Centre Wellington Tier Three Water Budget Assessment

Community Liaison Group Meeting #4

Aboyne Hall, Wellington County Museum

Monday, November 18, 2019, 7:00 – 9:00 pm

Drinking Water Source Protection – Act for Clean Water

Lake Erie Source Protection Region

Centre Wellington

MEETING PURPOSE

- Provide a refresh of the study, scope and key participants
- Provide an overview of the water budget and risk assessment outcomes
- Discussion and feedback on the Risk Assessment Report
- Address any questions about the project

ROLES & RESPONSIBILITIES

Tier 3 Water Budget Project Team:

- leads the Tier 3 Water Budget
- responsible for all decisions related to this project

Provincial Peer Review Team:

- provides an external, independent, third party peer review of the technical findings at each major milestone

Project Consultant Team:

- responsible for conducting the Tier 3 Water Budget with direction from the Project Team

ROLES & RESPONSIBILITIES

Community Liaison Group (CLG):

- provides a forum for the community to be informed
- provide input on the Tier 3 Water Budget and its progress
- abide by Terms of Reference and the code of conduct

Third Party Facilitator:

- chairs the CLG meetings
- provides facilitation and secretariat services

General Public:

- informed about the Tier 3 Water Budget
- provide input on the Tier 3 Water Budget (via public representatives)
- observers at CLG meetings

AGENDA

7:00 pm	Welcome
7:05 pm	Introductions and Updates
7:15 pm	Project Review
7:25 pm	Characterization and Model Development
7:40 pm	Risk Assessment
8:00 pm	Discussion
8:30 pm	Next Steps and Wrap Up
8:40 pm	Adjourn

UPDATES

Provincial Updates:

Moratorium on New Water Bottling Permits:

- 2016: Provincial moratorium placed on new or expanded groundwater takings by water bottling companies
- 2018: Moratorium was later extended by one year to January 1, 2020
- Provincial proposal to extend moratorium further for 9 months until October 1, 2020

Provincial Water Quantity Strategy

- The ministry has completed its review of the policies, programs and science used to manage water takings in Ontario.
- The ministry has completed its analysis of the water quantity review and to publicly consult on and finalize changes to how we manage water takings before the moratorium ends.

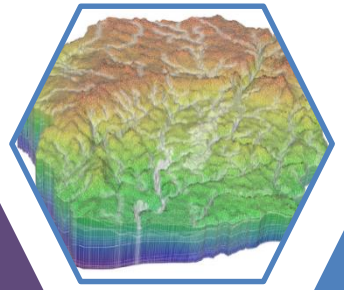
UPDATES

Middlebrook Well

- Middlebrook well included in development of groundwater model
- Gap in knowledge around Middlebrook well
- Middlebrook well was not included in Risk Assessment
  - lacks current PTTW
  - more local information needed around Middlebrook well
- Recommendation from Risk Assessment to fully evaluate potential Middlebrook taking (e.g., through pumping test)
- WSMP completed preliminary assessment of potential impacts of Middlebrook wells on future municipal wells
- PTTW application and review includes site specific assessment of impacts to other takings and the natural environment

REGULATORY PROCESSES

Private Wells
- PHU
- MECP



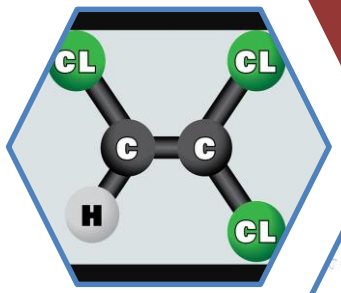
WSMP
- Municipal

Planning Act / PPS
- Municipal

Contaminated Sites
- MECP

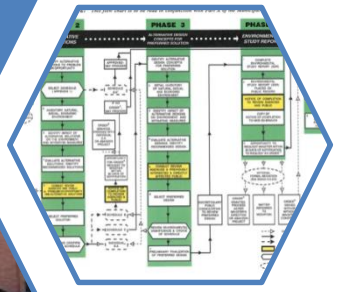
SP-Quantity
- GRCA
- Municipal
- MECP

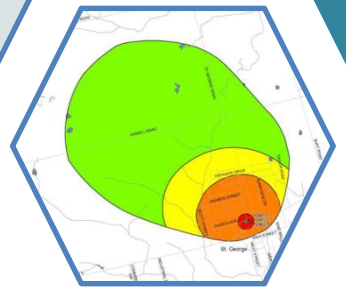
Class EA
- Municipal



SP-Quality
- GRCA
- Municipal
- MECP

PTTW
- MECP





SDWA
- Municipal
- MECP

- Permit To Take Water (PTTW)
- Safe Drinking Water Act (SDWA)
- Water Supply Master Plan (WSMP)
- Provincial Policy Statement (PPS)
- Class Environmental Assessment (EA)

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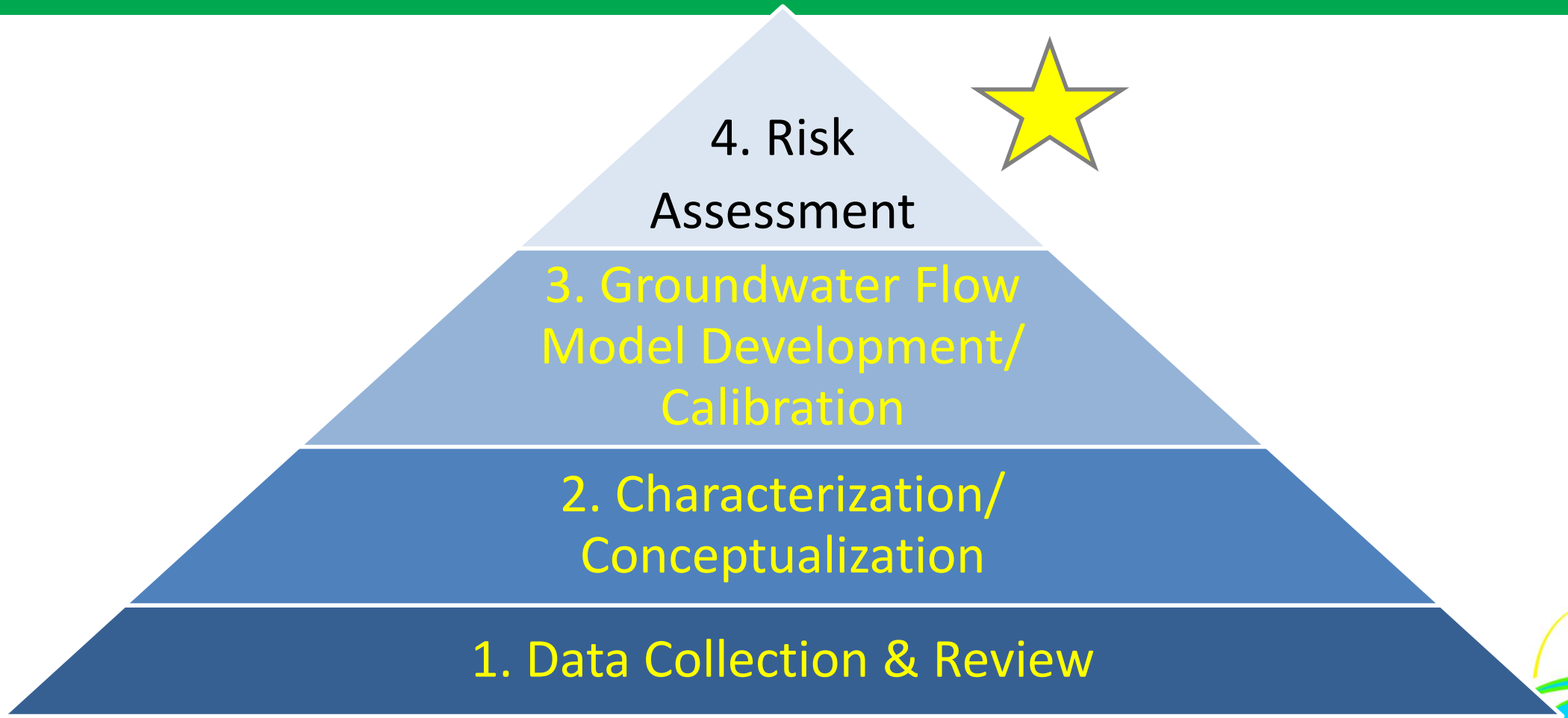
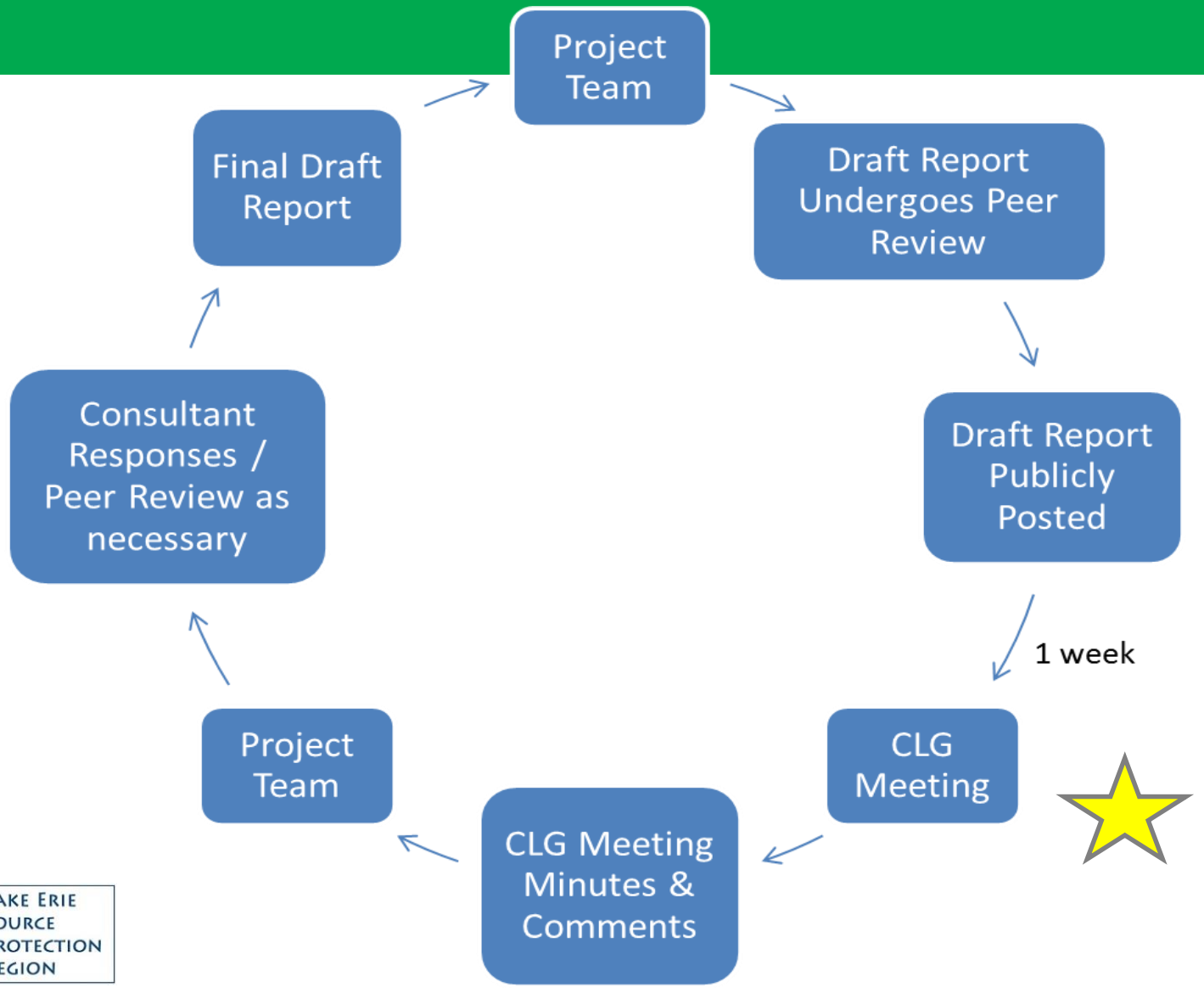
TIER 3 STUDY COMPONENTS

