

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

Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study

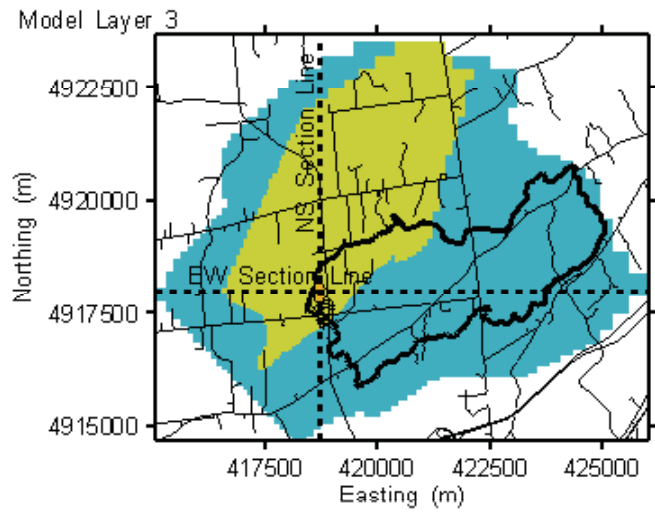
Prepared by: NMP

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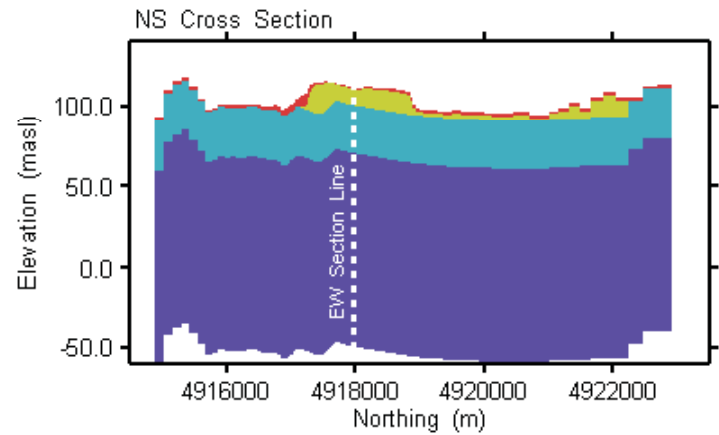
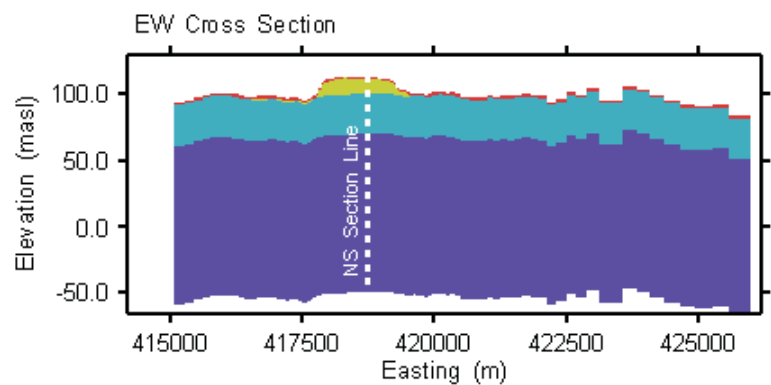
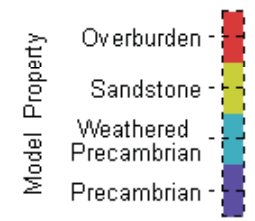
Figure 5-2

