

**LEGEND**

- MOE Water Wells
- Municipal Wells
- Roads
- Static Water Contour
- Lansdowne Subwatershed
- ▭ Model Boundary
- Waterbody

**Static Water Level**

mASL

High : 111.858  
Low : 46.7308

**Figure 5-1  
Static Water Level**

Scale 1:40,000  
0 0.25 0.5 1 1.5 2  
Kilometres

Projection: UTM NAD83 Zone 18N  
Source: MOE, MNM - Open File Report 5801, MNR, CRCA

PROJECT No. 09-205

PROJECT Cataraqi Source Protection Region  
Lansdowne WHPA & Tier 2 WB Study

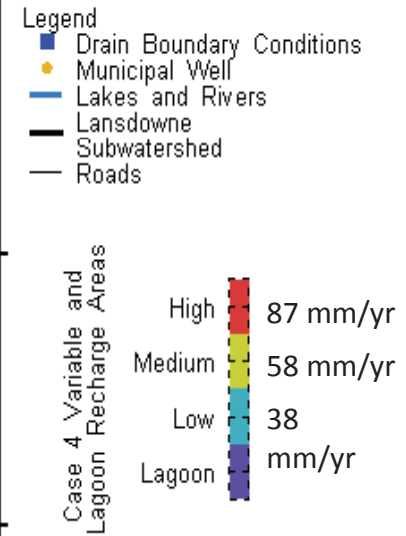
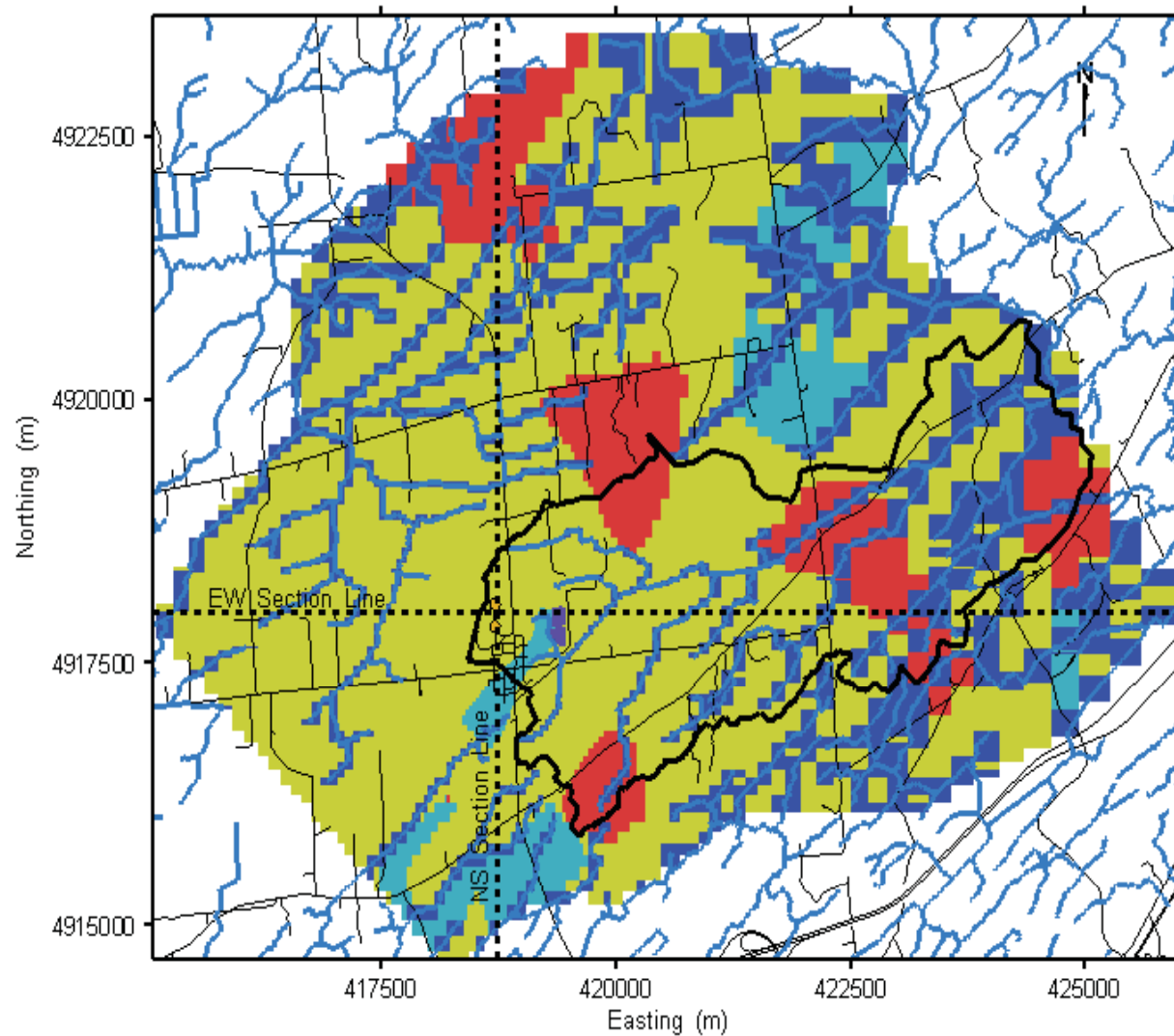
DESIGN: NMP  
CAD/GIS: NMP  
CHECK: ACW  
REV: 0A

