

Quantifying Exposure to Air Pollution – Preliminary Investigations





For Lease
09 358
• Quality premises
• Quality location
• High quality
• High quality

BFY741



51

Er
M
-

Time = 12:00



Time = 13:30





Time = 15:00

Time = 17:00
Experiment aborted.
Animals revived!

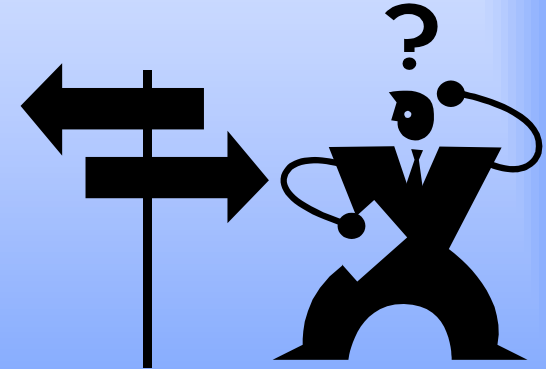
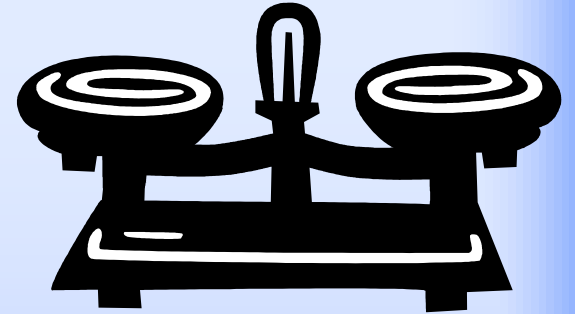


Yeah right.®



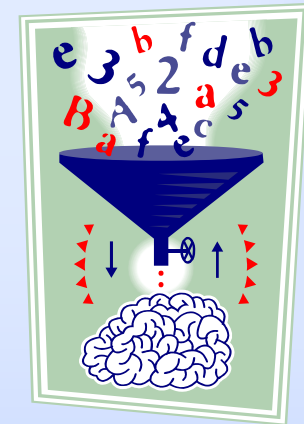
Quantifying Exposure - Case Study 1

- Weighted
- Risk-Element
- Decision
- Matrix



WREDM: A Basic Tool

- Semi – quantitative
- Input data – low requirements
- Specialist skills - none
- Provides a relative indicator of exposure to Air Pollution
- “*Back of the envelope*”