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Date: Mar 24, 2011



- Legend
- Municipal Well
 - Lansdowne Subwatershed
 - Roads



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

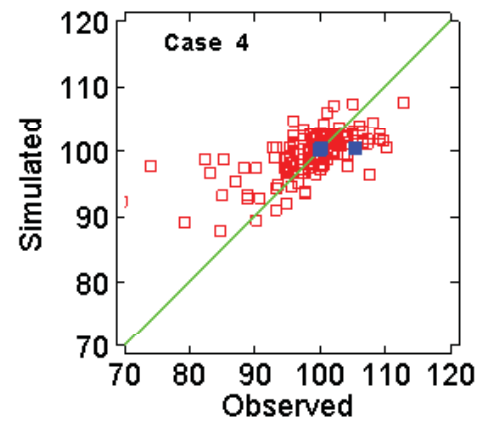
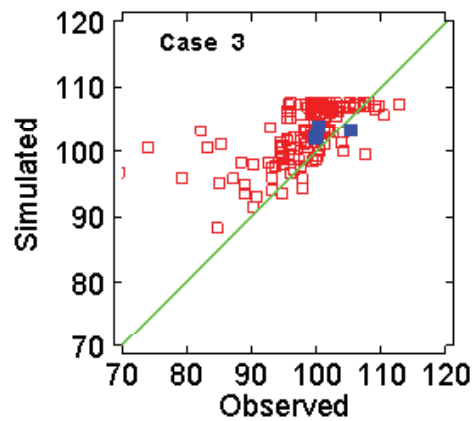
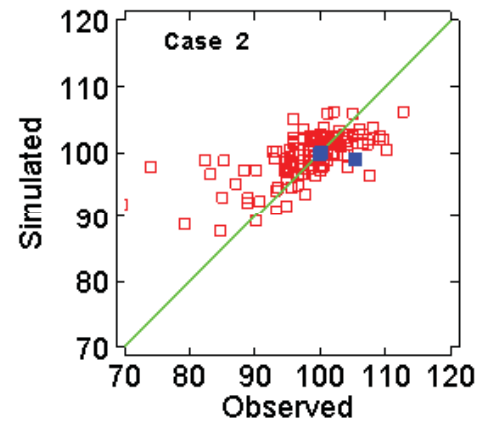
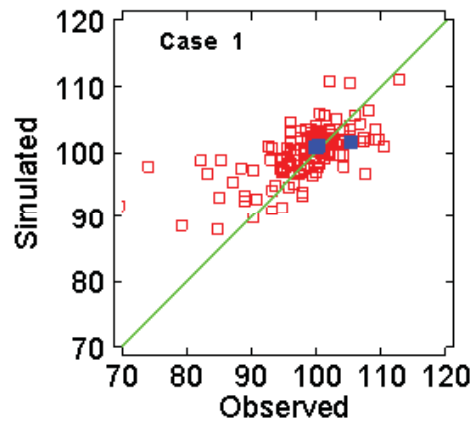
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Figure 5-3

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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 m³/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