DATE: 28/03/2011



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**Notes:**  
 A uniform recharge rate of 80 mm/year was applied in Case 1 and Case 3. A uniform recharge rate of 40 mm/year was applied in Case 2

**Boundary Conditions in Model Layer 1**

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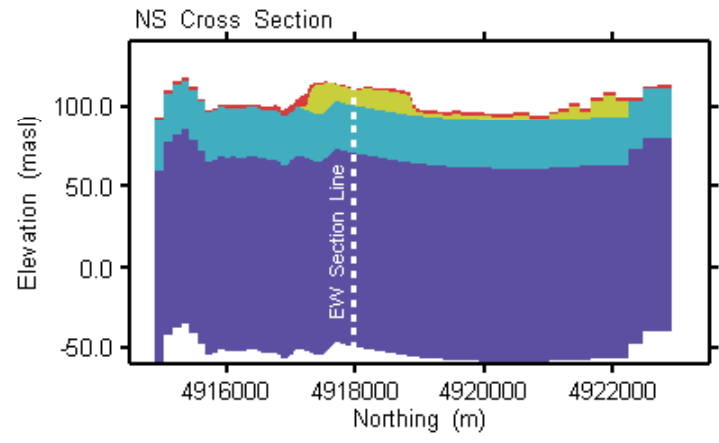
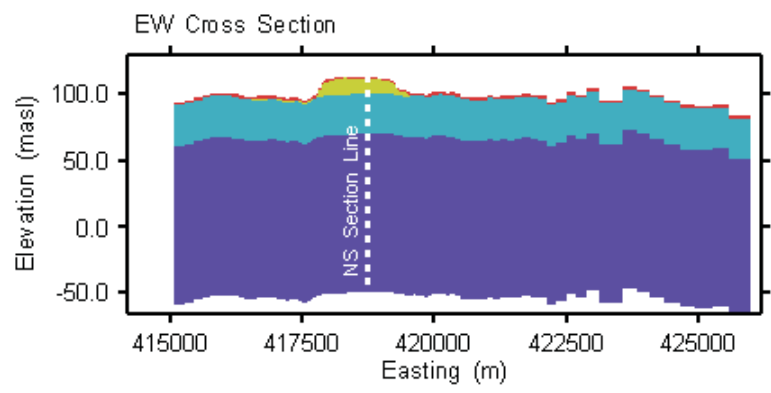
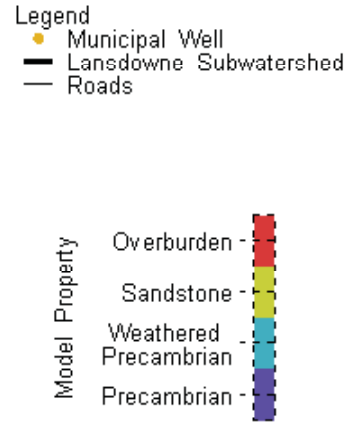
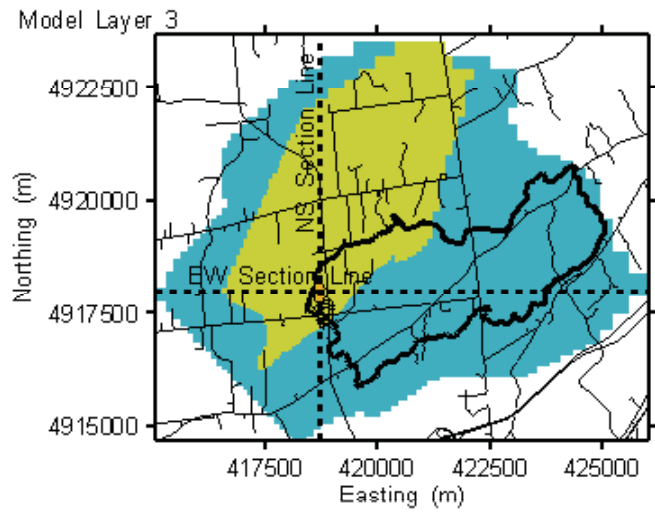
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**Figure 5-2**