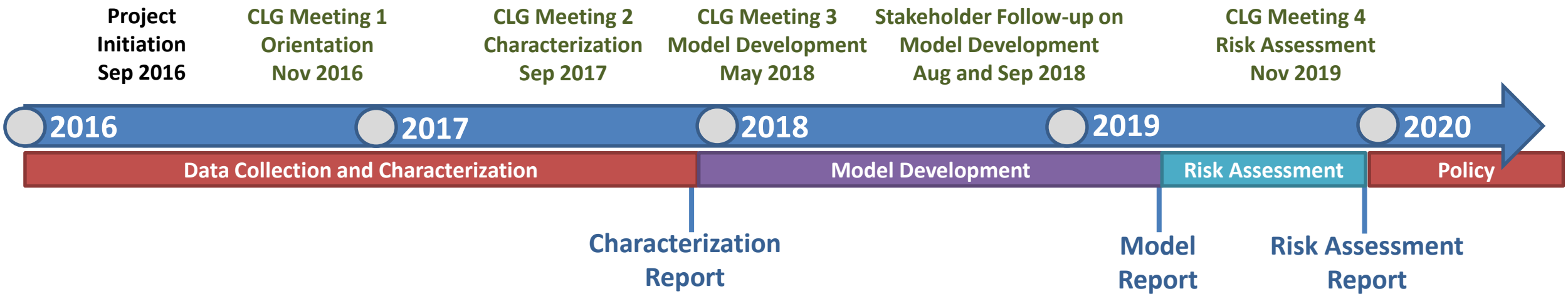


CLG INPUT & PEER REVIEW



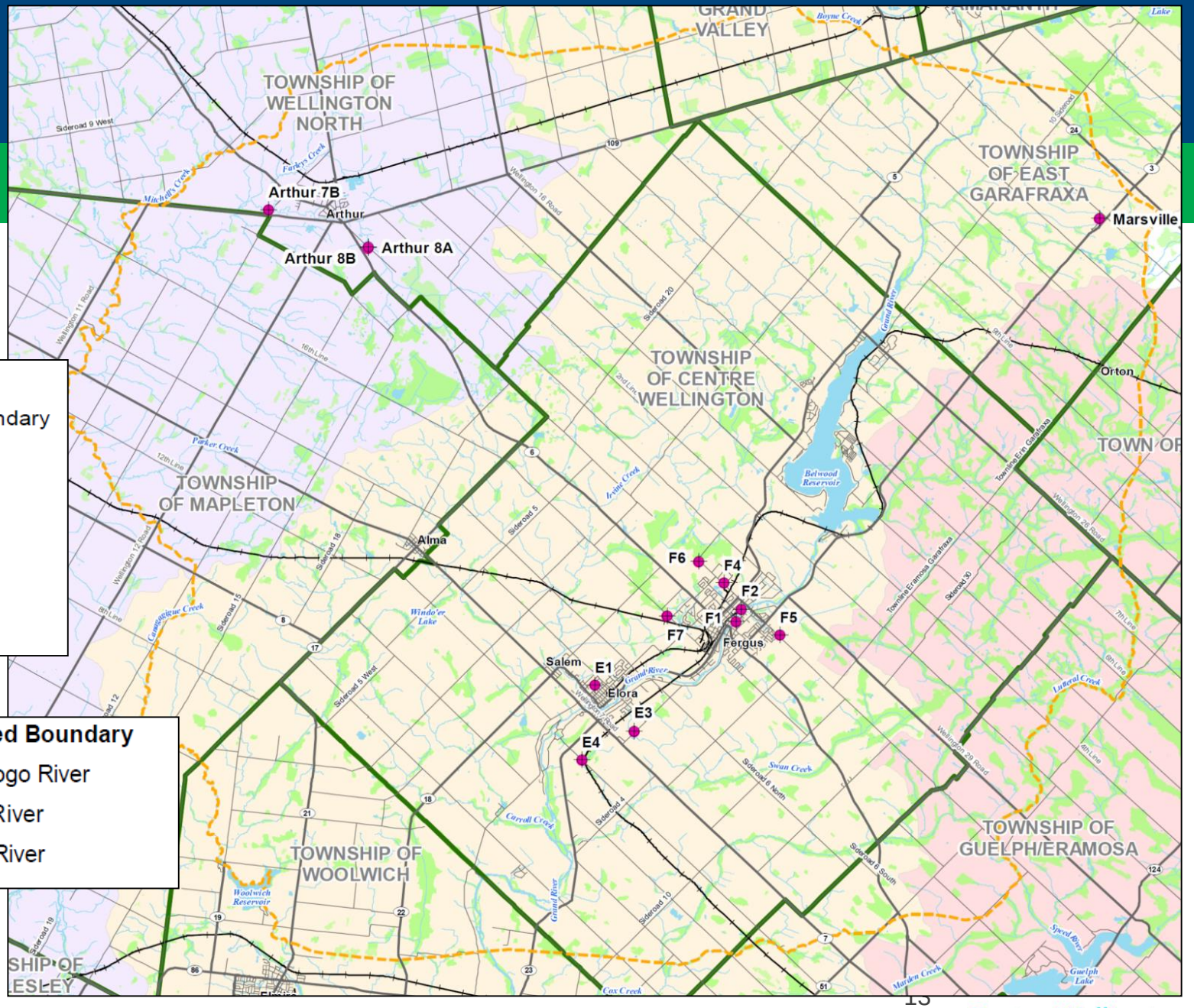
PROJECT REVIEW

PROJECT TIMELINE



STUDY AREA

9 municipal water supply wells (bedrock)



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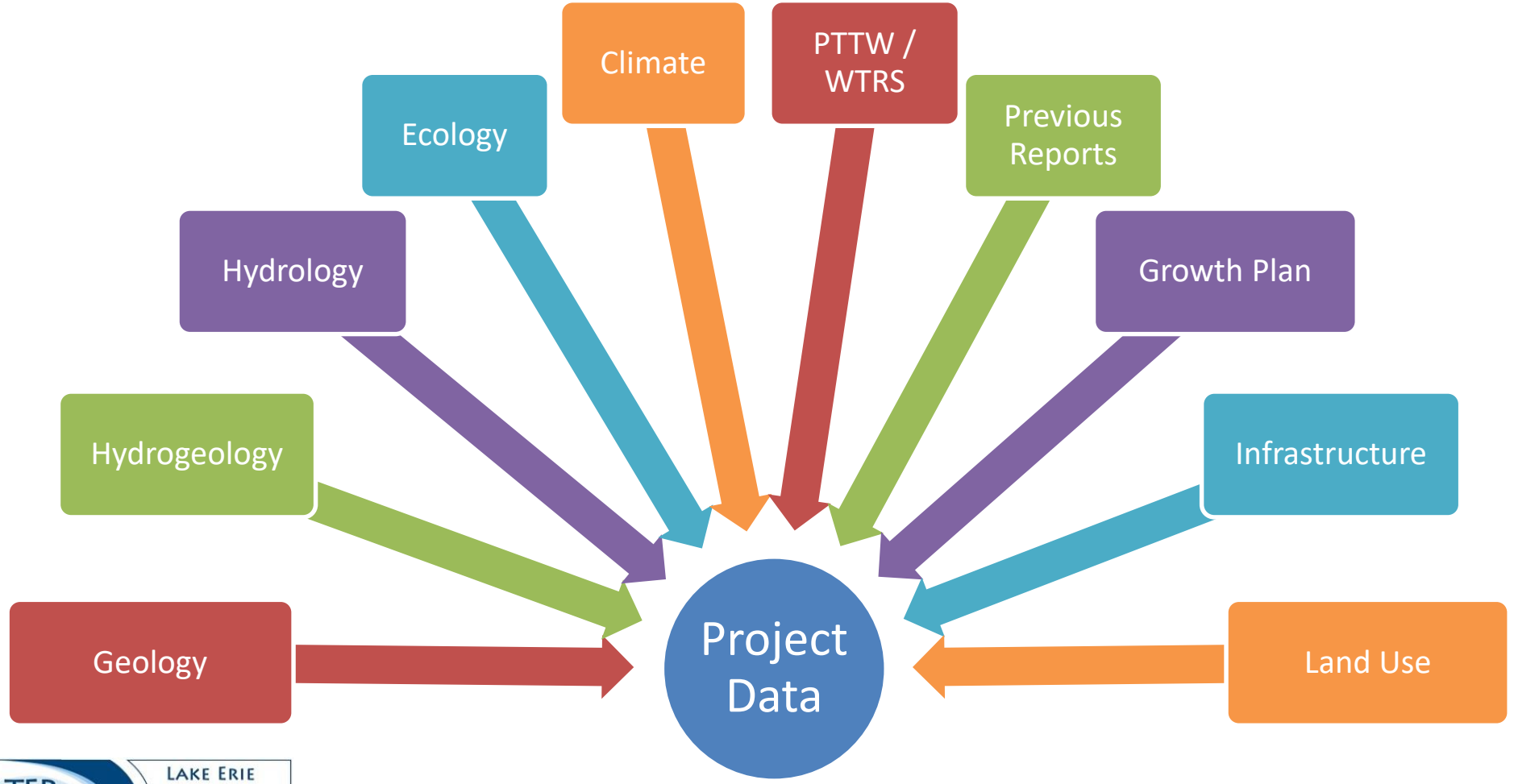
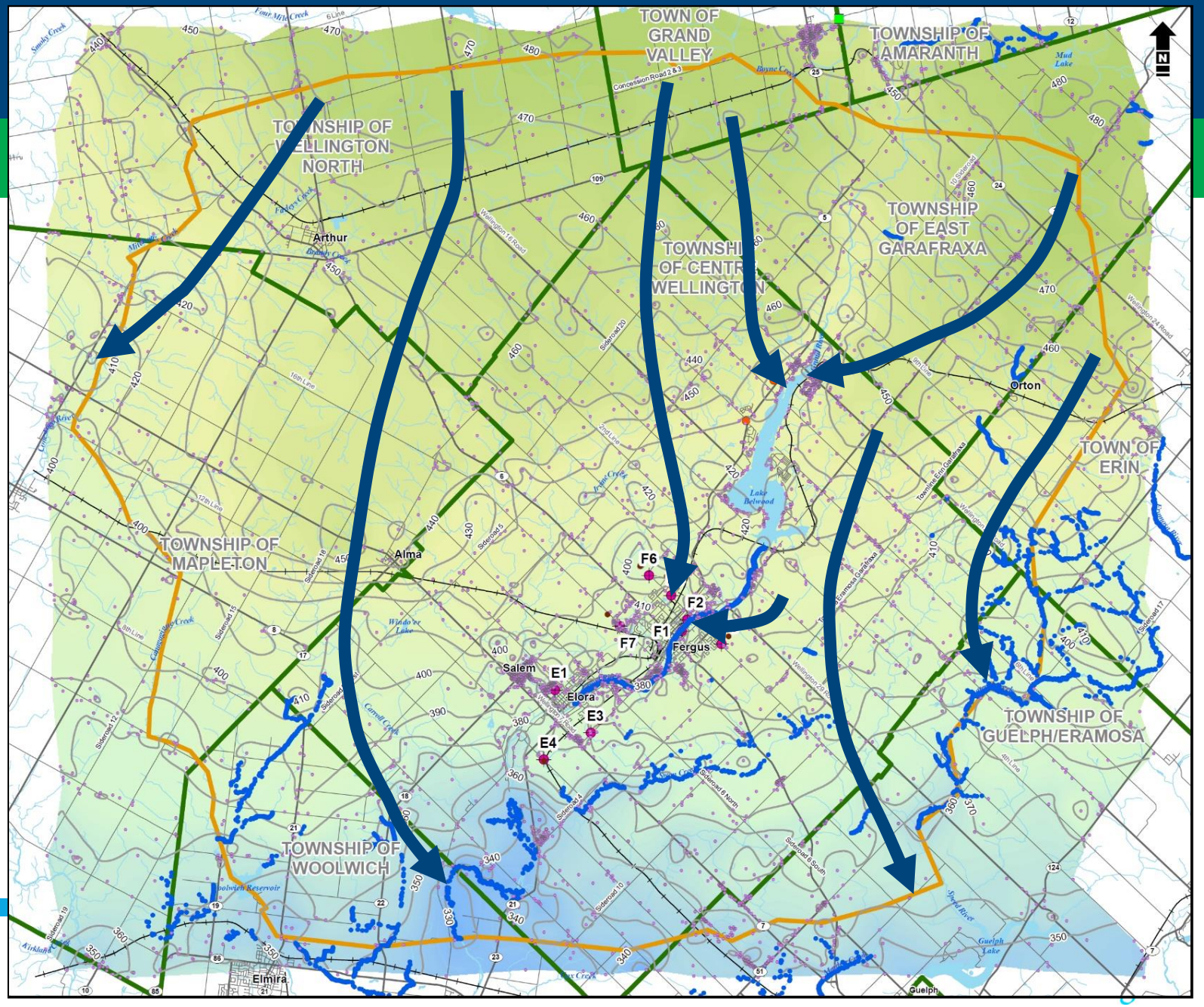
BACKGROUND REVIEW AND DATA COLLECTION