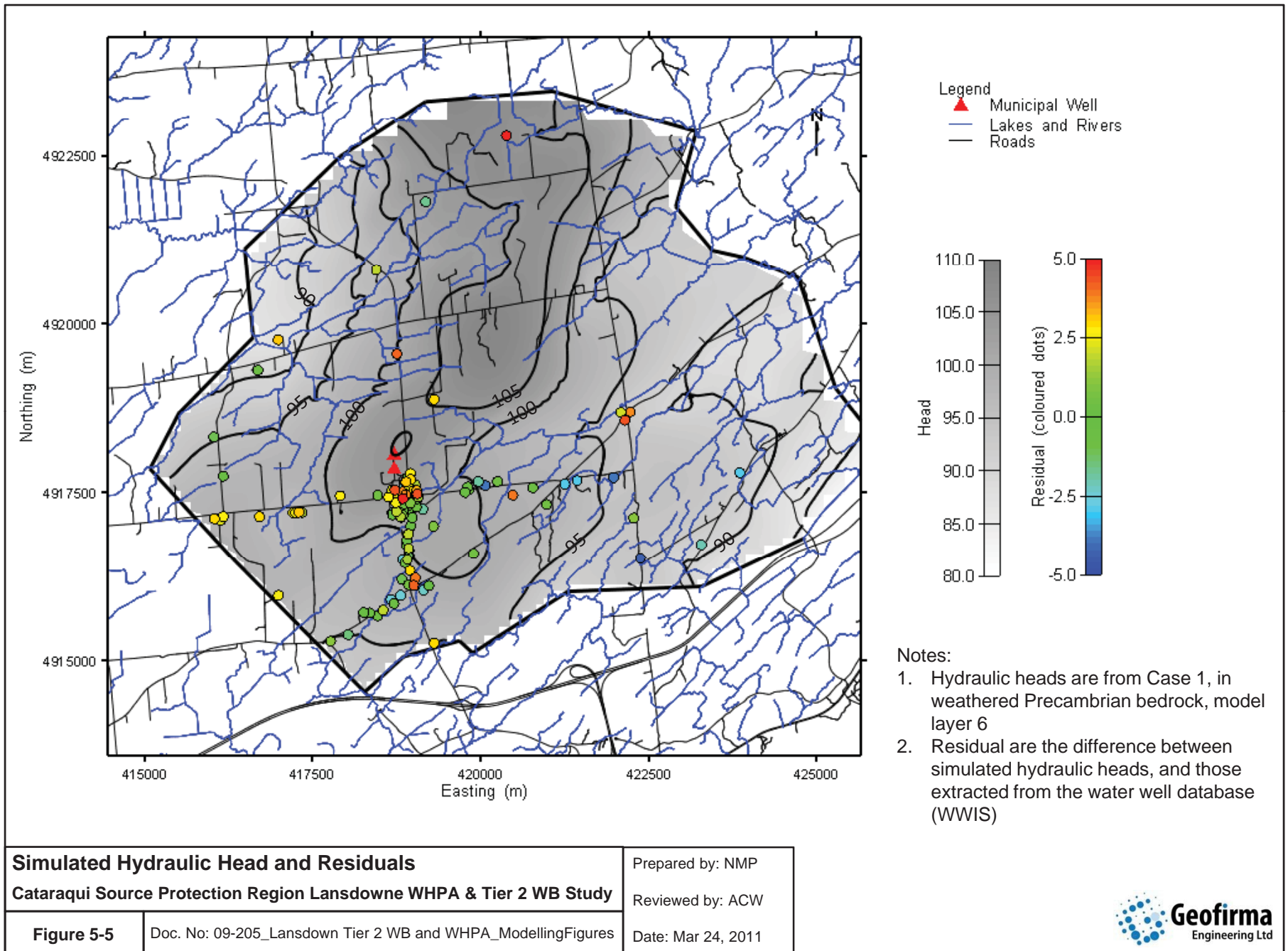
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