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Date: Mar 24, 2011



**Property Assignment in Groundwater Flow Model**  
**Cataraqi Source Protection Region Lansdowne WHPA & Tier 2 WB Study**

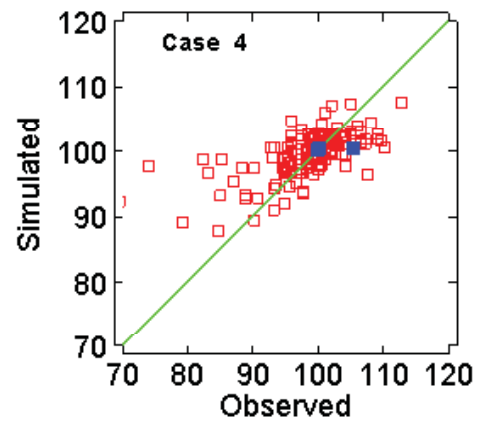
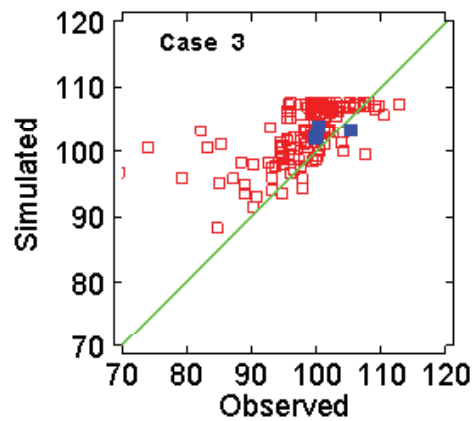
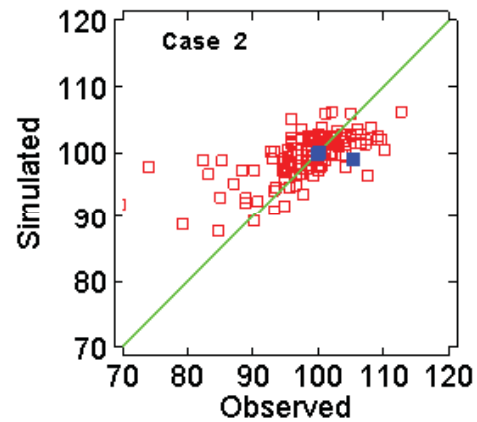
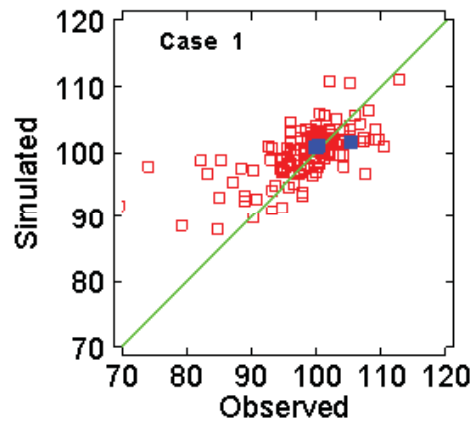
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**Figure 5-3**

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□ Water Well (WWIS)  
■ Monitoring Well (this study)

**Notes:**

To reflect conditions when hydraulic heads were measured, the following pumping boundary conditions were applied:

1. Zero pumping for hydraulic heads at water wells.
2. 71000 m<sup>3</sup>/year even split between municipal wells for hydraulic heads at monitoring wells.