GROUNDWATER FLOW (UPPER BEDROCK)

Flow from high elevations to low elevations

Flow towards Grand River, other coldwater streams



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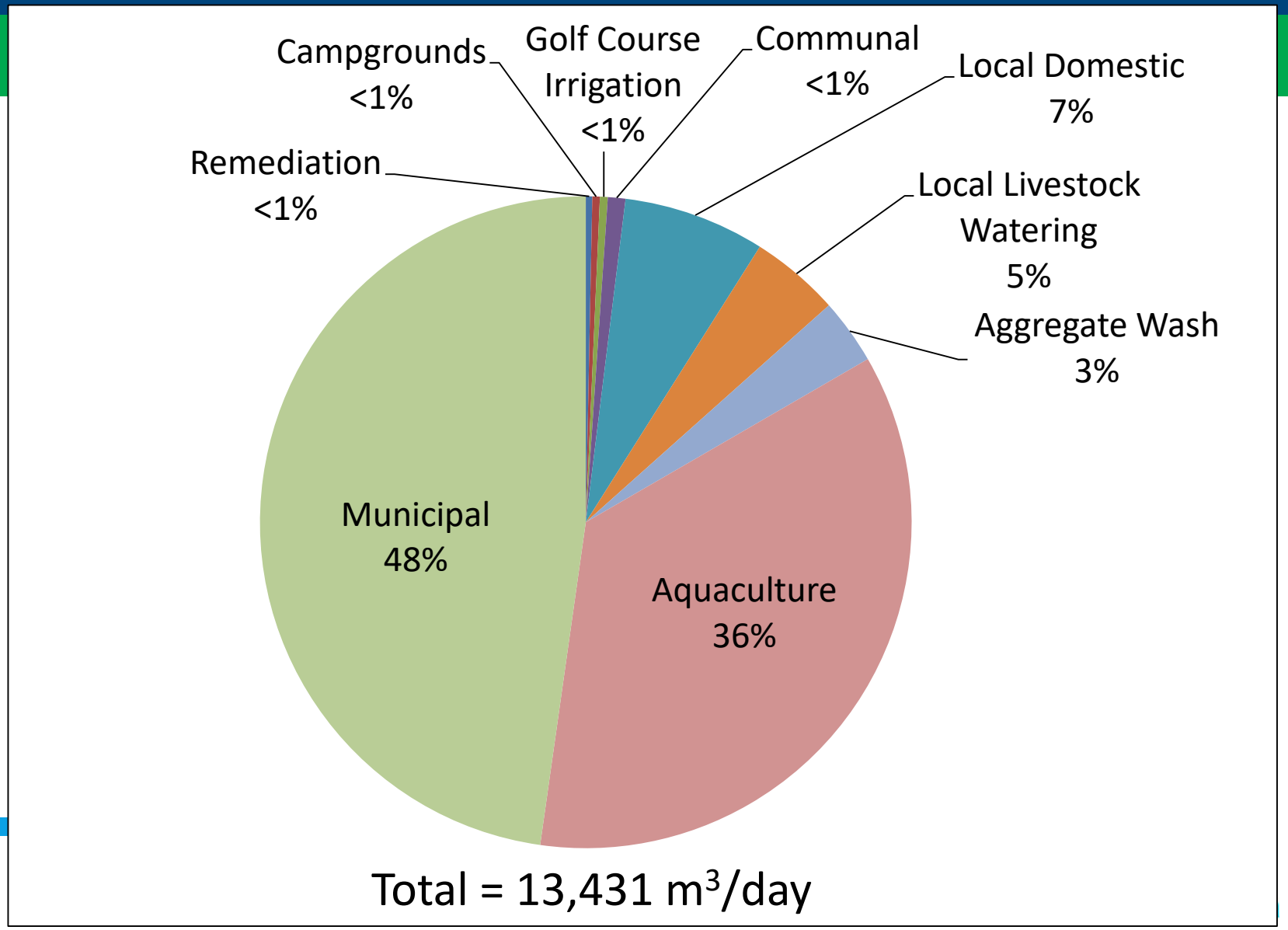
WATER DEMANDS

Estimated groundwater demands

Municipal demand

- Centre Wellington (2016) = 5,422 m^3/d
- Arthur and Marsville (2016) = 993 m^3/d



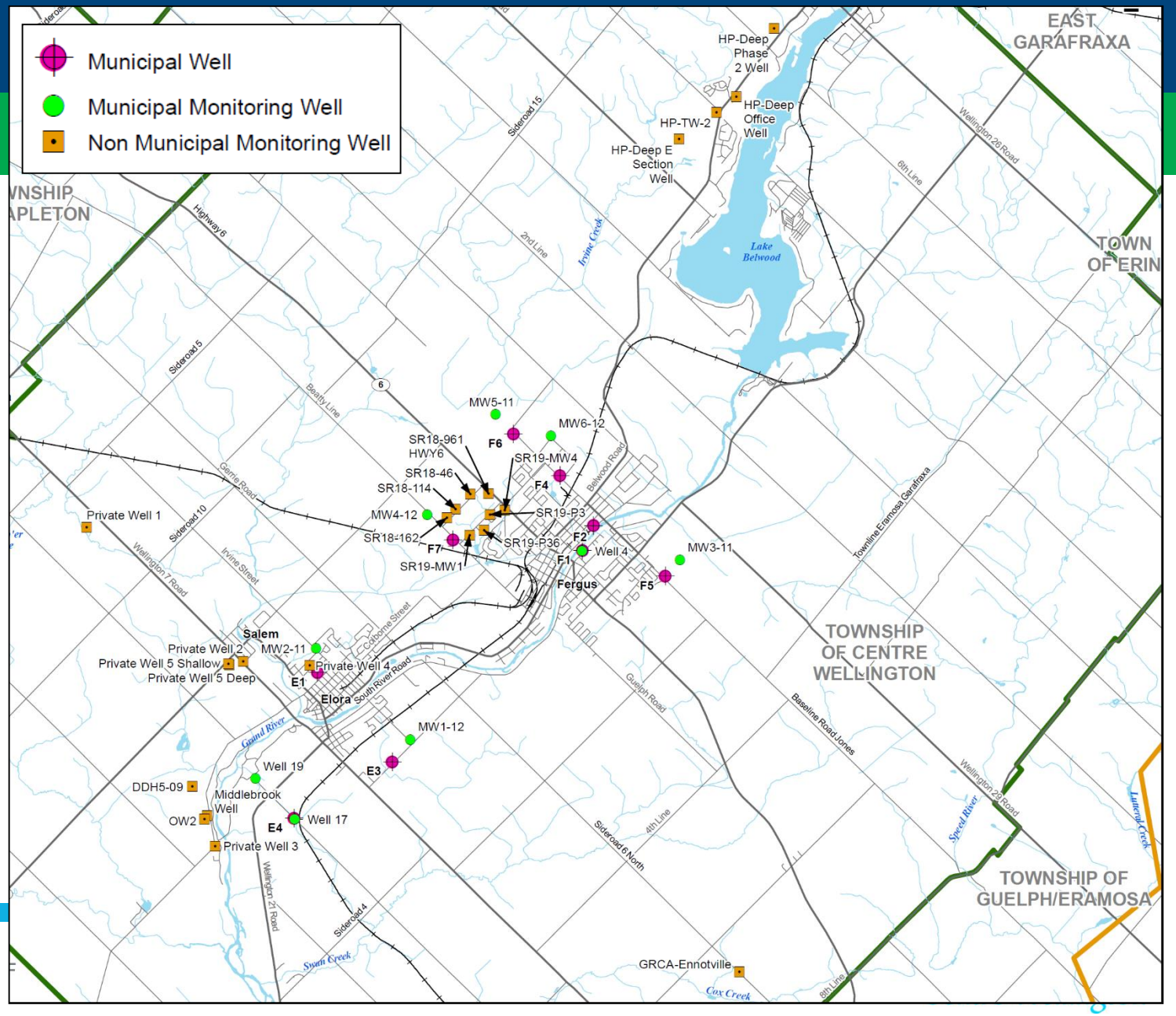
MONITORING LOCATIONS

Municipal

- Municipal pumping wells
- Monitoring wells

Non-Municipal

- Highland Pines Campground
- Nestle Waters Canada
- Short term dewatering
- GRCA monitoring well