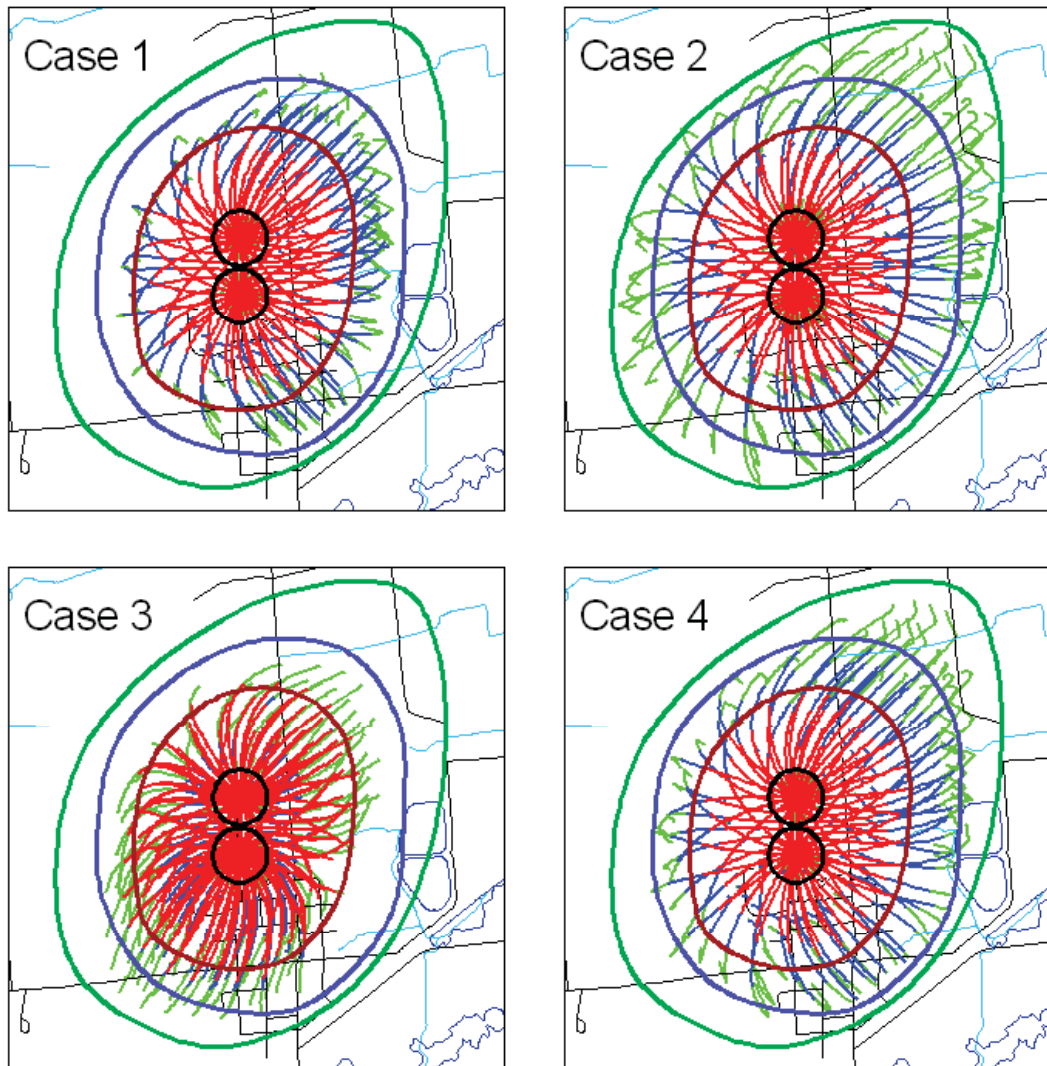
Reviewed by: ACW