Exposure Assessment



Risk Elements

■ Palmerston North

- ◆ 62,000 people – 1,500 people/km²
- ◆ 17 kg/km²/day PM₁₀
- ◆ 35% >2 m/s

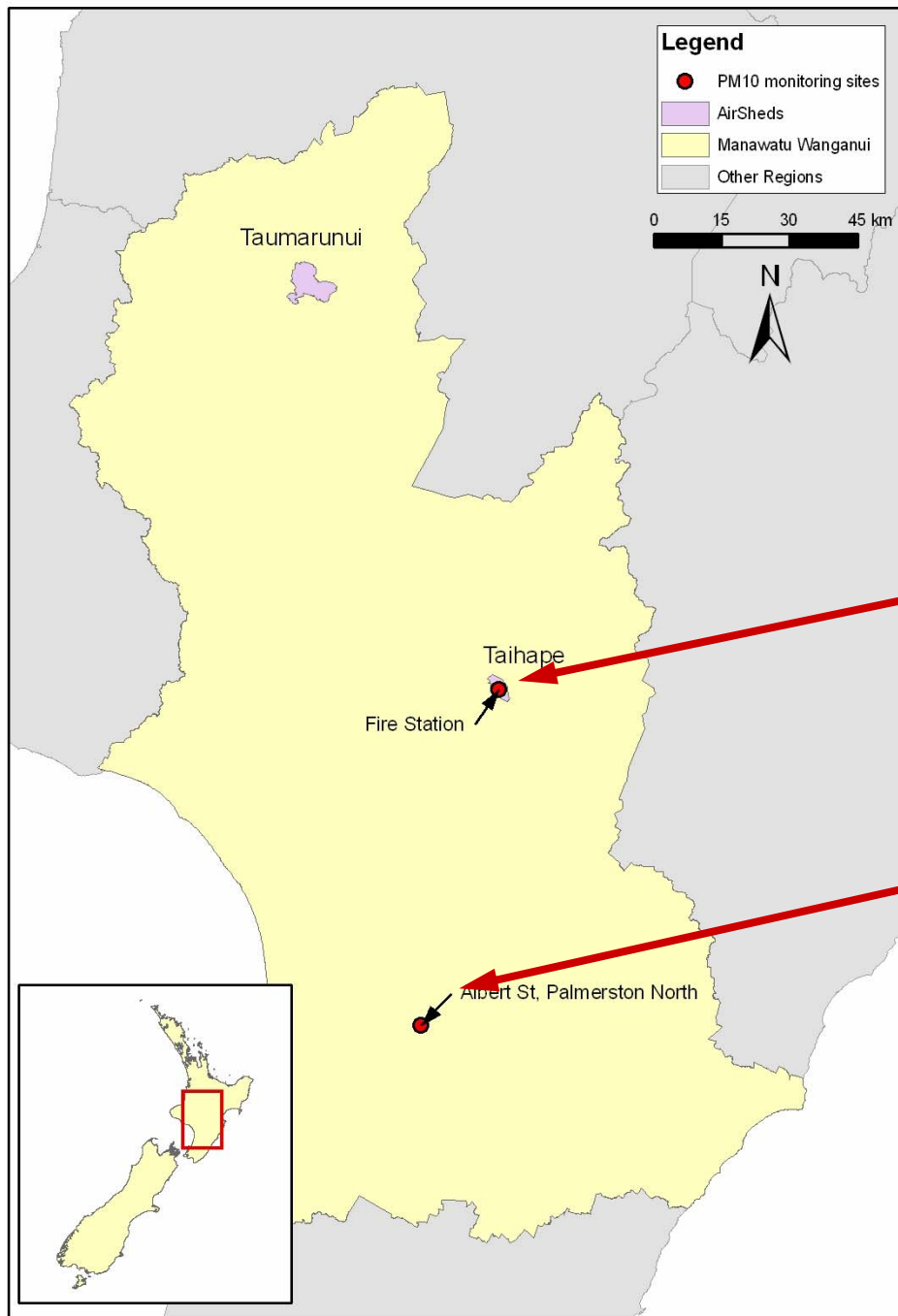
■ Taumaranui

- ◆ 4,000 people – 400 people/km²
- ◆ 5.5 kg/day PM₁₀
- ◆ 52% >2m/s



Weighting

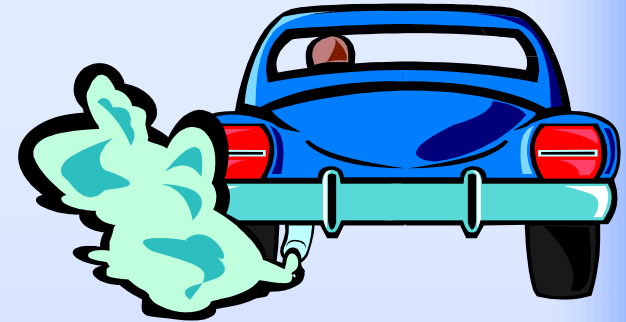
Town	Population score (/33)	Emission density (/33)	Wind- speed (/34)	Total (100)
Palmerston North	33	16	22	71
Wanganui	16	33	18	67
Taumararui	2	5	33	40
Taihape	1	4	34	39