**Groundwater Model Calibration**

Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study

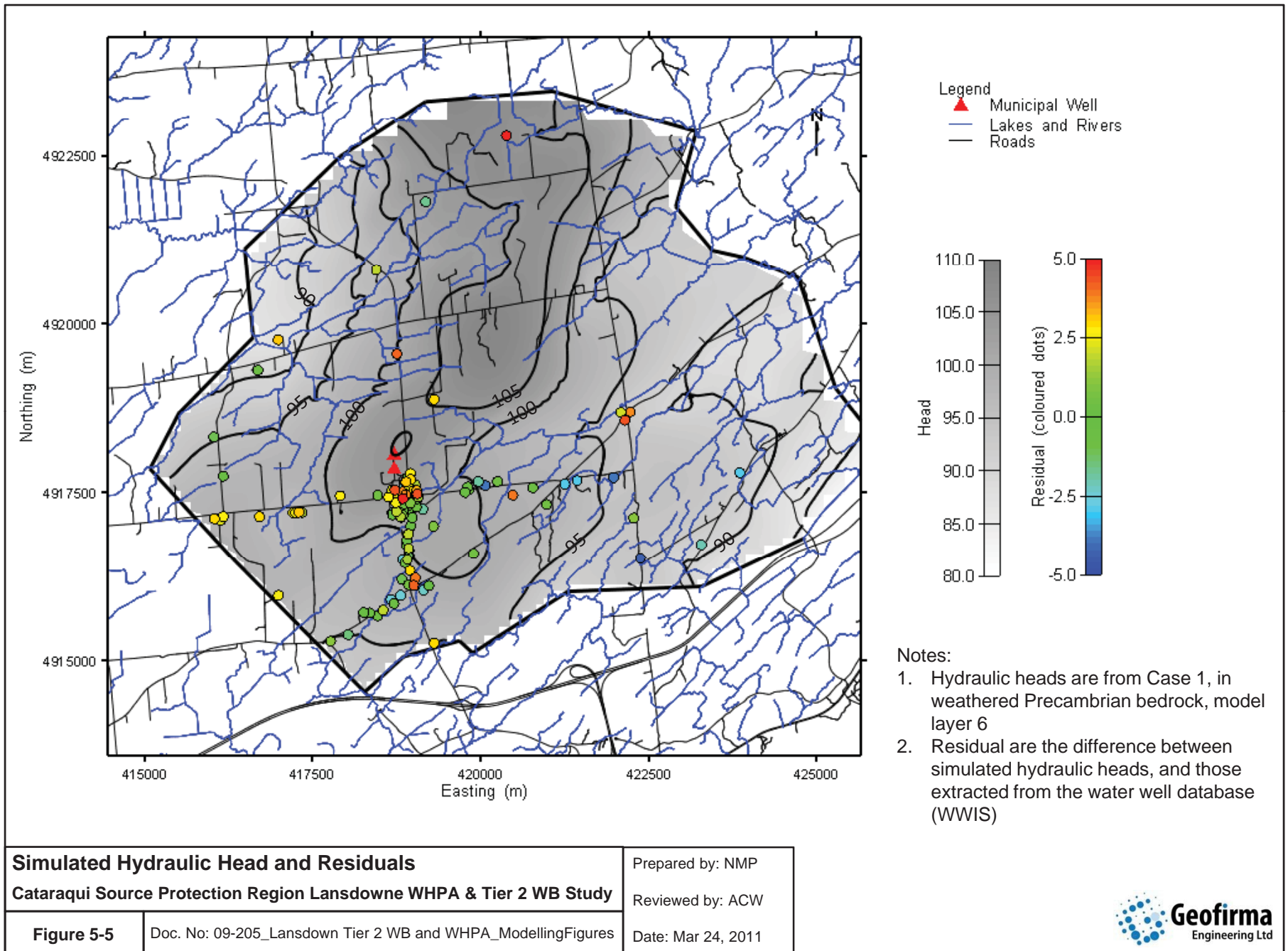
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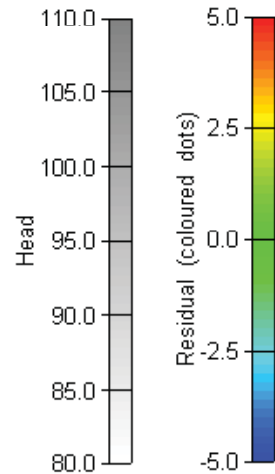
Figure 5-4