Figure 5-4

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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.

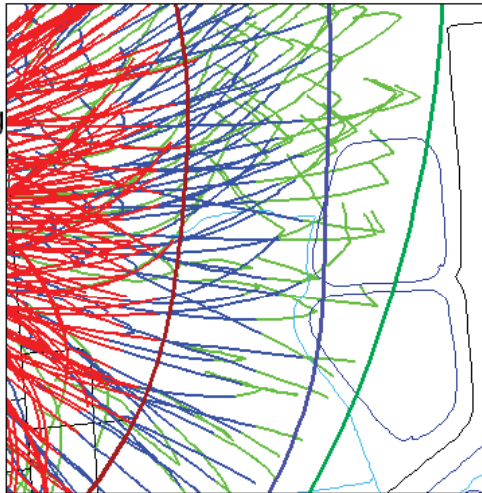
Relationship between Case by Case Particle Traces and the Delineated WHPA
 Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study

Prepared by: NMP
 Reviewed by: ACW
 Date: Mar 24, 2011

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
Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study

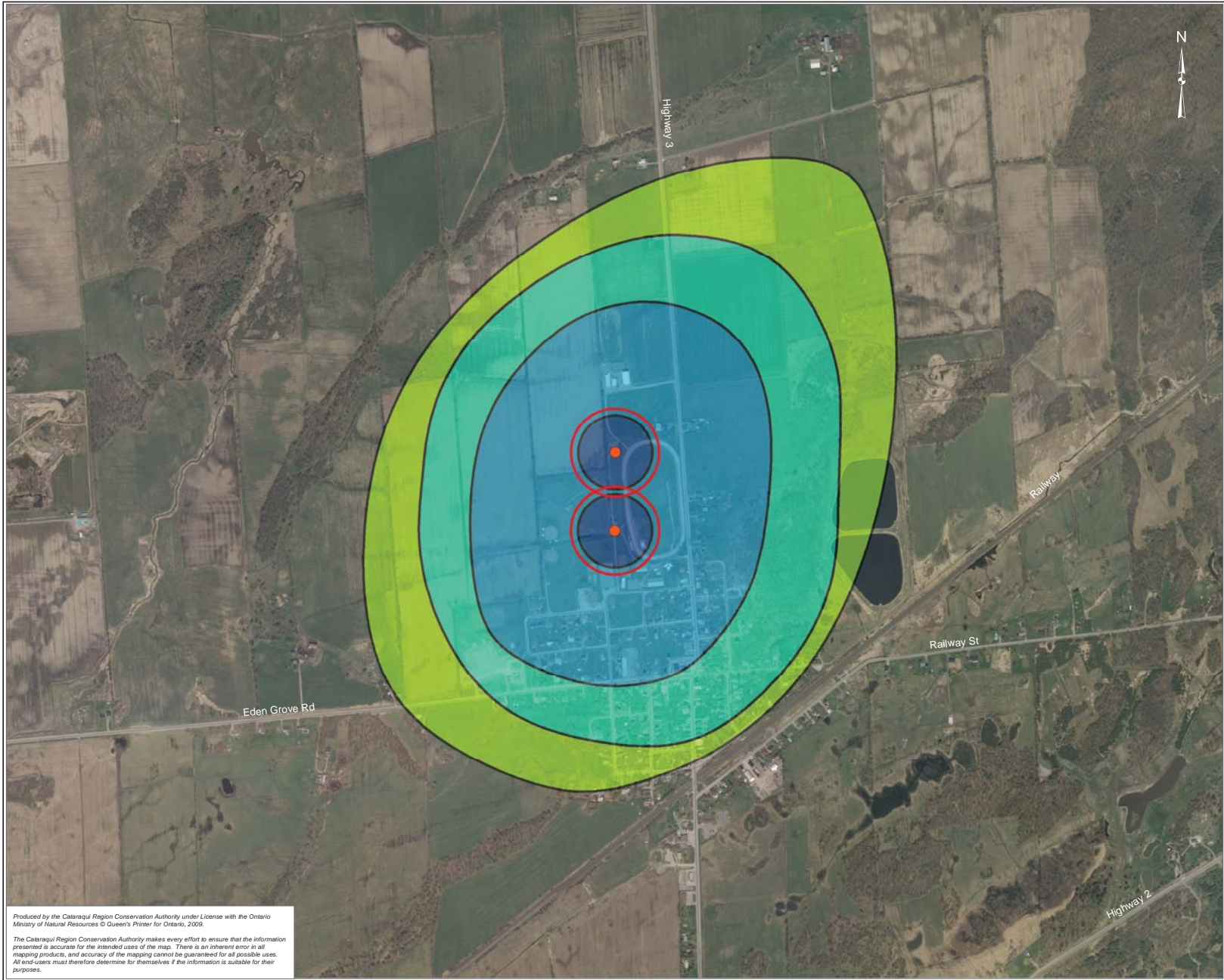
Figure 5-7

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Prepared by: NMP

Reviewed by: ACW

Date: Mar 24, 2011



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

PROJECT No. 09-205

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

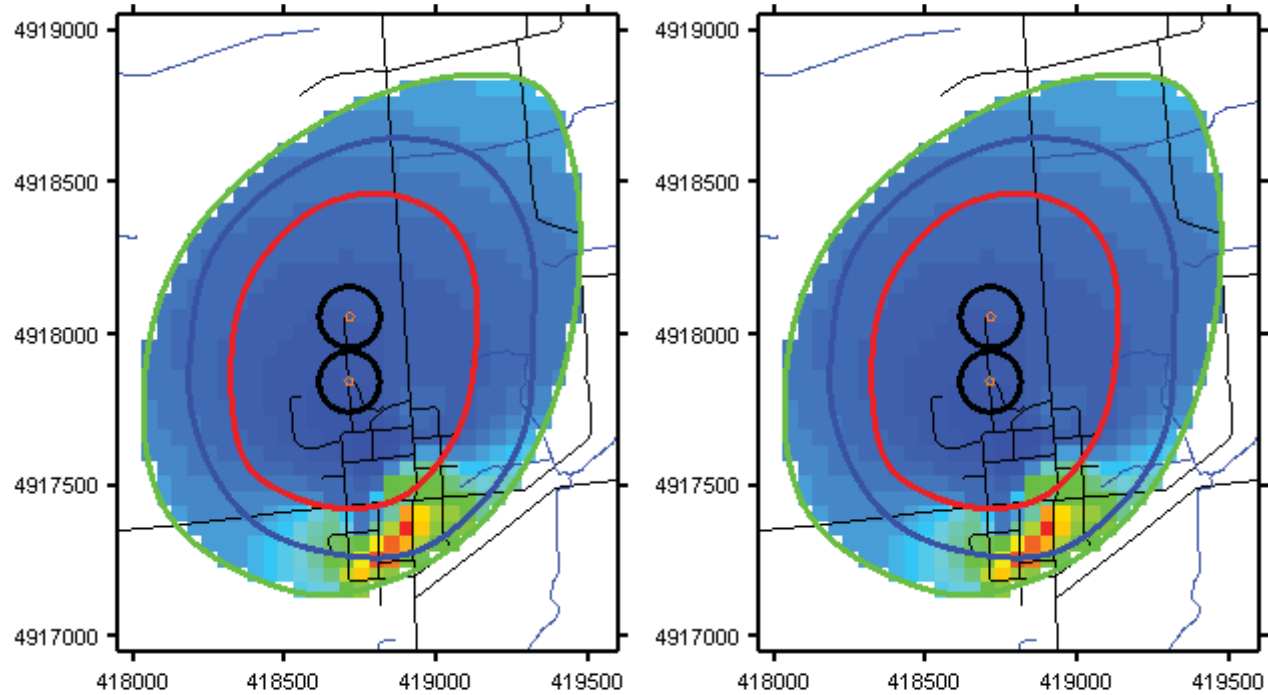
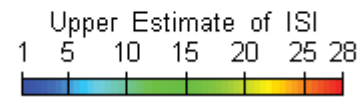
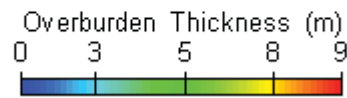
DESIGN: NMP
CAD/GIS: NMP
CHECK: ACW
REV: 0A