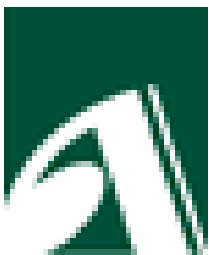
Taihape

**Palmerston
North**

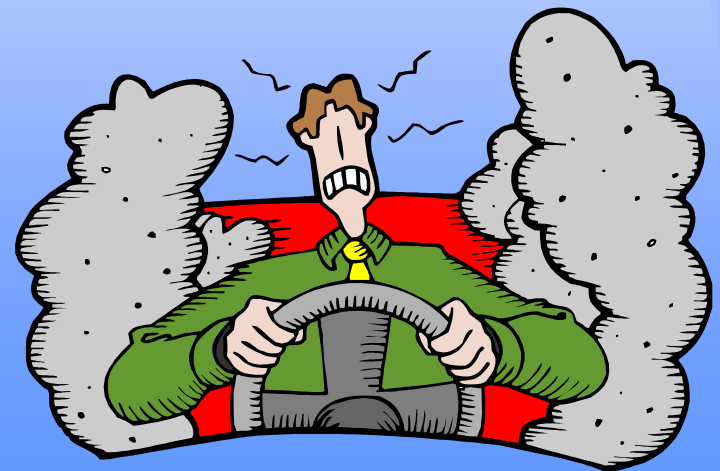
Quantifying Exposure - Case Study 2

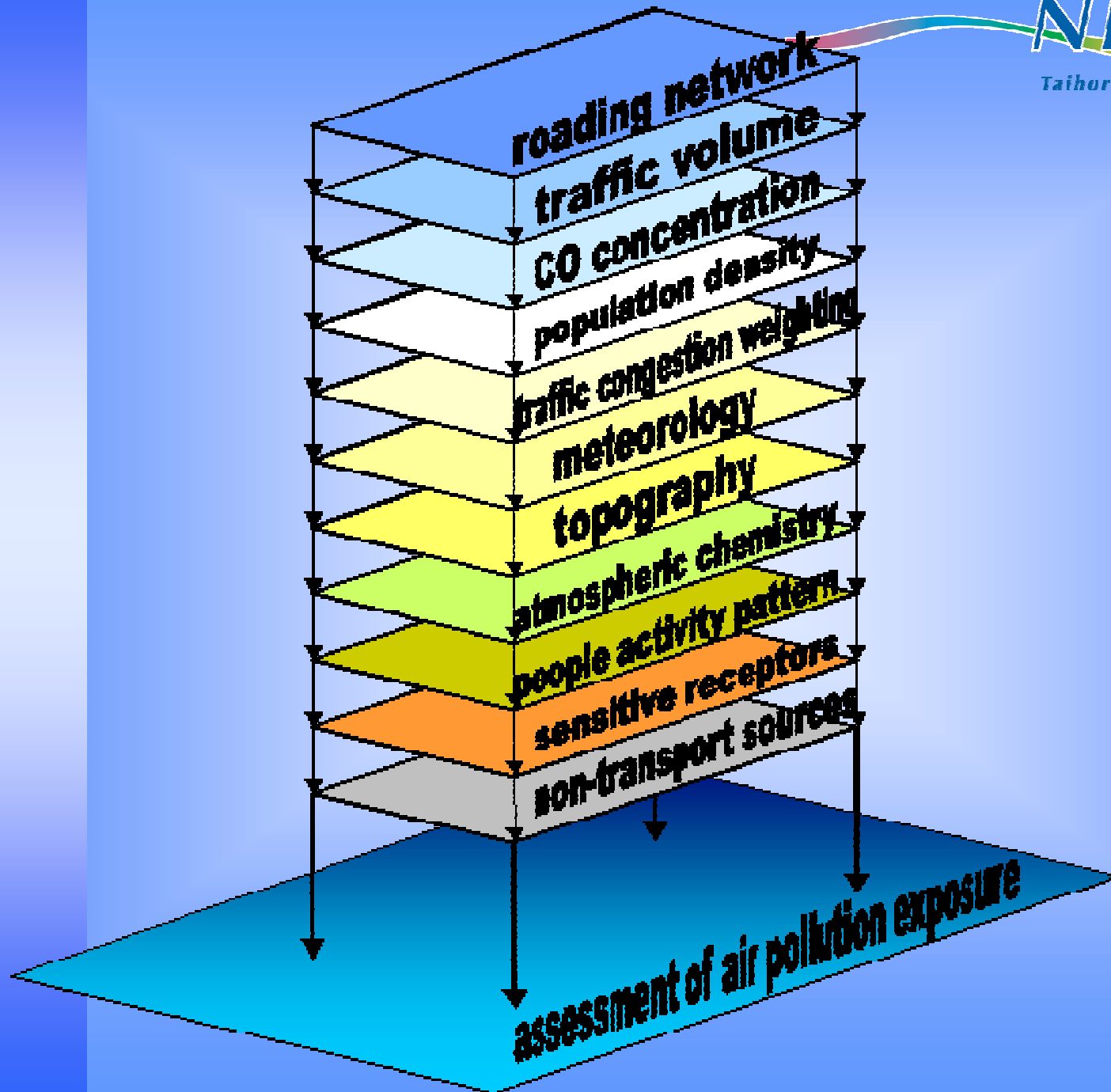


- **Composite Mapping for Environmental Exposure Analysis**
 - ◆ *Air Pollution from Motor Vehicles in Auckland*