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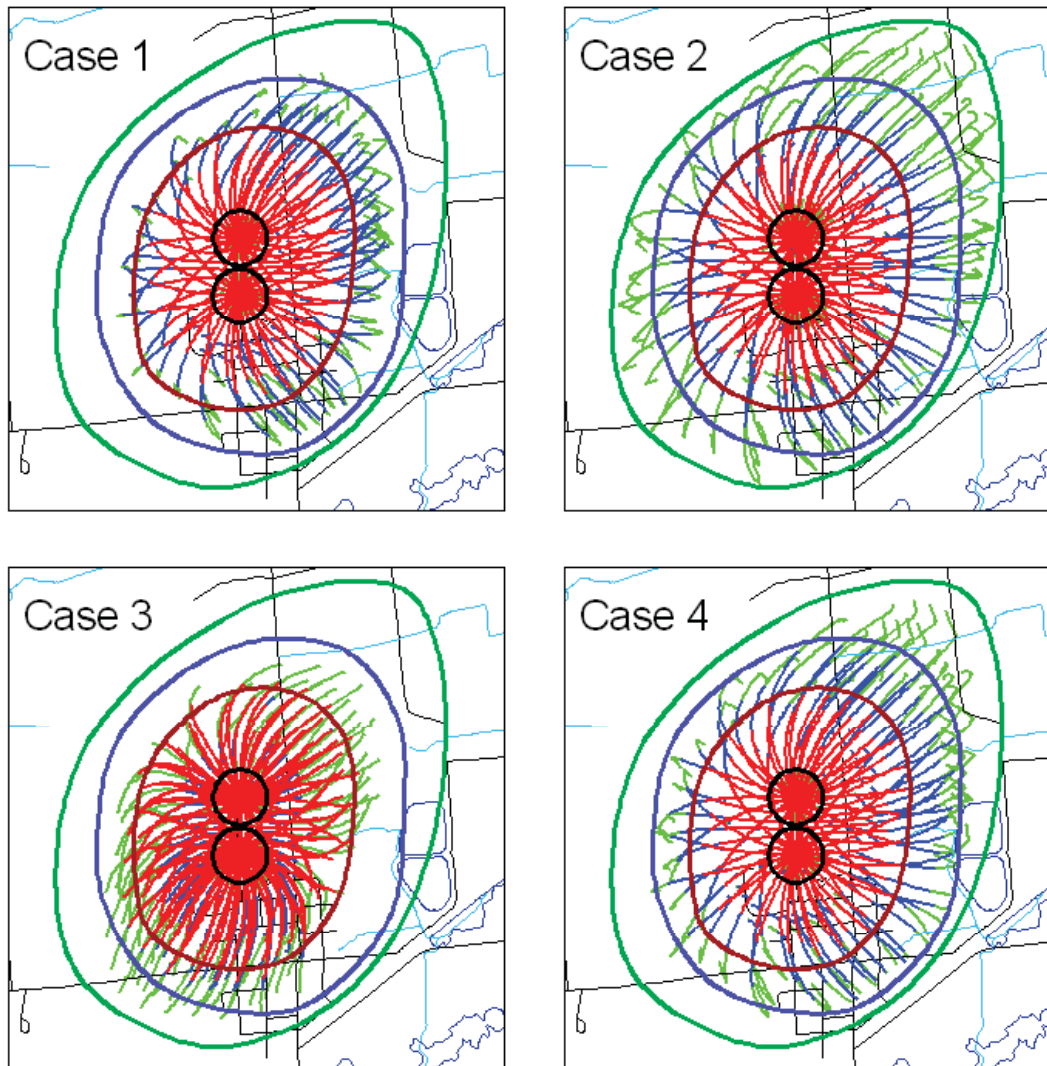
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Legend  
 ▲ Municipal Well  
 — Lakes and Rivers  
 — Roads



- Notes:
1. Hydraulic heads are from Case 1, in weathered Precambrian bedrock, model layer 6
  2. Residual are the difference between simulated hydraulic heads, and those extracted from the water well database (WWIS)



**LEGEND**

- <2 yr time of travel
- 2-5 yr time of travel
- 5-25 yr time of travel
- WHPA Zone A
- WHPA Zone B
- WHPA Zone C
- WHPA Zone D

**Notes:**

1. In each case, particles are shown from three pumping scenarios:
  - a) water taken entirely from Municipal Well 1 (southerly well),
  - b) water taken entirely from Municipal Well 2 (northerly well),
  - and c) water taken evenly from Municipal Well 1 and 2.