DATE: 28/03/2011

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

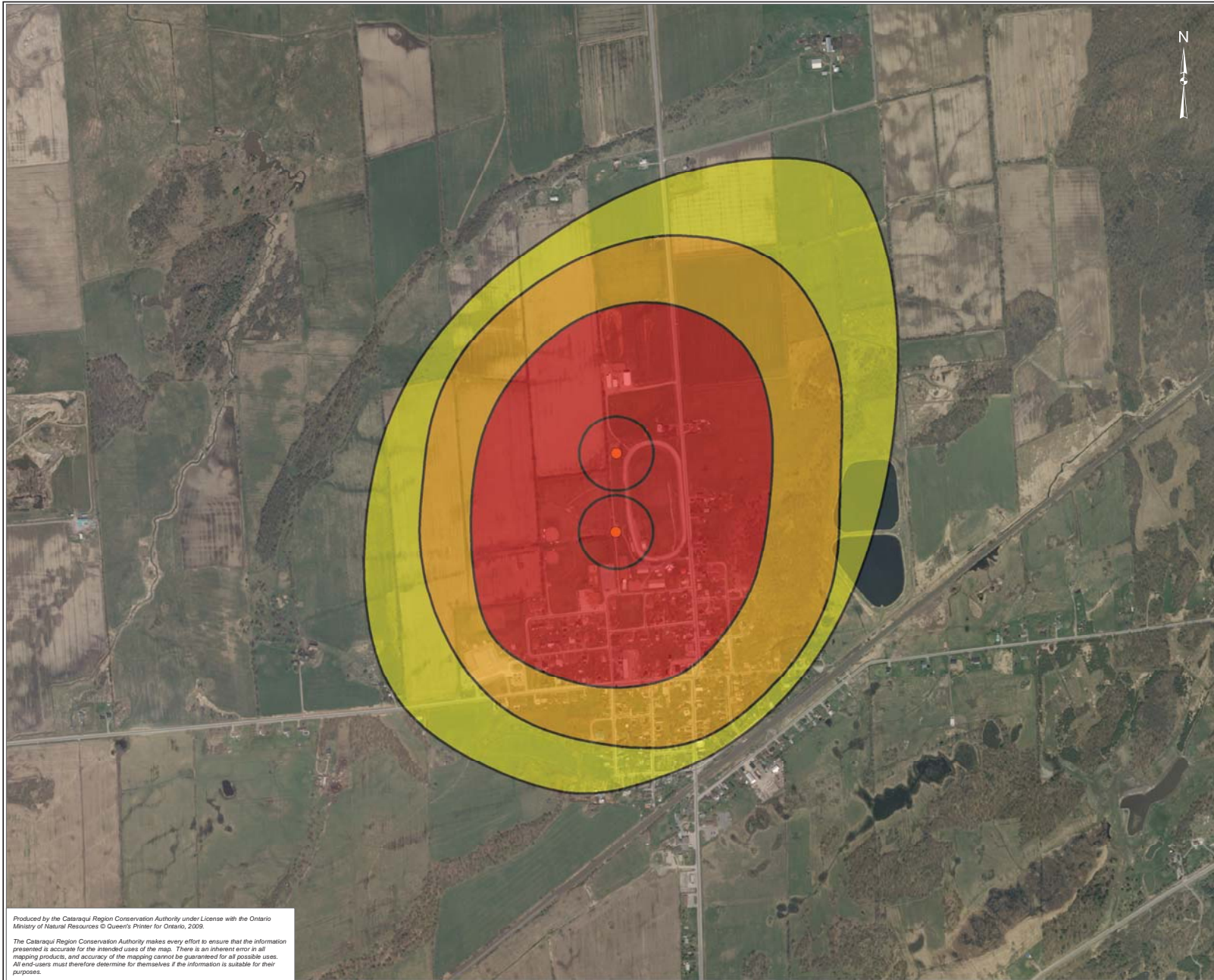


Overburden Thickness and Upper Estimate of ISI
Cataraqui Source Protection Region Lansdowne WHPA & Tier 2 WB Study

Prepared by: NMP
 Reviewed by: ACW
 Date: Mar 24, 2011

Figure 5-9

Doc. No: 09-205_Lansdown Tier 2 WB and WHPA_ModellingFigures



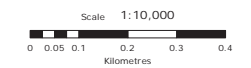
LEGEND

● Municipal Wells

Intrinsic Vulnerability Score

■ 10
 ■ 8
 ■ 6

**Figure 5-10
 Intrinsic Vulnerability**



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

PROJECT No. 09-205

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 Lansdowne WHPA & Tier 2 WB Study**

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