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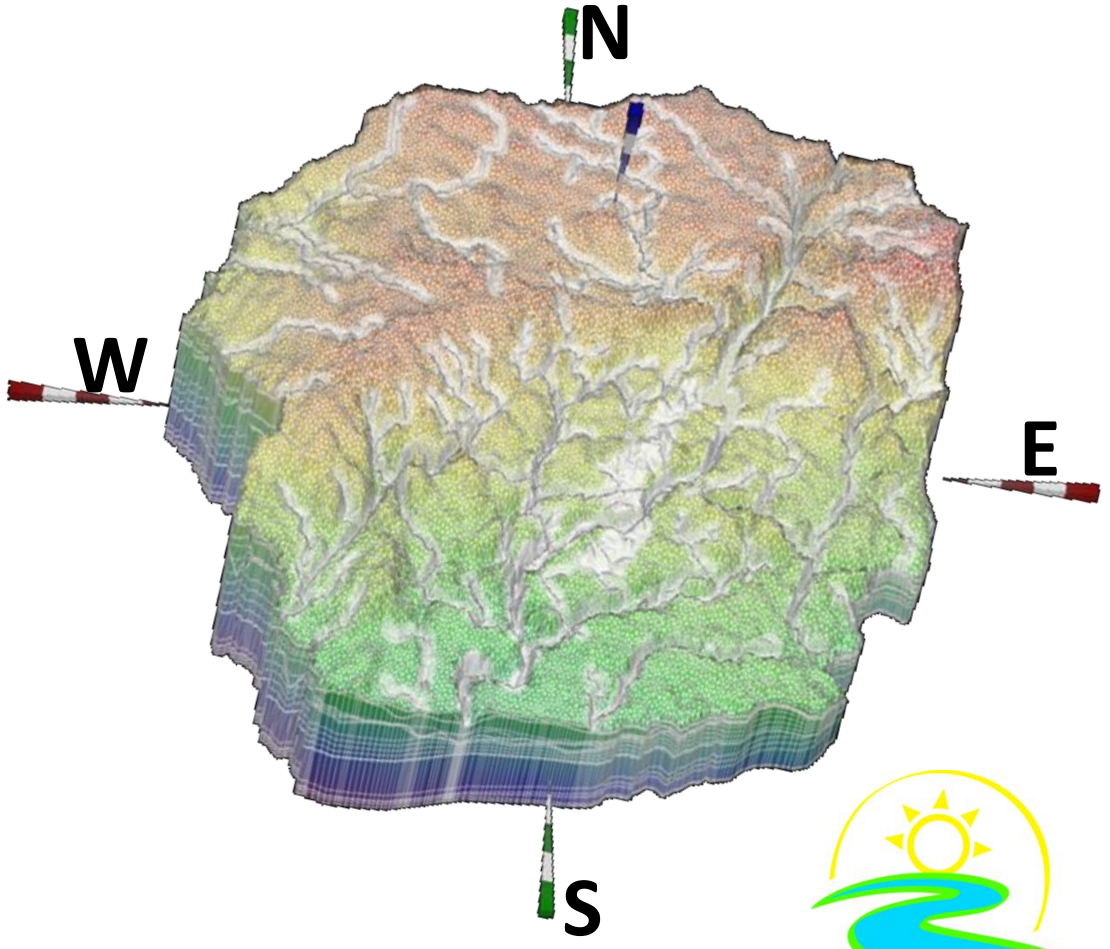
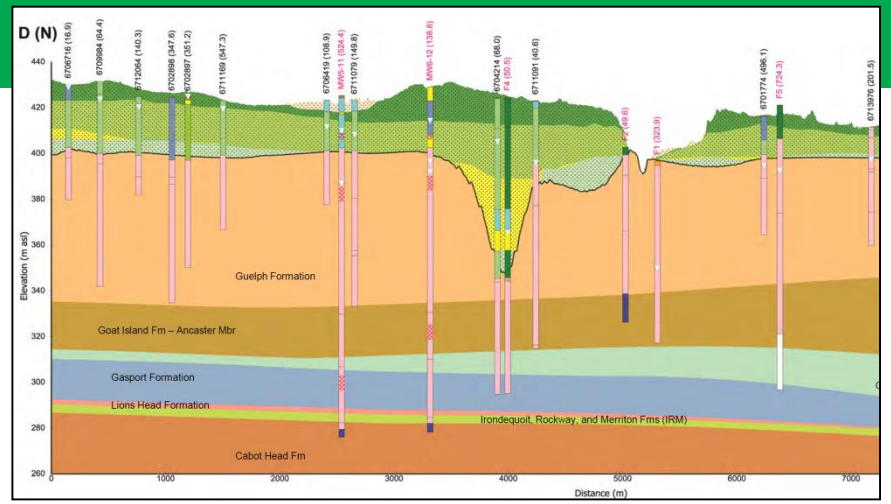
GROUNDWATER MODEL DEVELOPMENT

WHAT IS A GROUNDWATER MODEL?

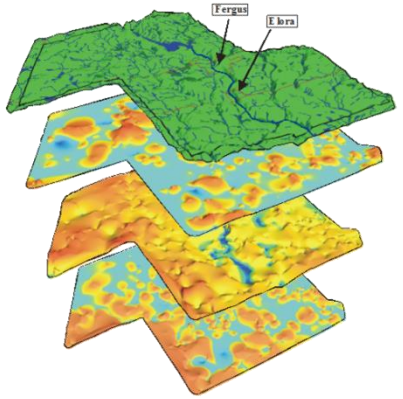
- A mathematical representation of the flow of groundwater through soil and rock.
- Contains our current knowledge and understanding of the subsurface
- Give us insight into groundwater flow conditions
- Help answer “what if” questions that cannot be measured or tested in the field.
  - How might an aquifer or our water supply source respond in a 10 year drought period?