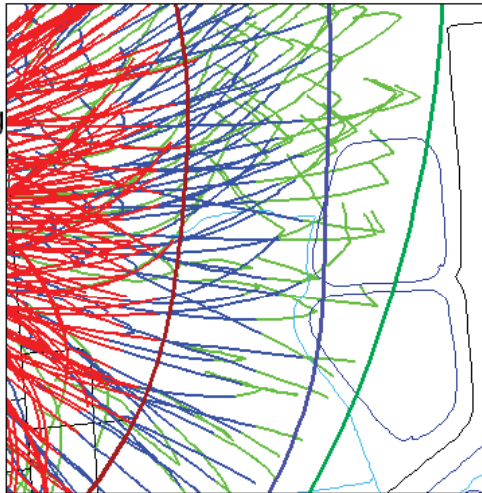
**Relationship between Case by Case Particle Traces and the Delineated WHPA**  
**Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study**

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Figure 5-6

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38-80  
mm/yr,  
depending  
on Case



0 mm/yr



400 mm/yr



#### LEGEND

- <2 yr time of travel
- 2-5 yr time of travel
- 5-25 yr time of travel
- WHPA Zone A
- WHPA Zone B
- WHPA Zone C
- WHPA Zone D

#### NOTES

1. Calibration statistics are insensitive to choice of lagoon recharge rate.
2. Particles traces from all 4 cases (calibrations) are displayed for each choice of lagoon recharge rate.

### Sensitivity of Particle Traces to Lagoon Recharge Rate Cataraqi Source Protection Region Lansdowne WHPA & Tier 2 WB Study

