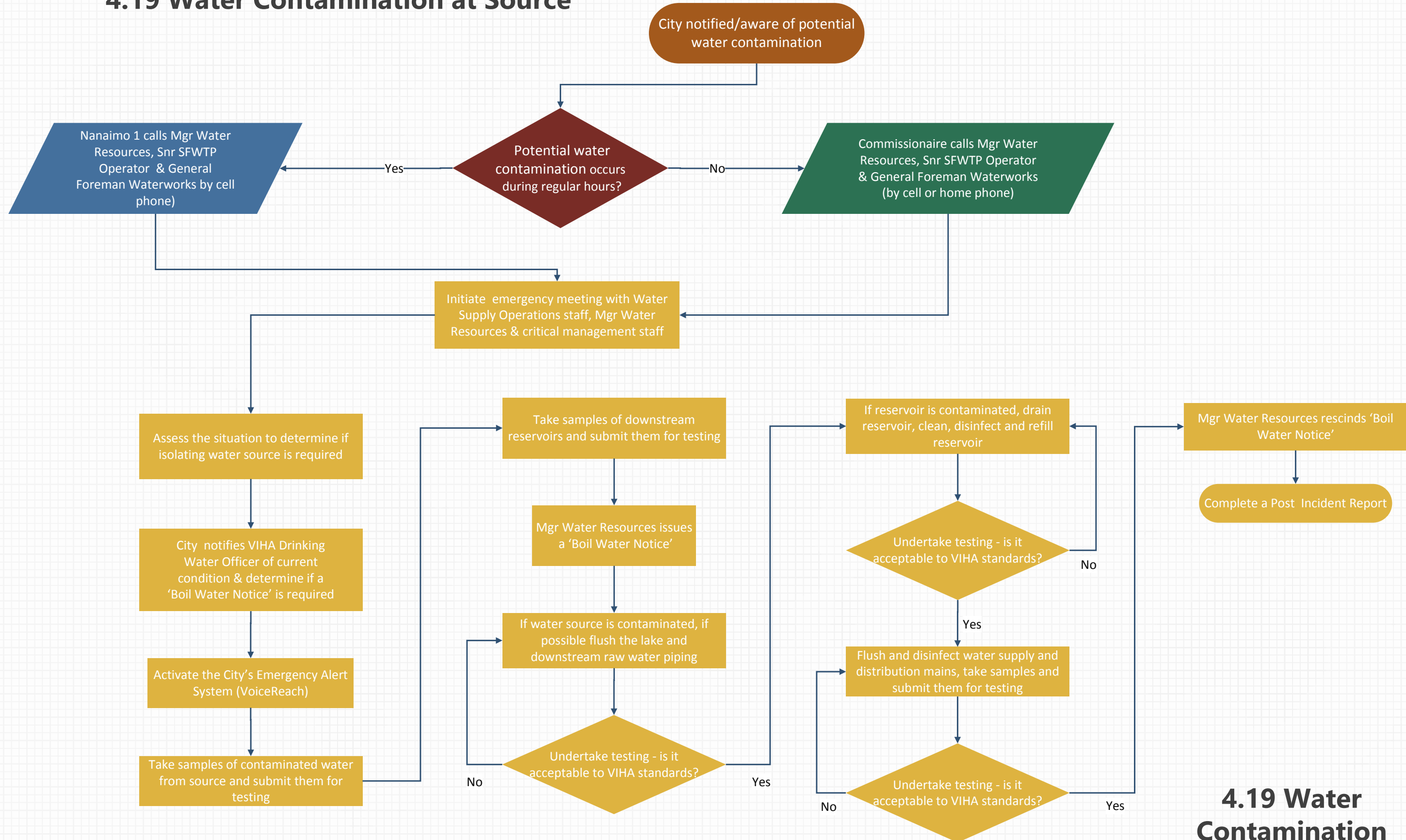
- Emergency Program Manager
- Vancouver Island Health Authority
- Ministry of Forests, Lands & Natural Resource Operations
- Media
- Southwest Extension Improvement District
- Snuneymuxw First Nation

Communications:

See Voice Broadcast scripts, 3.4.

Press release samples are located in Appendix B.

4.19 Water Contamination at Source



4.19 Water Contamination at Source

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