



Preparing the Lakehead Source Protection Area Assessment Report

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Assessment Report Must Include:

- **Delineation of Source Protection Areas (i.e. IPZ, WHPA) around Municipal residential drinking water systems.**
- **Identification of drinking water threats in vulnerable areas.**
- **Hazard Scoring assigned to threats – low, moderate, significant.**



There are only two Municipal residential drinking water systems in the Lakehead Source Protection Area.

The City of Thunder Bay is supplied with source water from Lake Superior at the Bare Point Water Treatment Plant.

Rosslyn Village Municipal System located in the Municipality of Oliver Paipoonge is feed by two groundwater wells.

Rosslyn Village Municipality of Oliver Paiponge



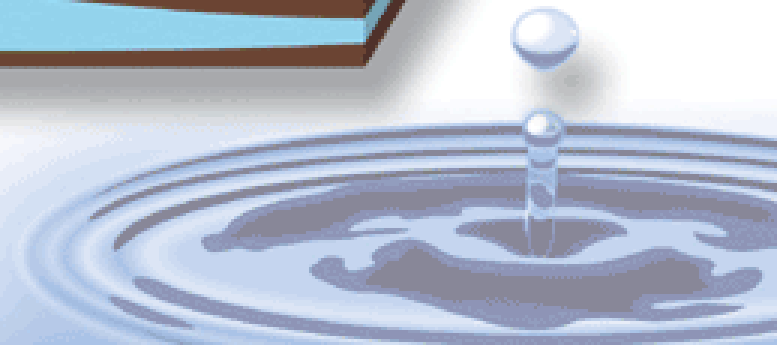
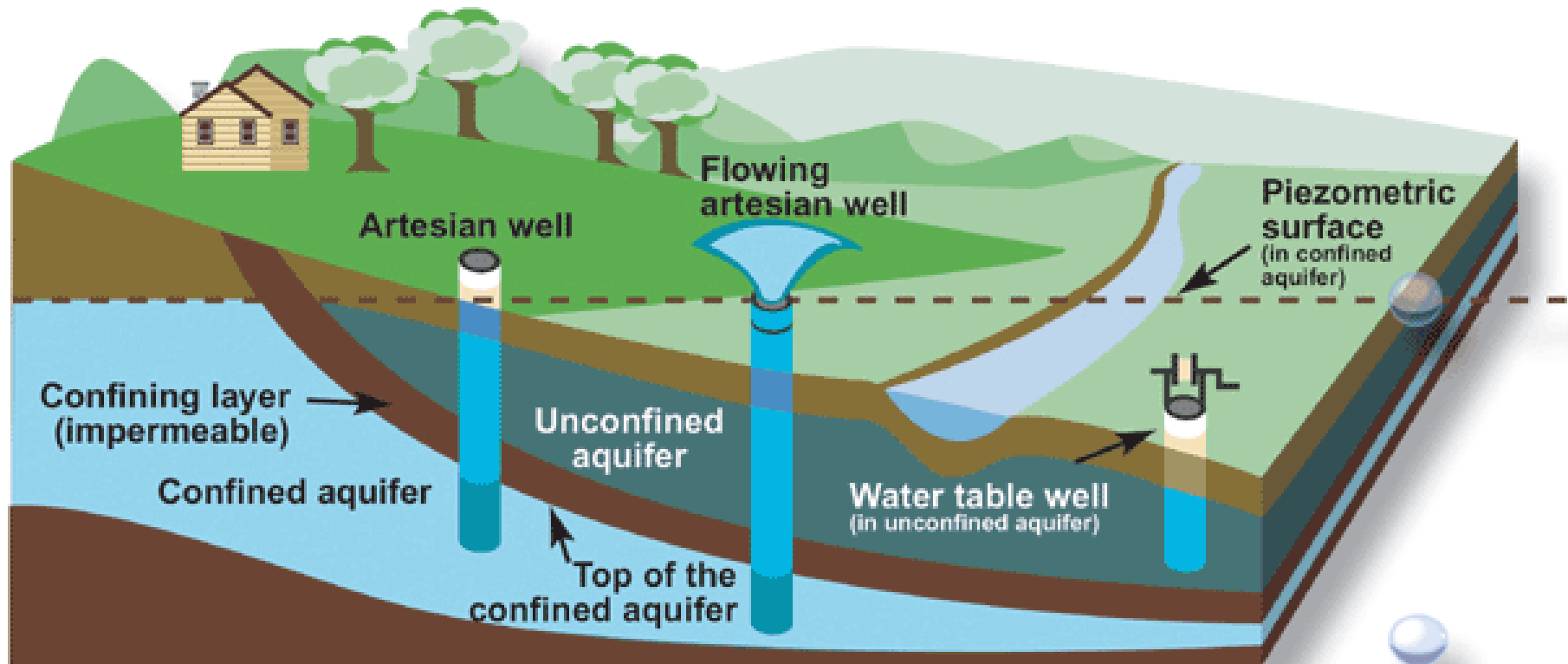
Assessment Report – Technical Studies