CHARACTERIZATION → GW FLOW MODEL



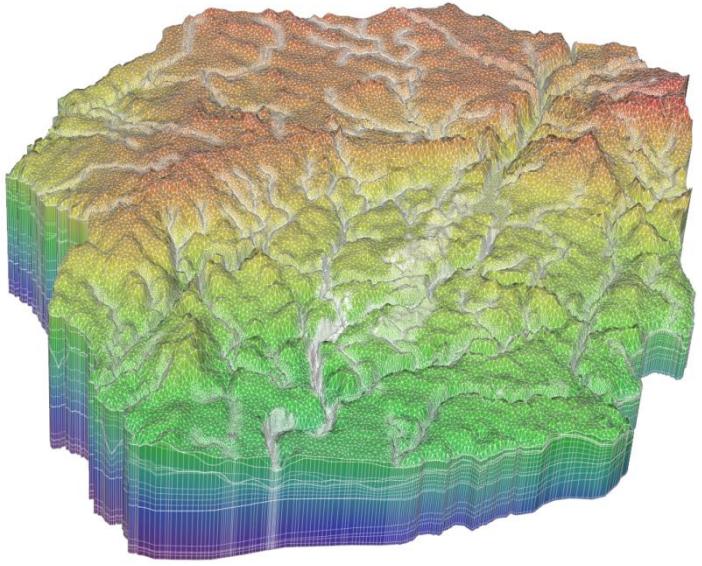
Geological interpretations



Layer Property Interpretations

Water Demand Water Level Data

Groundwater Flow Model



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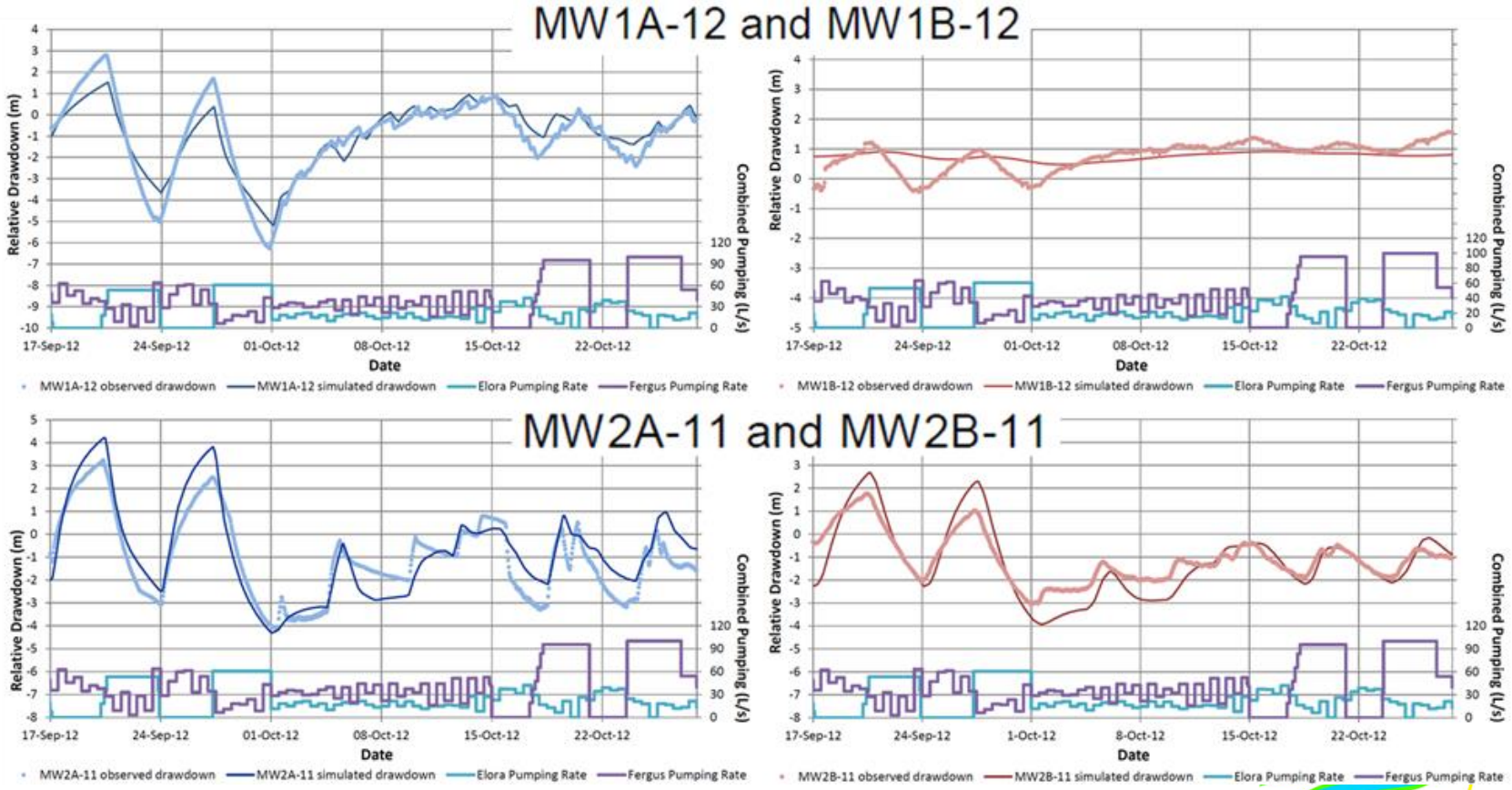
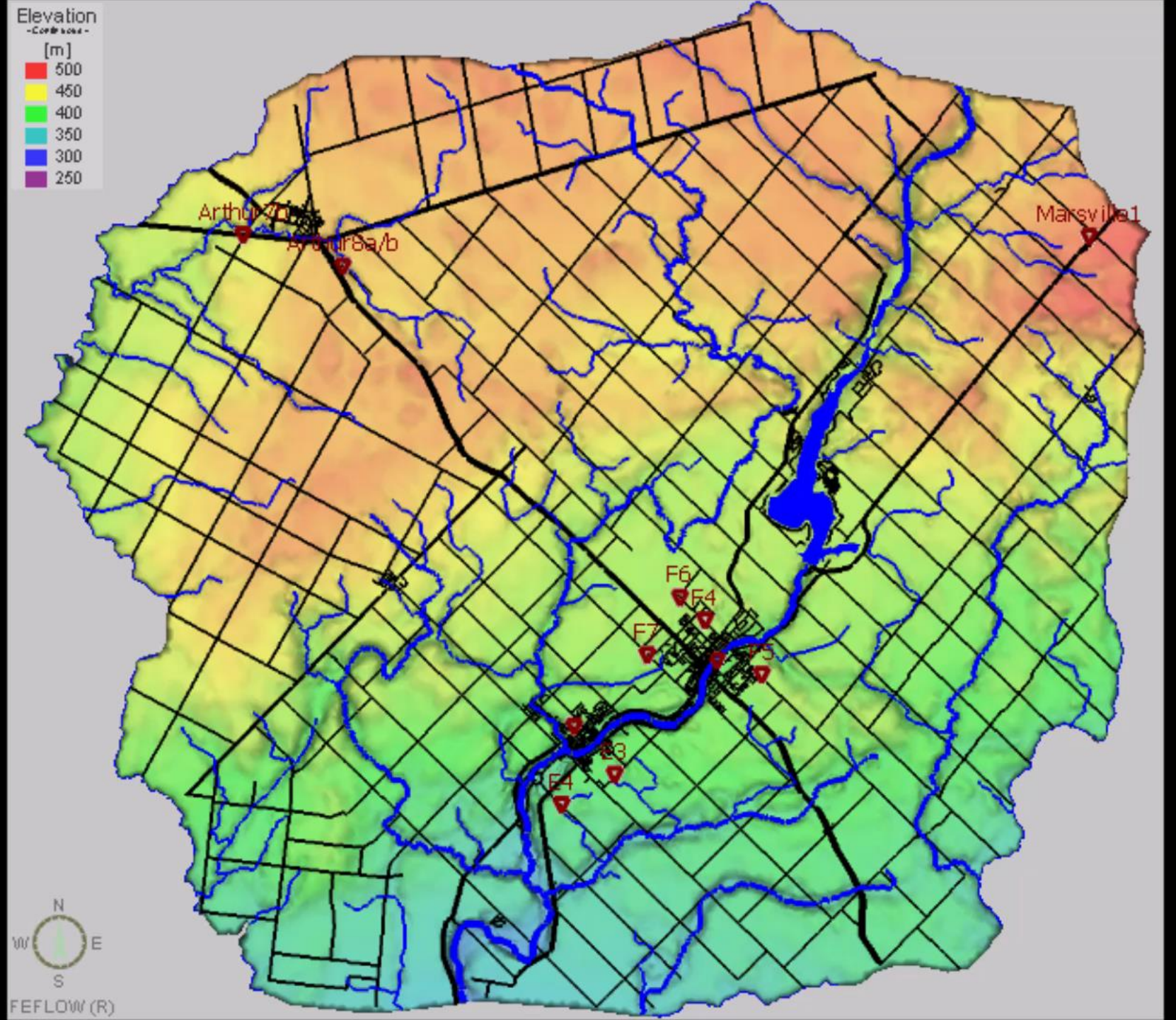
MODEL CALIBRATION

Outcome of calibration is to adjust the model until simulated water levels match measured conditions.

Results in confidence of model predictions.

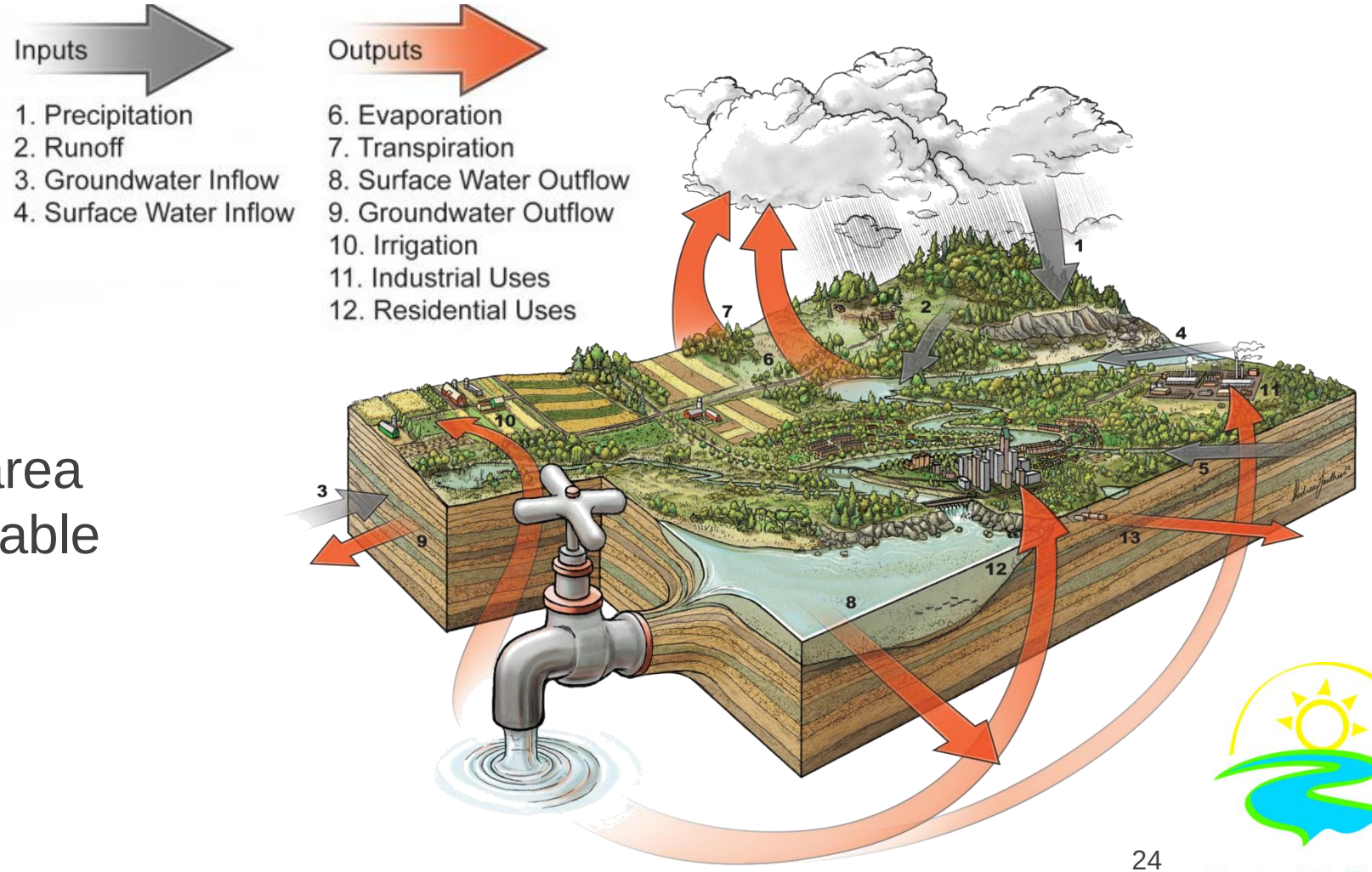


MODEL ANIMATION


Elevation
[m]
500
450
400
350
300
250
Marsville1
F6
F4
F7
F5
F3
F4
N
W
E
S
FEFLOW (R)

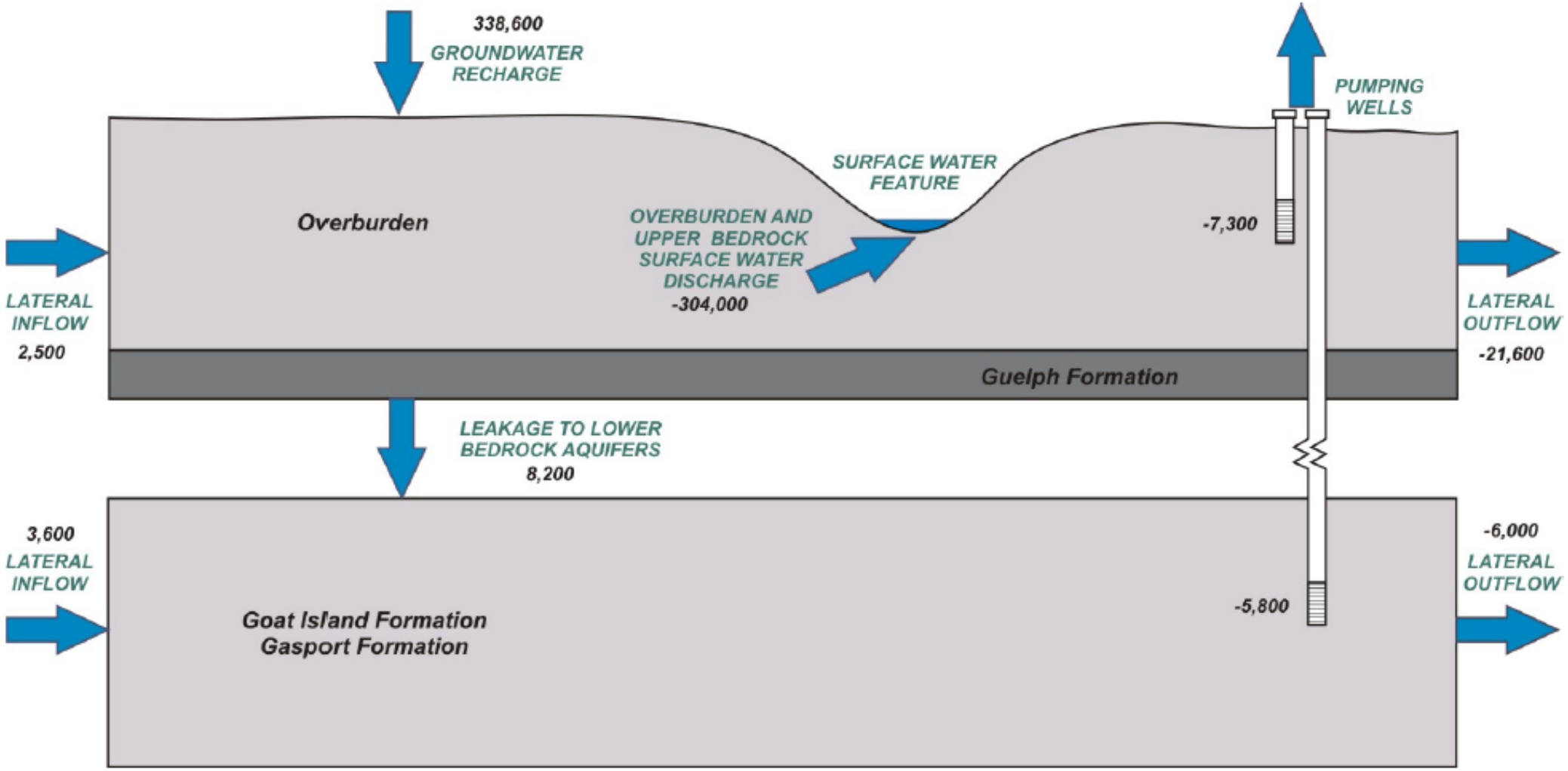
WHAT IS A WATER BUDGET

Quantifies the volume of water entering, moving through and leaving the area to help determine sustainable water use