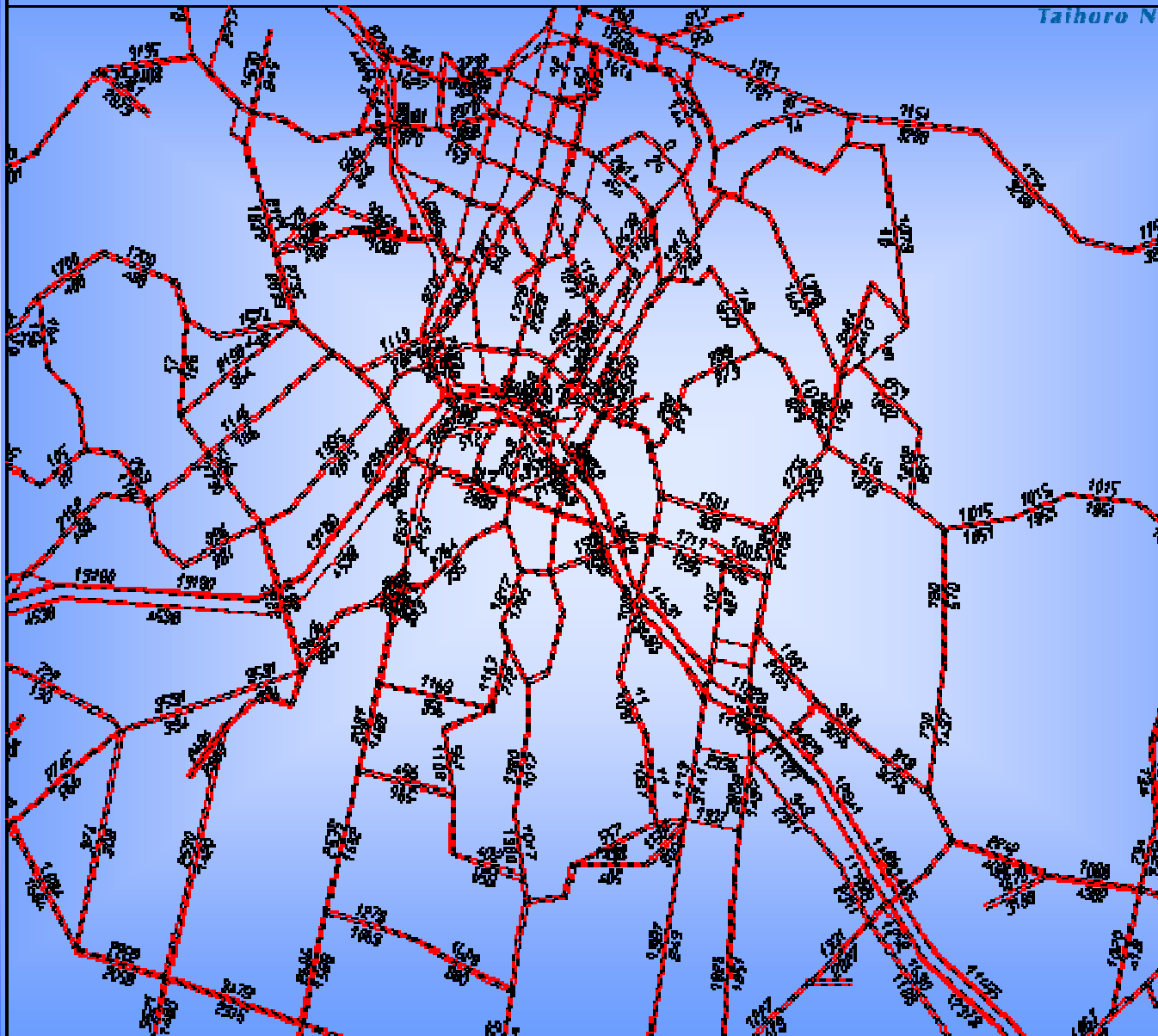
Auckland
Regional Council
TE RAUHITANGA TAIAO