- **Delineation of the Wellhead Protection Areas (2, 5 and 25 year Time of Travel Zones)**
- **Identify potential threats and issues for ground water quality and quantity.**
- **Complete hazard scores and risk assessment of threats and issues.**
- **Further study – search for third (and fourth?) well in Rosslyn Village.**

What is an aquifer?

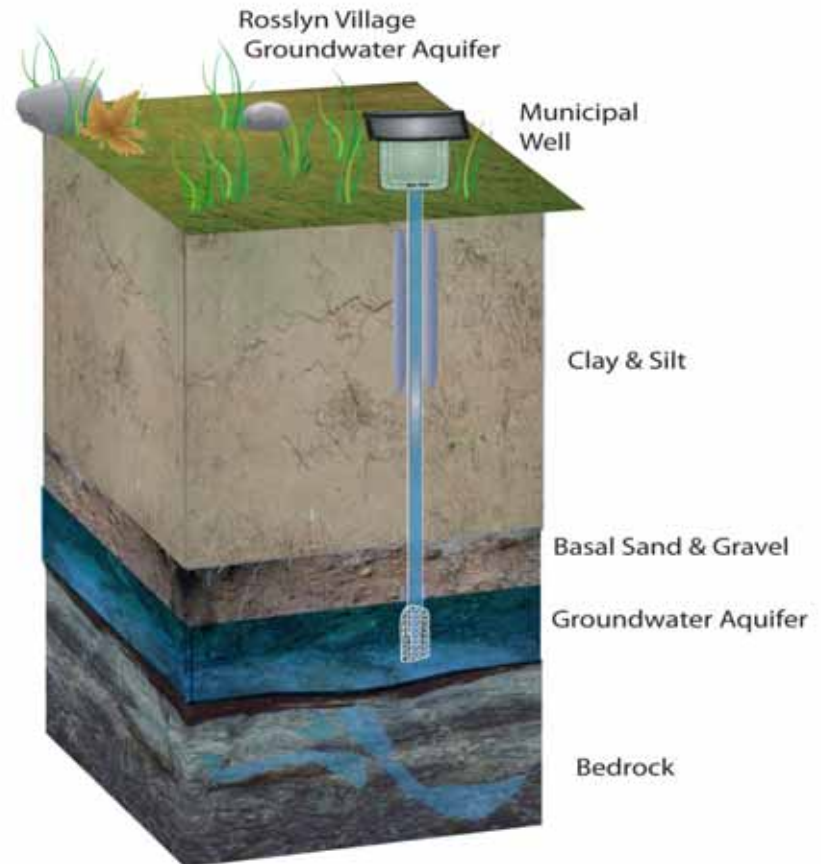
- Groundwater occurs in the tiny spaces between soil particles (silt, sand, and gravel) or in cracks in bedrock, much like a sponge holds water.
- Although groundwater exists everywhere under the ground, some parts of the saturated zone contain more water than others.
- An *aquifer* is an underground formation of permeable rock or loose material which can produce useful quantities of water when tapped by a well.
- Aquifers come in all sizes. They may be small, only a few hectares in area, or very large, underlying thousands of square kilometres of the earth's surface. They may be only a few metres thick, or they may measure hundreds of metres from top to bottom.

Aquifers and wells



Profile of the Rosslyn Aquifer

- 35 metres of clay overtop of aquifer.
- Confined aquifer in basal sand and gravel.
- Confined below by bedrock.
- No influence on the aquifer from the Kaministiquia River located about 500 m south of the wellheads.



What is a Wellhead Protection Area?

- A *wellhead protection area* is the area around the *wellhead* where land use activities have the potential to affect the quality of water that flows into the well.
- A *wellhead* is simply the physical structure of the well above ground.
- For Source Protection Planning there is always a designated 100 metre radius protection zone around the wellhead.