WATER BUDGET

Average Current Conditions



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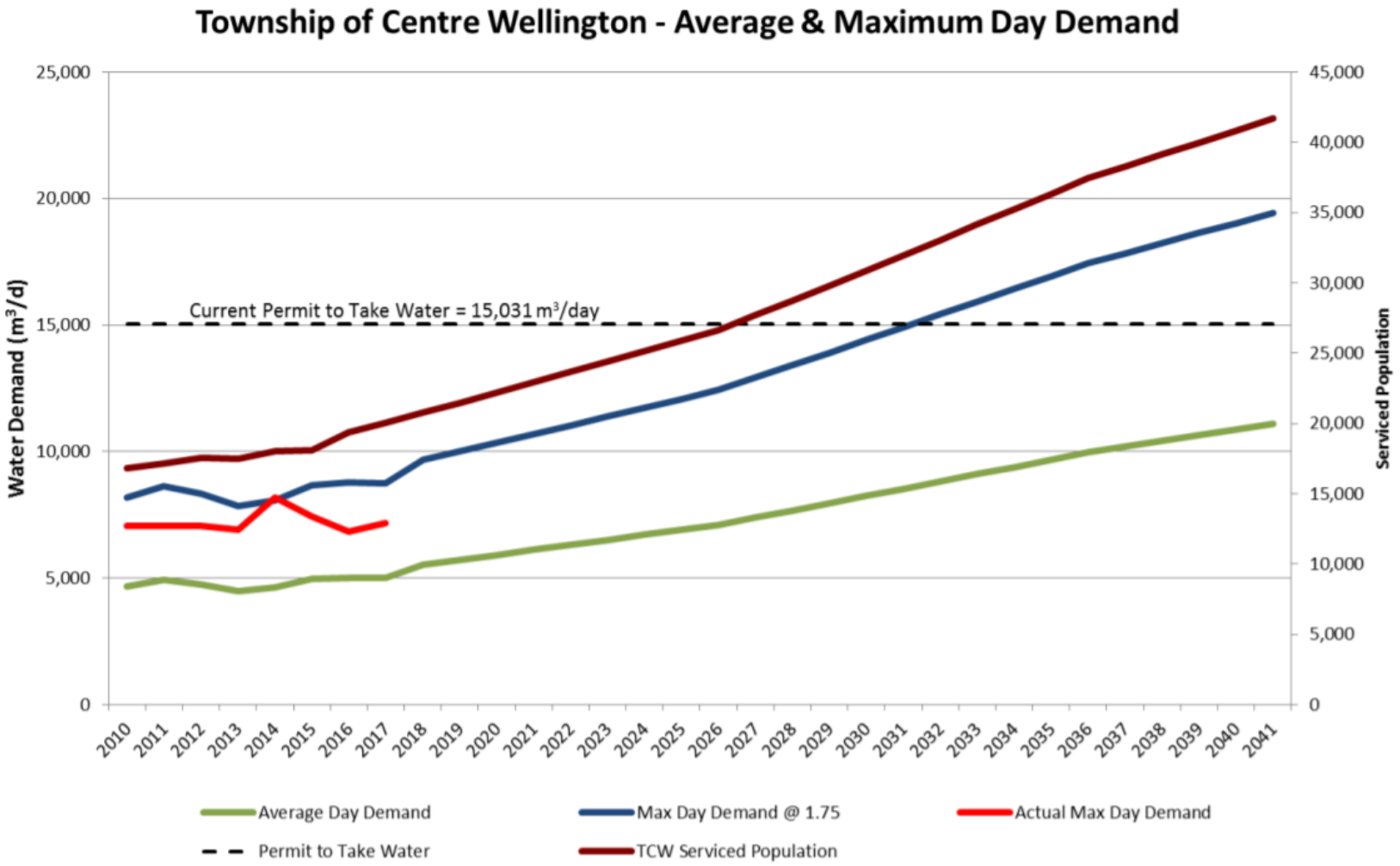
WATER SUPPLY MASTER PLAN

WATER SUPPLY MASTER PLAN

Serviced population projected to double by 2041

Centre Wellington requires a new water supply source before 2031



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WSMP PROCESS – PHASE 2

Phase 2 – Alternative Solutions

- Develop alternatives
  - Do Nothing; Limit Growth
  - Water conservation & demand management
  - Existing groundwater supply – optimization
  - New groundwater supply
  - Surface water supply
- Identify & mitigate impacts to natural, social, cultural environments
- Evaluate alternative solutions
- Establish preferred solution
- Develop implementation strategy
- Approved by Council in June, 2019

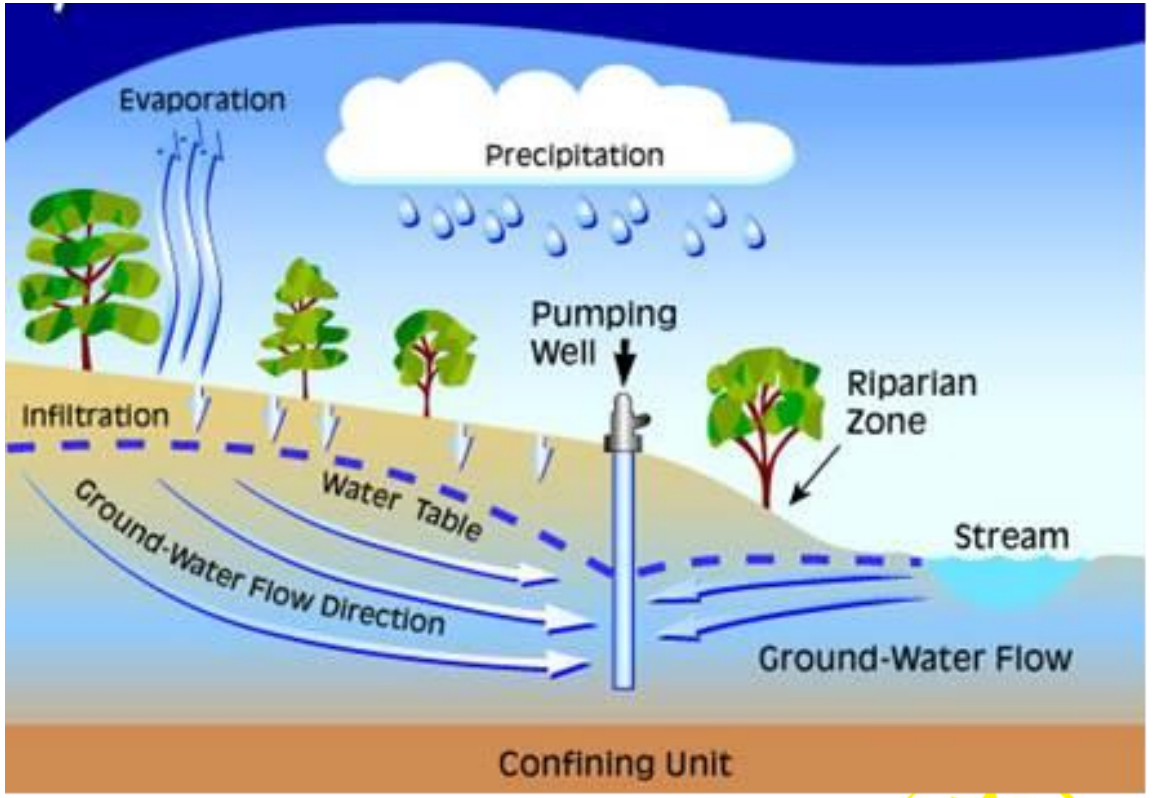
RISK ASSESSMENT

RISK ASSESSMENT

Can the current well infrastructure supply enough water …

- …with current population (i.e., 2018 pumping rates)
- …with projected population growth (i.e., increased pumping rates)?
- …during a prolonged drought?
- …with increased development (i.e., more impervious areas -> less groundwater recharge)

What are the impacts to other users including cold water streams and Provincially Significant Wetlands?