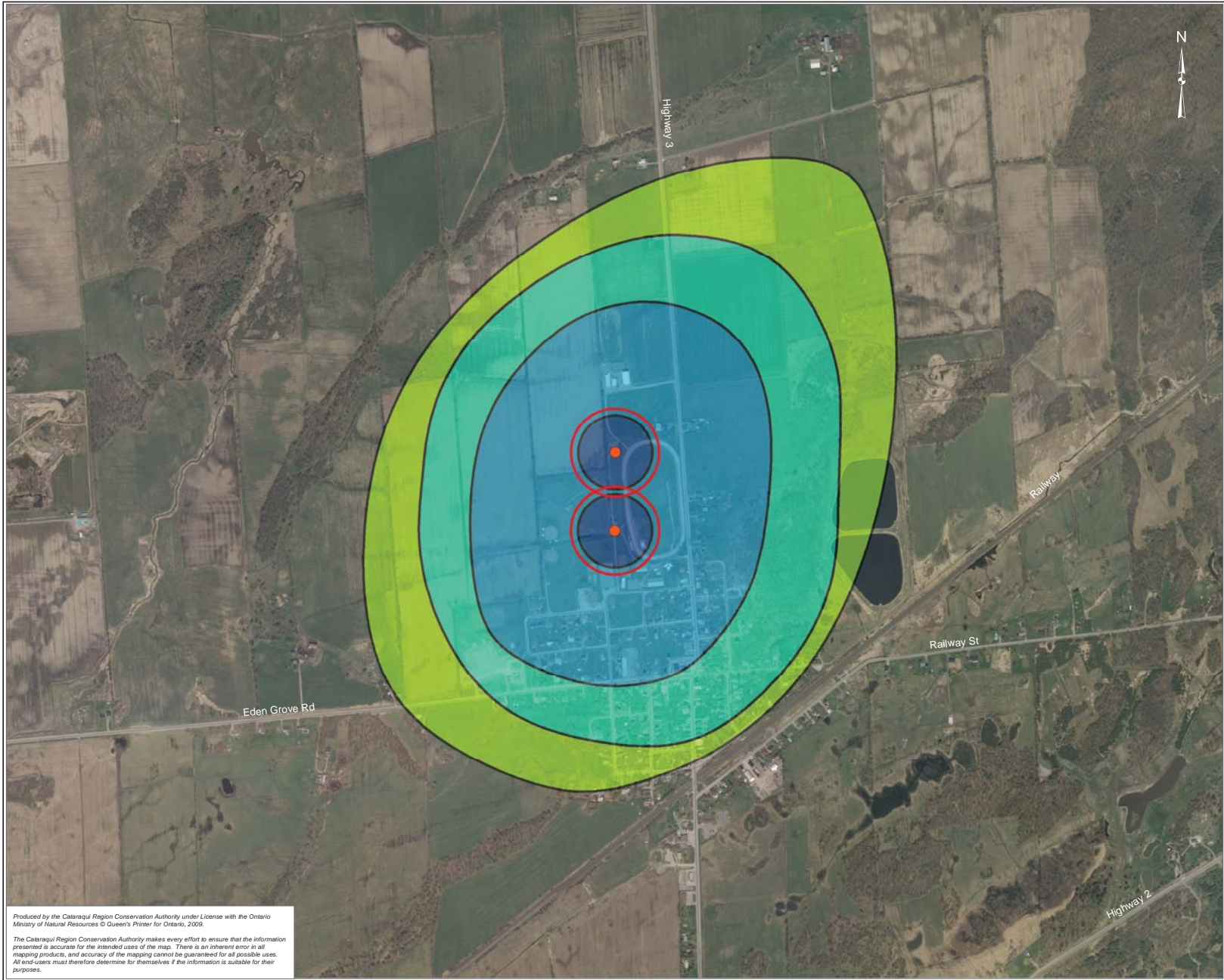
Figure 5-7

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**LEGEND**

● Municipal Wells

**Well head Protection Area**

- Zone A
- Zone B
- Zone C
- Zone D
- Zone E/F

**Figure 5-8  
Wellhead Protection Area**



Projection: UTM NAD83 Zone 18N  
Source: MOE, MNM- Open File Report 5801, MNR, CRCA

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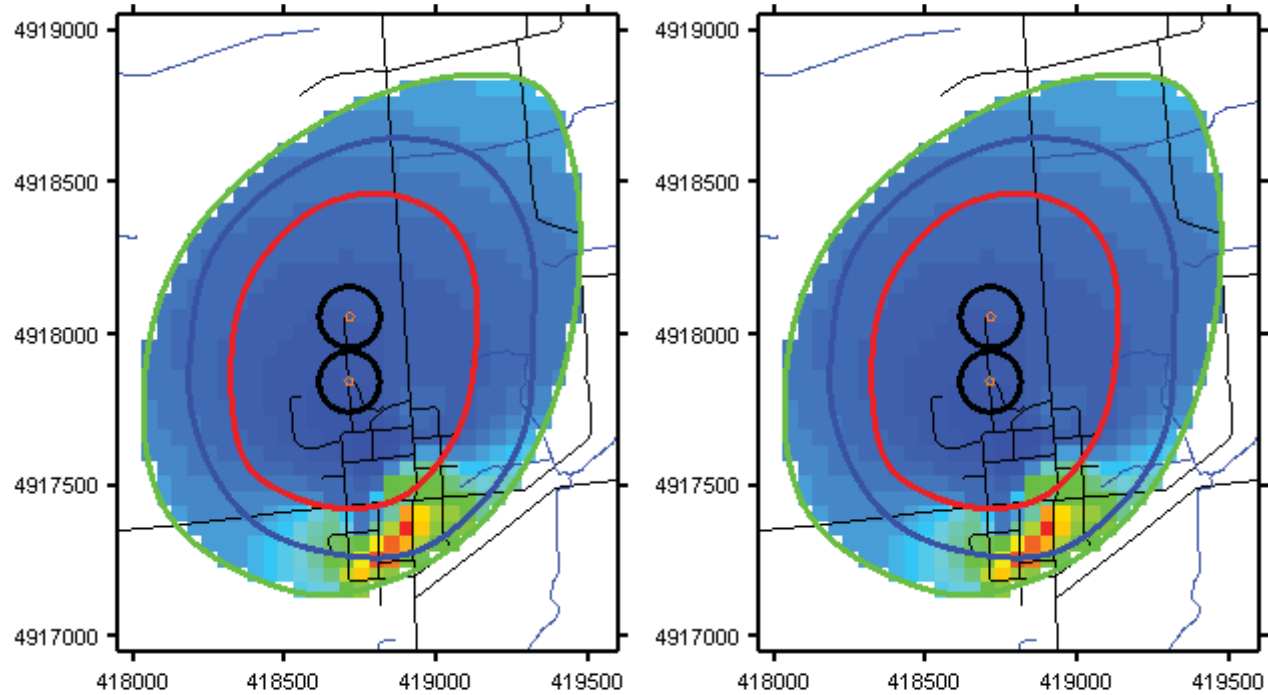
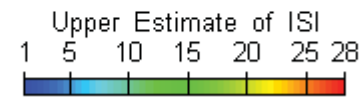
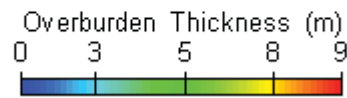
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- LEGEND**
- Roads
  - Lakes and Rivers
  - ◻ Municipal Well
  - WHPA Zone A
  - WHPA Zone B
  - WHPA Zone C
  - WHPA Zone D