Rosslyn Village Wellhead Protection Area

- 2 groundwater wells.
- 30 people on the system.
- Aquifer protected by 35 metres of clay.
- Concerns about the number of private wells in the area.
- All homes have on site septic systems.



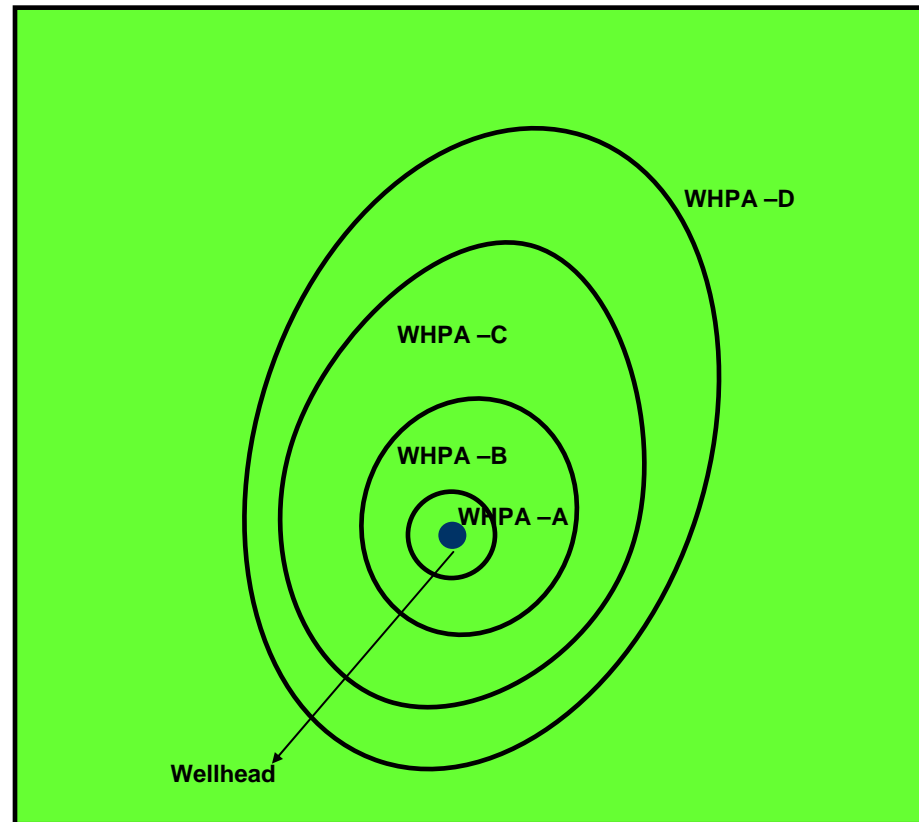
What are Time of Travel (TOT) Zones?

- Time of Travel Zones are used to calculate how long it takes water (or a contaminant) to move underground to the aquifer.
- Time of Travel Zones are determined for two, five and 25 year time periods.
- Factors that can determine the direction and speed that groundwater travels to the aquifer are:
 - the rise and fall of the land,
 - type of soil surrounding the aquifer,
 - the type of aquifer,
 - the amount of water being pumped from the well.