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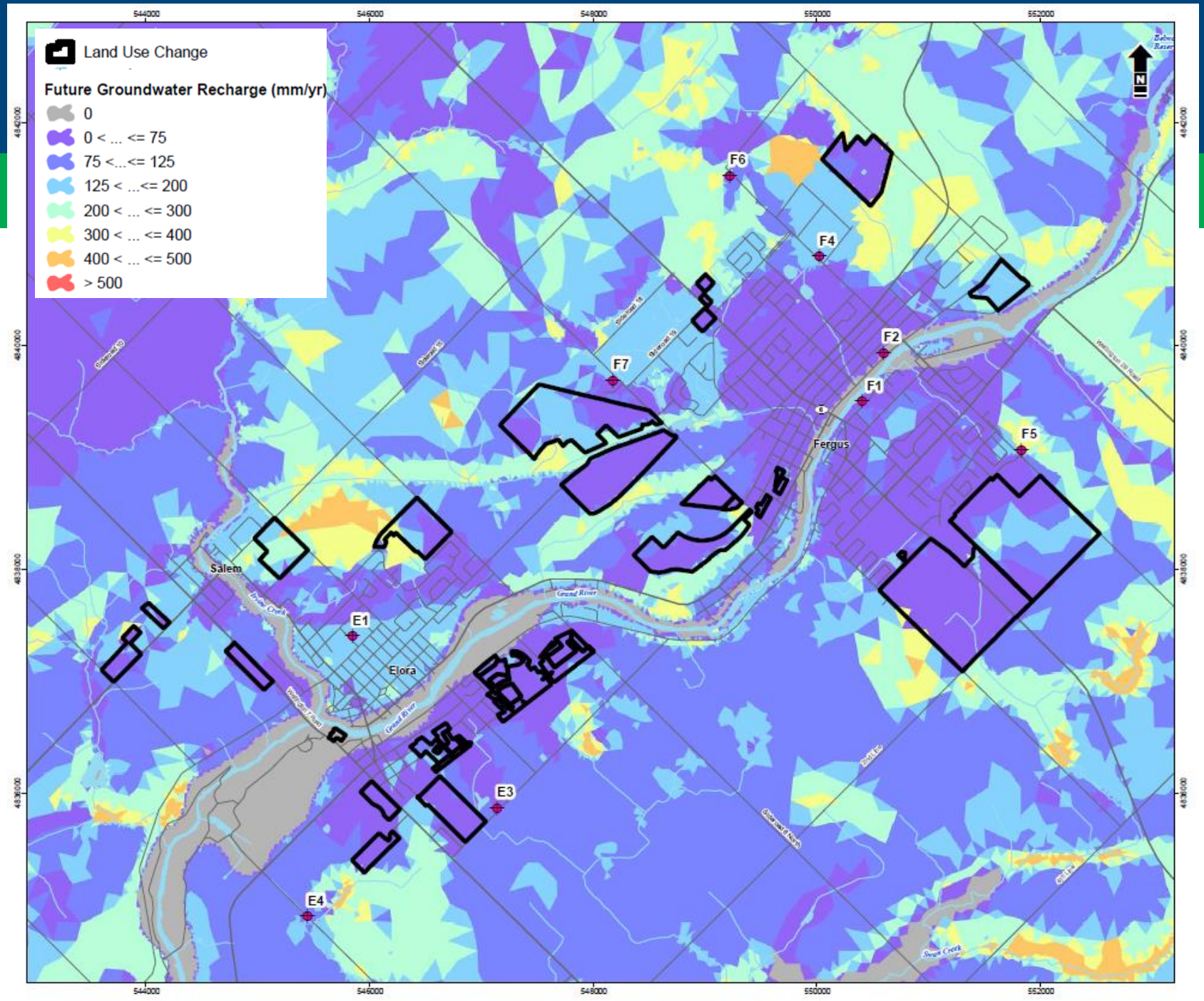
LAND USE CHANGE

Changes in land use that may reduce groundwater recharge

Mapped in Fergus and Elora using Official Plan mapping



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SCENARIOS

A set of scenarios to evaluate ability to pump water under various conditions:

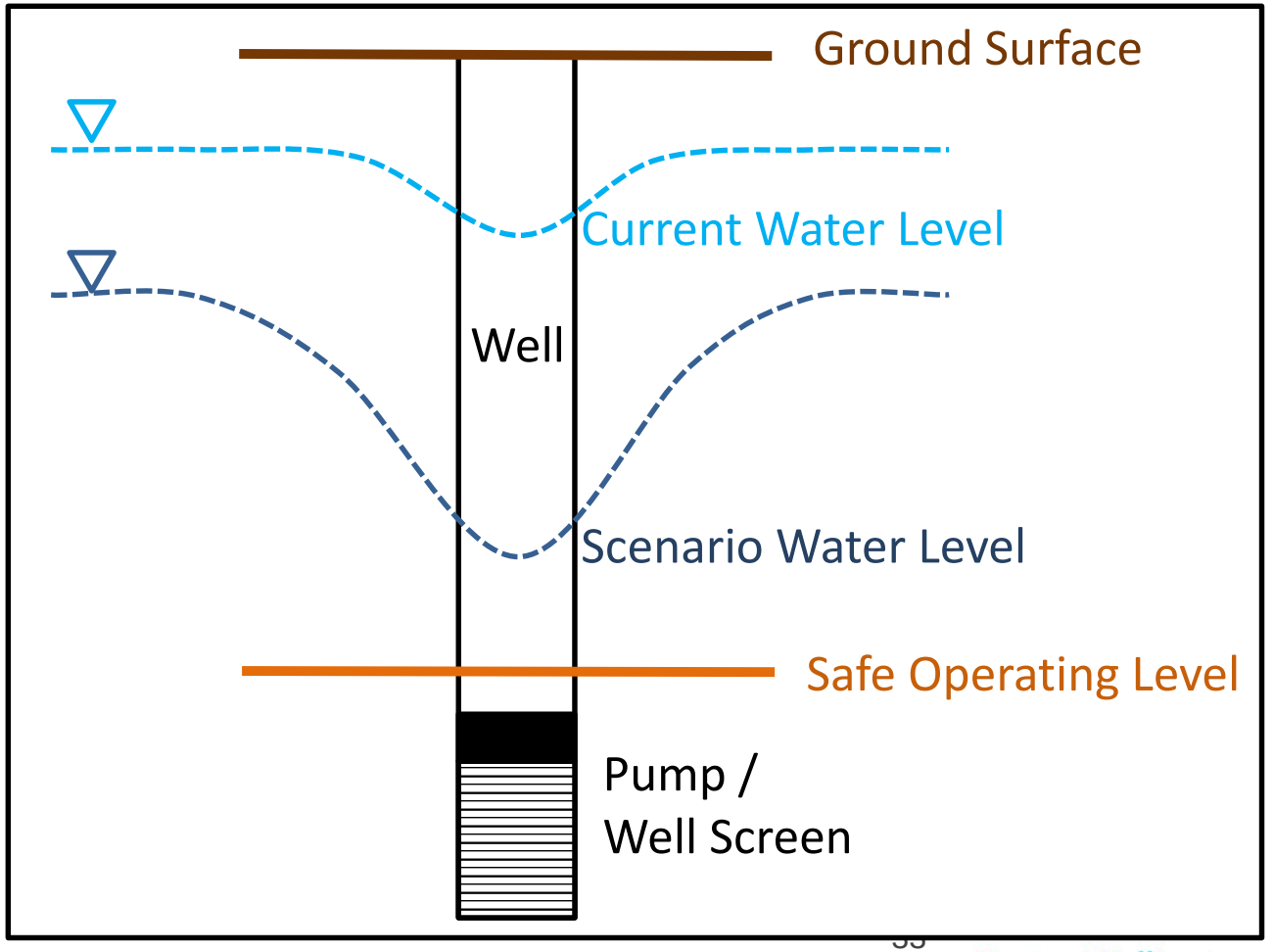
	Existing Water Demand	Future (2031) Average Water Demand
Existing Land Use	☑	☑
Future Land Use	☑	☑
Average Climate	☑	☑
Drought Conditions	☑	☑

MUNICIPAL WELL WATER LEVELS

Assess simulated water level decline in Centre Wellington municipal wells relative to a safe operating level

Significant Risk Level = If simulated water level drops below safe level

Result = Low Risk Level as no scenario water level dropped below set point



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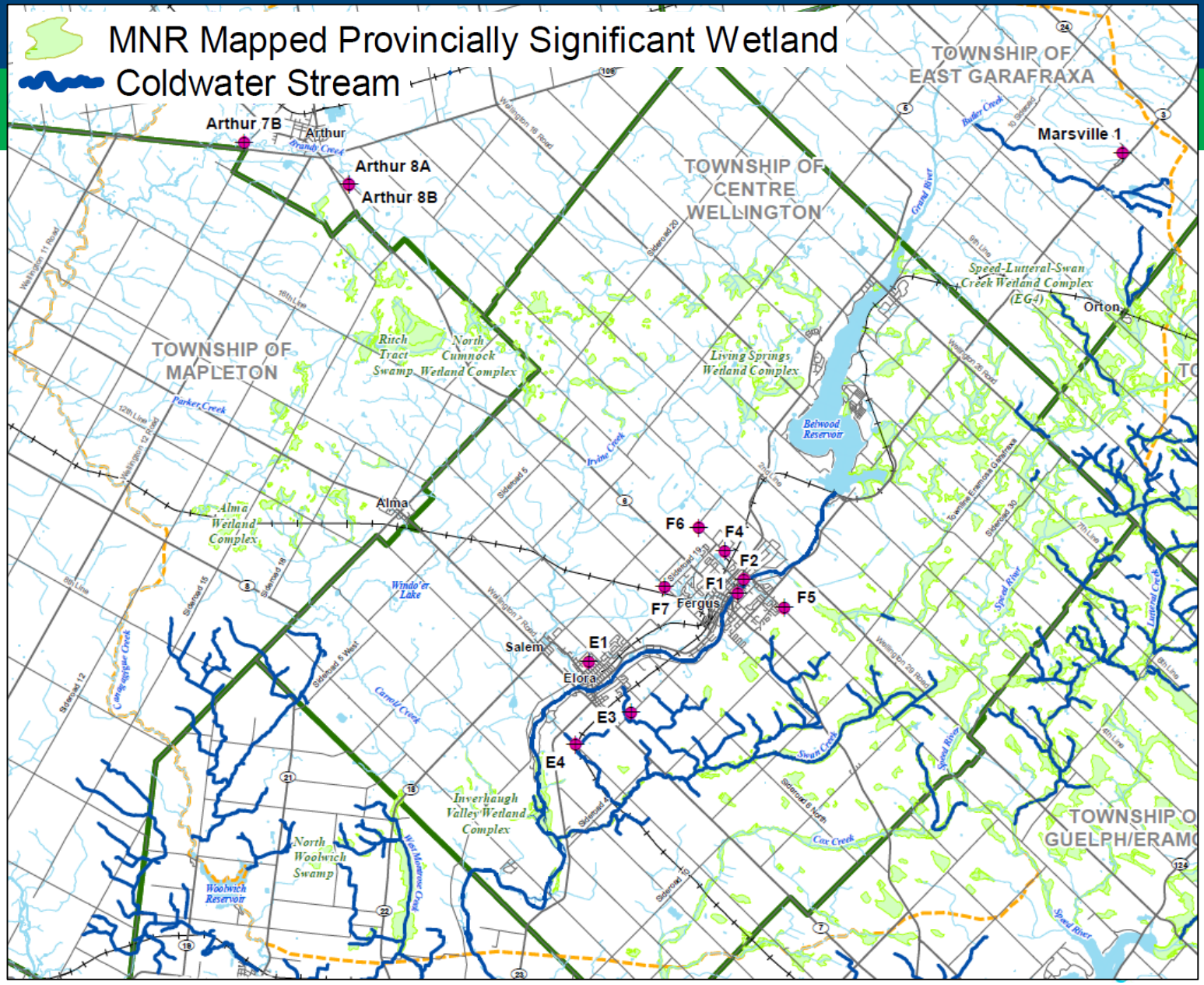
COLDWATER STREAMS AND WETLANDS