**Overburden Thickness and Upper Estimate of ISI**  
**Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study**

Figure 5-9

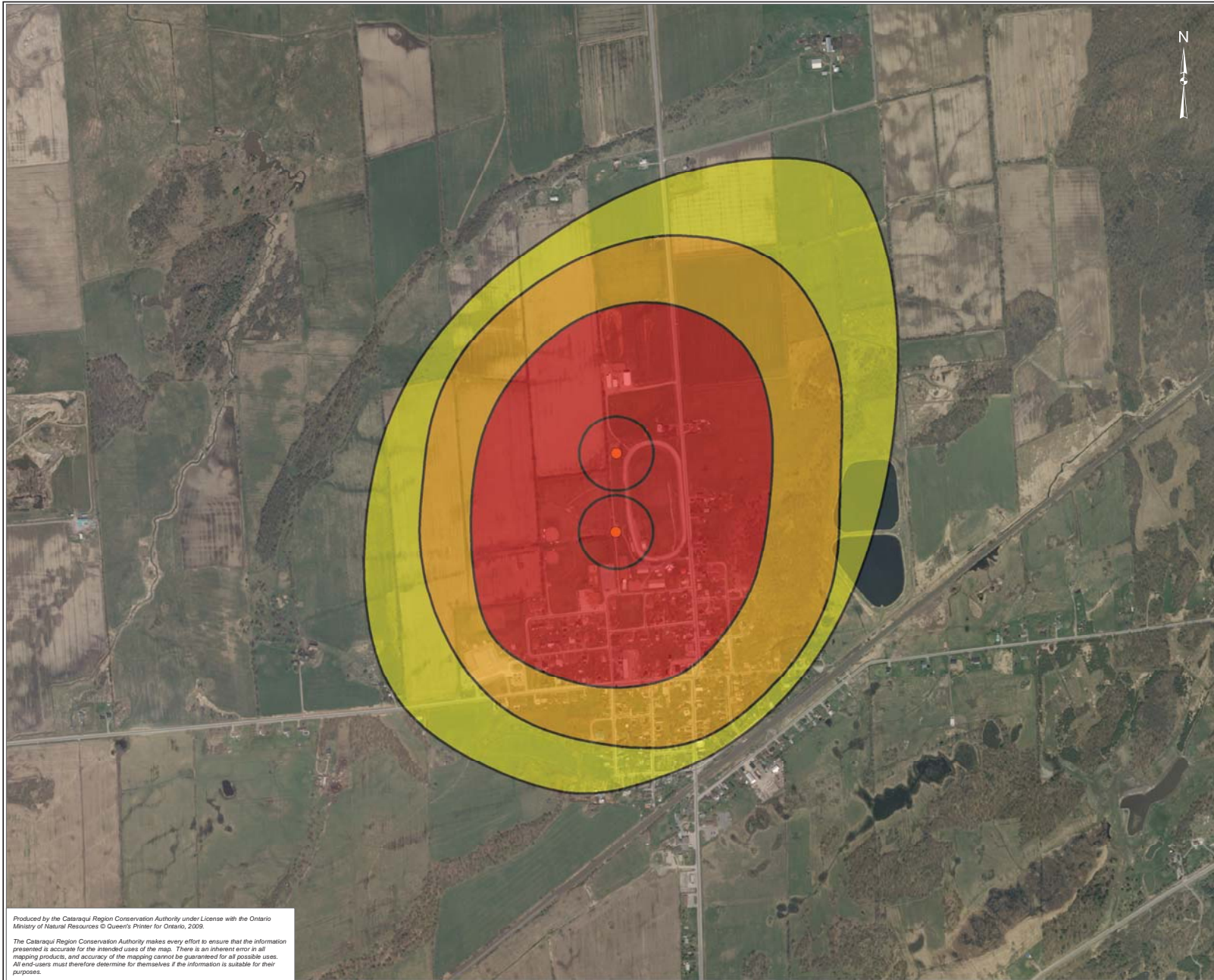
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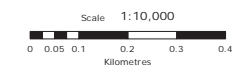
**LEGEND**

● Municipal Wells

**Intrinsic Vulnerability Score**

■ 10  
 ■ 8  
 ■ 6

**Figure 5-10  
 Intrinsic Vulnerability**



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