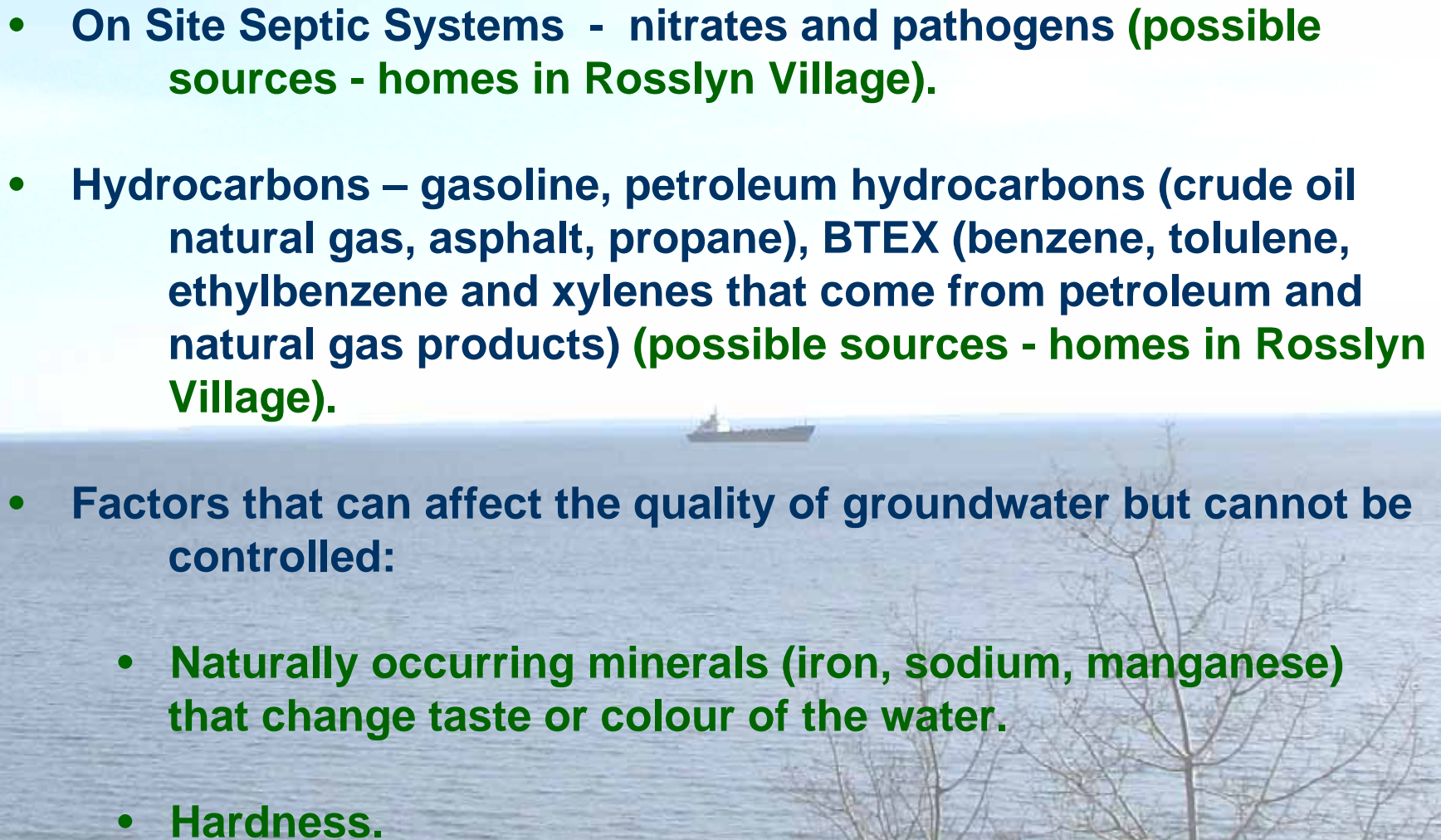
Wellhead Protection Area (WHPA) Delineation

Four zones:

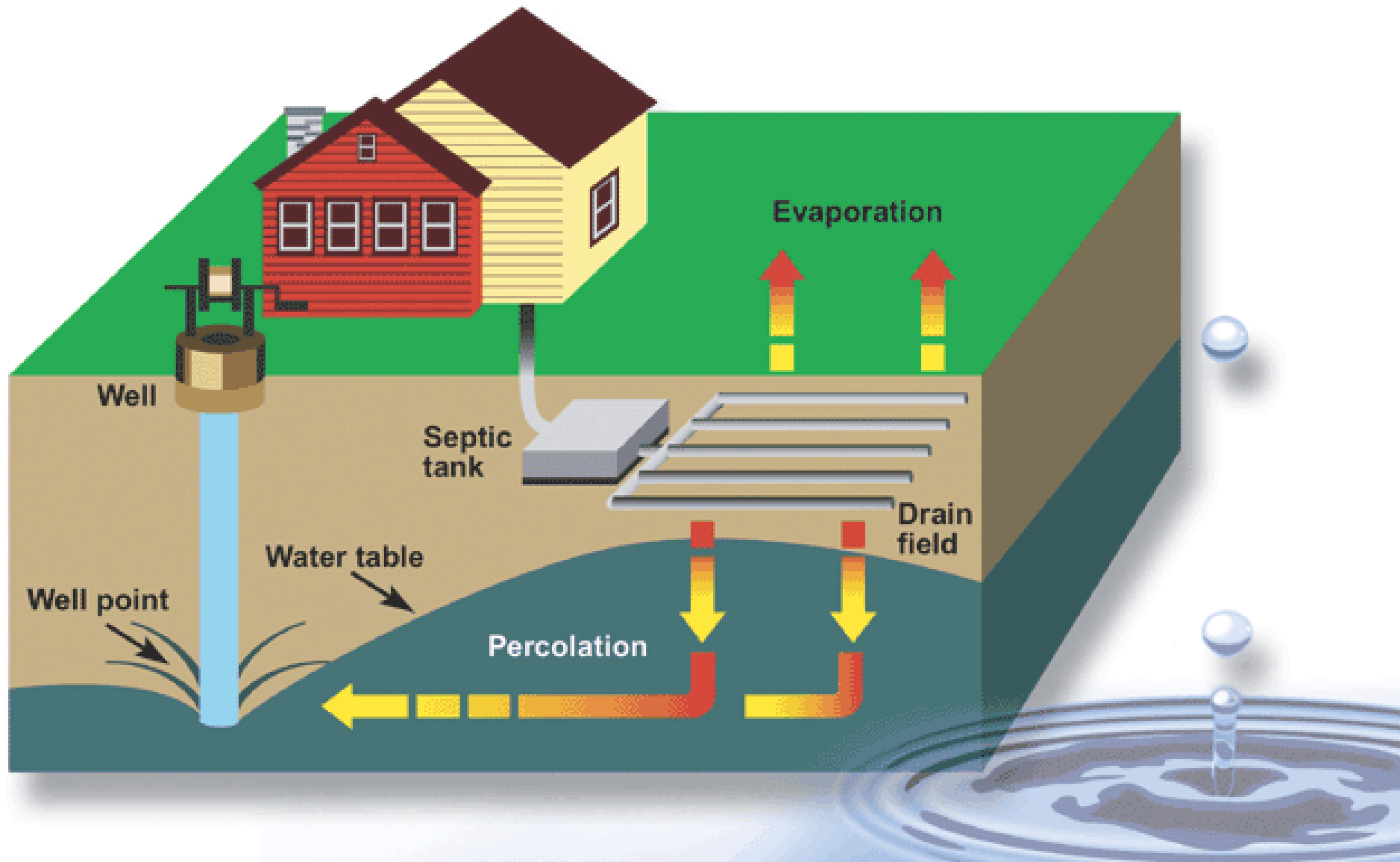
- WHPA-A: 100m radius
- WHPA-B: 2 yr. TOT
- WHPA-C: 5 yr. TOT
- WHPA-D: 25 yr. TOT



What are the potential threats?

- **On Site Septic Systems** - nitrates and pathogens (**possible sources - homes in Rosslyn Village**).
 - **Hydrocarbons** – gasoline, petroleum hydrocarbons (crude oil natural gas, asphalt, propane), BTEX (benzene, toluene, ethylbenzene and xylenes that come from petroleum and natural gas products) (**possible sources - homes in Rosslyn Village**).
 - **Factors that can affect the quality of groundwater but cannot be controlled:**
 - **Naturally occurring minerals (iron, sodium, manganese) that change taste or colour of the water.**
 - **Hardness.**
- 
- A background image showing a large body of water, likely a lake or bay, with a ship visible on the horizon. In the foreground, there are bare trees and a metal railing, suggesting a waterfront park or viewing area.

Septic effluent percolates to the water table





Tour of Rosslyn Village Municipal System

DRINKING WATER SOURCE PROTECTION

ACT FOR CLEAN WATER



Lakehead Region
Conservation Authority
Conserve Today...For A Better Tomorrow

LAKEHEAD Source Protection AREA



Bare Point Water Treatment Plant is located on the boundary of the City of Thunder Bay and the Municipality of Shuniah.



**Bare Point Water Treatment Plant
City of Thunder Bay**

Assessment Report – Technical Studies

- **Delineation of the IPZ-1 and IPZ-2 (Time of Travel Zones for surface water intakes from Lake Superior).**
- **Identify potential threats and issues for surface water quality and quantity.**
- **Complete hazard scores and risk assessment of threats and issues.**
- **Further study for IPZ 3 (i.e. potential 100 year storm, impact on large quantity storage of liquids).**

What is an Intake Protection Zone?

Protecting the area around a *surface water intake* means protecting the surrounding water and, in most cases, the land that surrounds the water. This area of water and land is known as an *intake protection zone*, or *IPZ*. Protecting it ensures a healthy supply of water now and in the future.



Bare Point Intake Protection Zone

- Lake Superior surface water intake.
- Located 750 metres off shore in 30 metres of water.
- Bare Point Water Treatment is single system supplying City of Thunder Bay.
- Raw water quality in vicinity of intake is generally excellent.



What are the potential threats?