Future pumping will have a minimal effect on coldwater streams and wetlands



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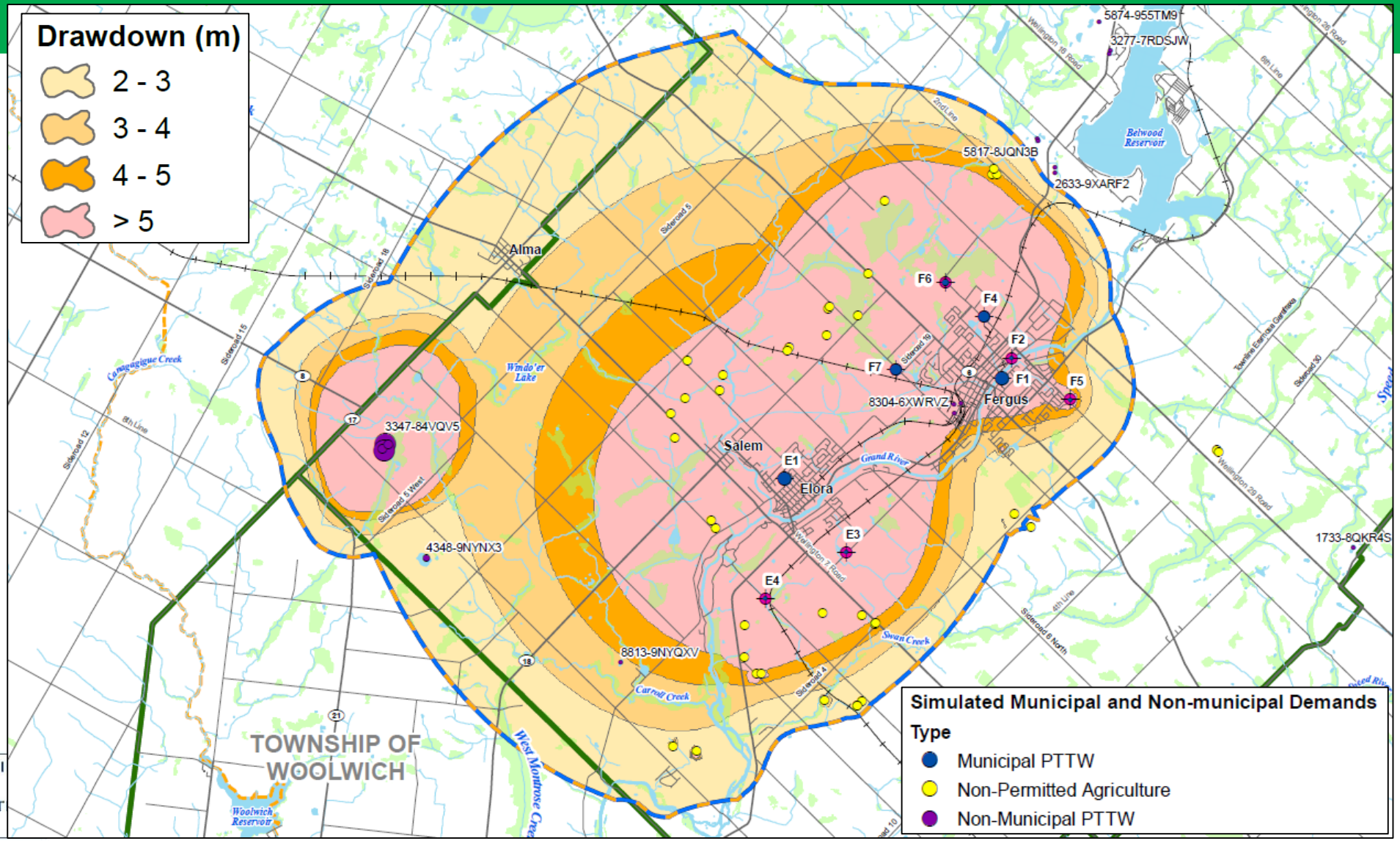
VULNERABLE AREA DELINEATION

Water takings within the vulnerable area do not necessarily affect the municipal water supply



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WATER QUANTITY RISK LEVEL OF VULNERABLE AREA

The current water supply system can meet future water demand up to 2031 in average and drought climate conditions without impacts to the natural environment.

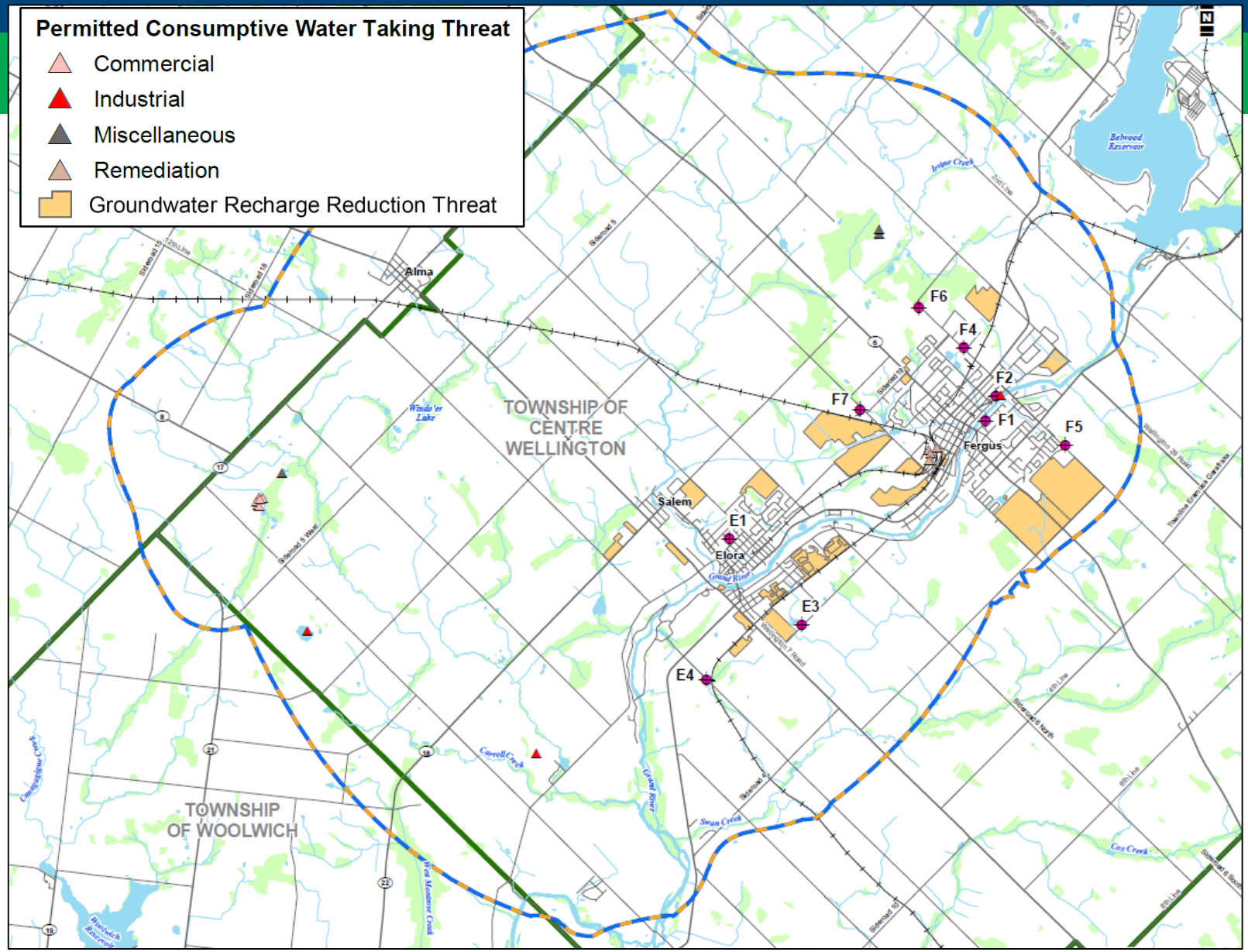
The current well infrastructure capacity (9,060 m^3/day) is insufficient to meet 2041 average day demand (11,709 m^3/day). This results in a significant risk level.

Vulnerable Area assigned significant risk level. All groundwater takings and potential reductions to groundwater recharge within the vulnerable area are classified as significant water quantity threats.

WATER QUANTITY THREATS

All groundwater takings and potential reductions to groundwater recharge within the vulnerable area are classified as significant water quantity threats.

Groundwater takings located within the vulnerable area do not necessarily impact groundwater levels at municipal wells



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PEER REVIEW PROCESS

Peer Review Committee comprised of three groundwater experts from University of Guelph (Dr. Hugh Whiteley), Western University (Dr. Rob Schincariol), and University of Waterloo (Dr. David Rudolph).

Each peer reviewer concluded that the work is scientifically defensible and the deliverables are consistent with the expectations of the province's source protection framework.

INSIGHTS

1) Largest influence on future groundwater levels is from municipal pumping to meet population growth

2) Cumulative effect of unserviced domestic water well pumping on water supply aquifer is minimal

3) Affects from other existing water users (e.g., livestock watering) on water supply aquifer is negligible

4) Affects from land development on future groundwater levels in the water supply aquifer is minimal

5) Increased or new large groundwater takings may affect groundwater levels at municipal wells depending on location and pumping rate

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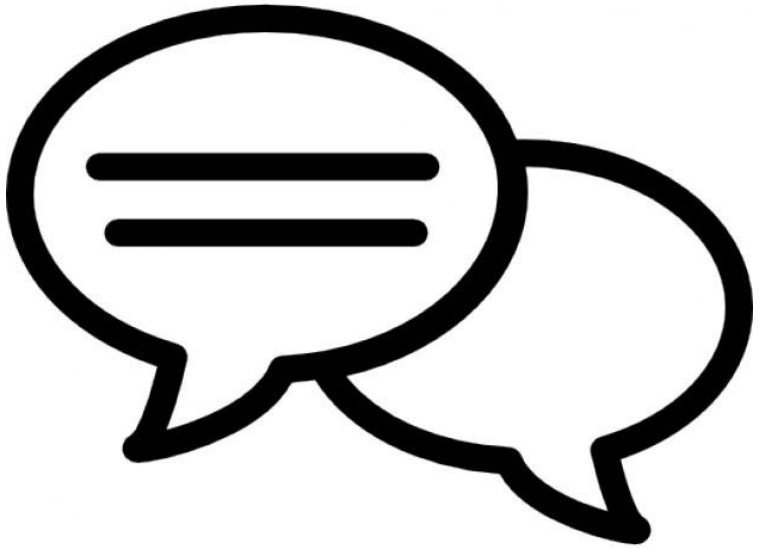
DISCUSSION

Risk Assessment

What did you like or what confirmed your thinking in the Risk Assessment Report?

Was there anything surprising or concerning in the Risk Assessment Report?

Any other comments?



NEXT STEPS

Circulate meeting summary

- CLG provide comments on meeting summary
- finalize meeting summary with comments
- post meeting summary and presentation on website

Policy Development

- Centre Wellington w/Source Protection Region will take the lead with policy development
- Water quantity policies already developed for other areas (e.g., Long Point Region, Orangeville, Acton/Georgetown, Brant County)
- Timelines align with City of Guelph and Township of Guelph/Eramosa water quantity policy development

Next CLG Meeting:

- February/ March 2020 to present draft water quantity policies

POLICY TIMELINE

- February/March 2020 – present draft policies to CLG
- April 2020 – draft water quantity policies presented to Source Protection Committee
- June 2020 – draft updated Source Protection Plan municipal policy sections presented to Source Protection Committee, and released for pre-consultation
- October 2020 – revised Source Protection Plan section presented to SPC and released for public consultation
- February 2021 – revised Source Protection Plan sections presented to SPC and release to Source Protection Area for submission to MECP