- **On Site Septic Systems - nitrates and pathogens (possible sources - homes in proximity to Bare Point).**
- **Toxic compounds (various chemicals) associated with industrial operations. (possible sources: industrial sites along shore of Lake Superior and in proximity to Bare Point).**
- **Storm water runoff draining into Lake Superior.**



Bare Point Water Treatment Plant City of Thunder Bay



Industry along the Lake Superior Shoreline



Technical Study Data Collection



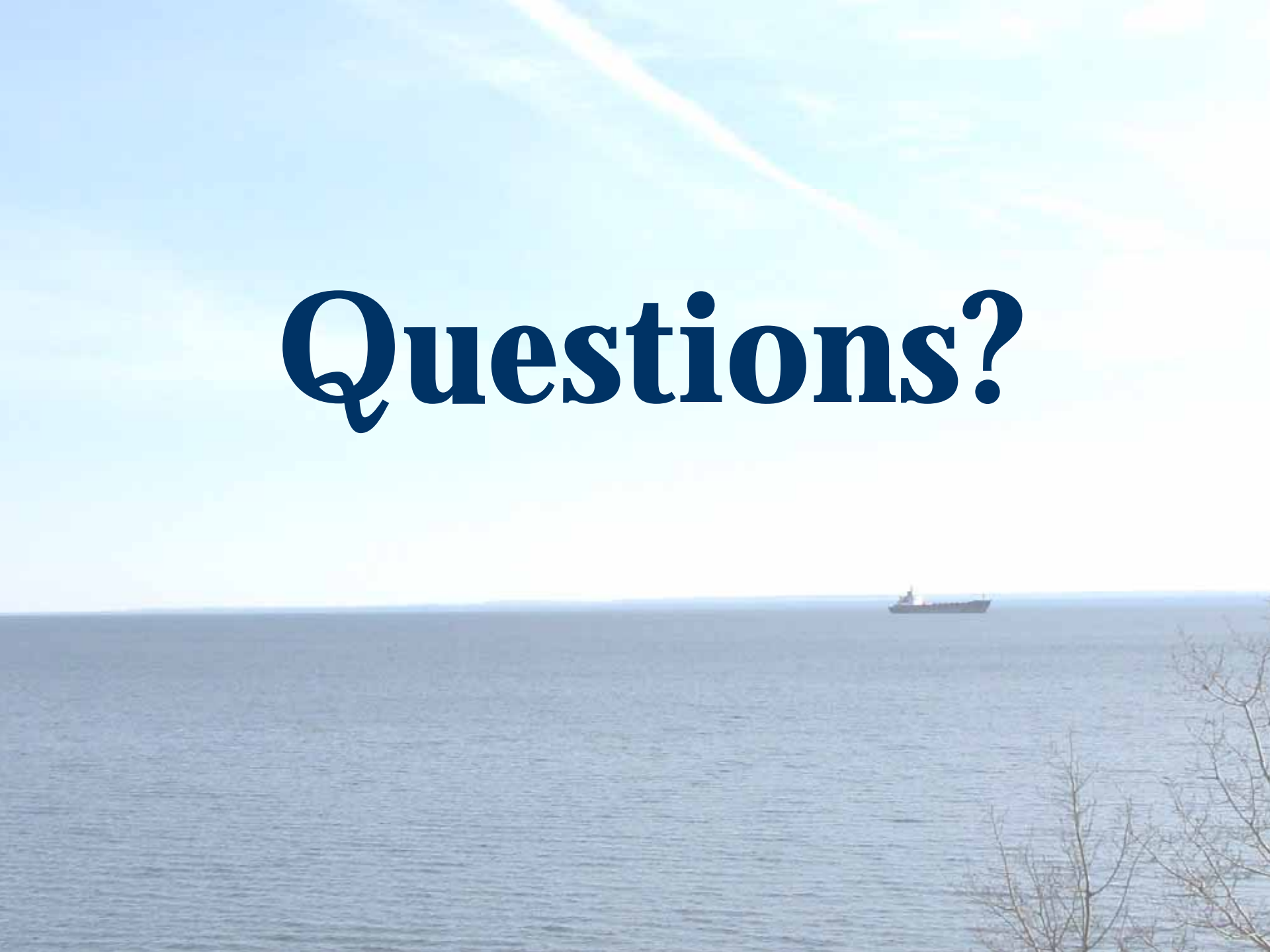
Lake Superior Shoreline Municipality of Shuniah

Tour of Bare Point Water Treatment Plant





Questions?



For more information:

www.sourceprotection.net

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