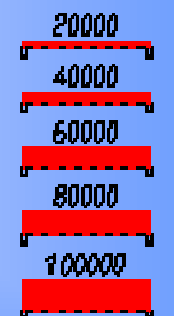




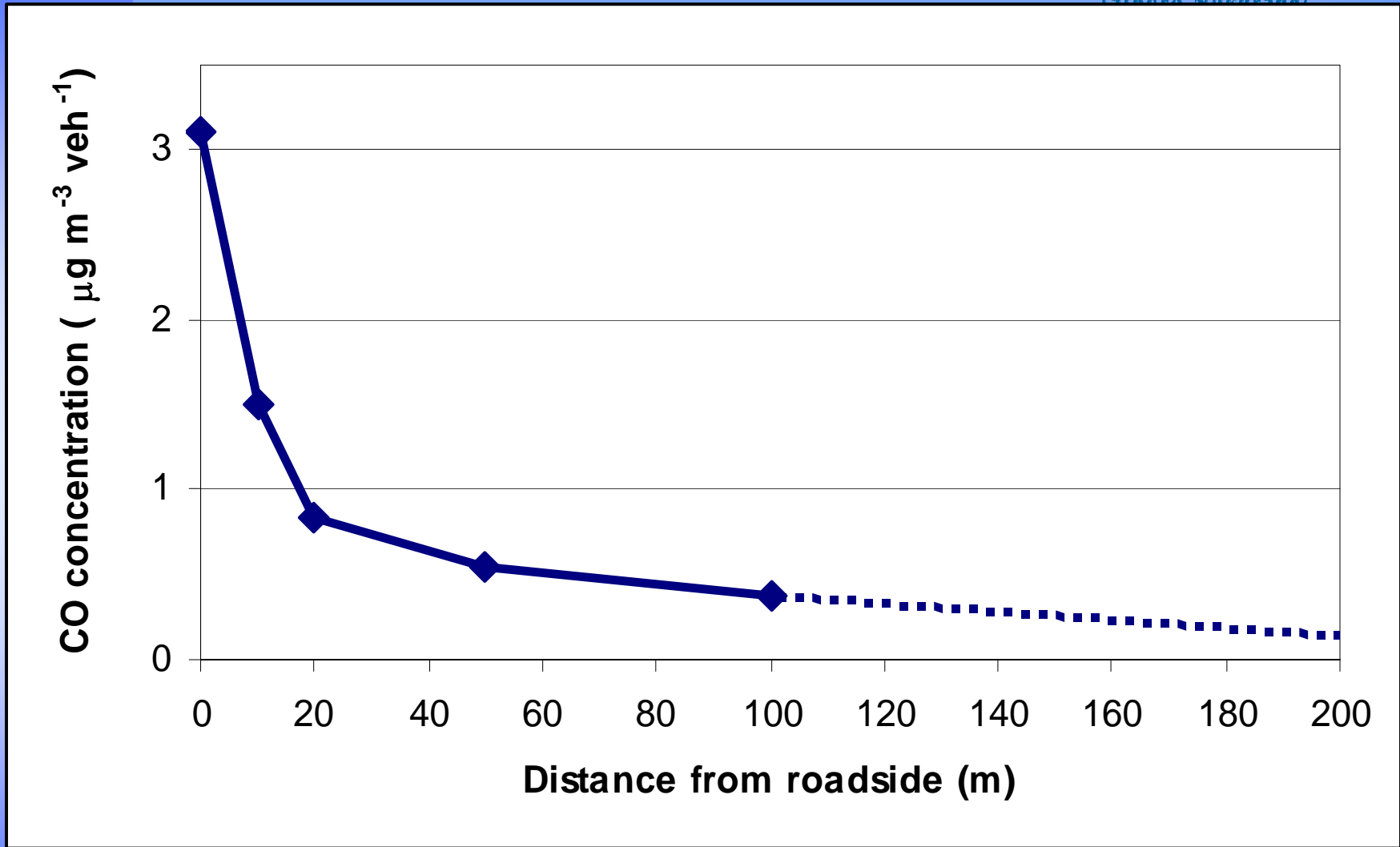




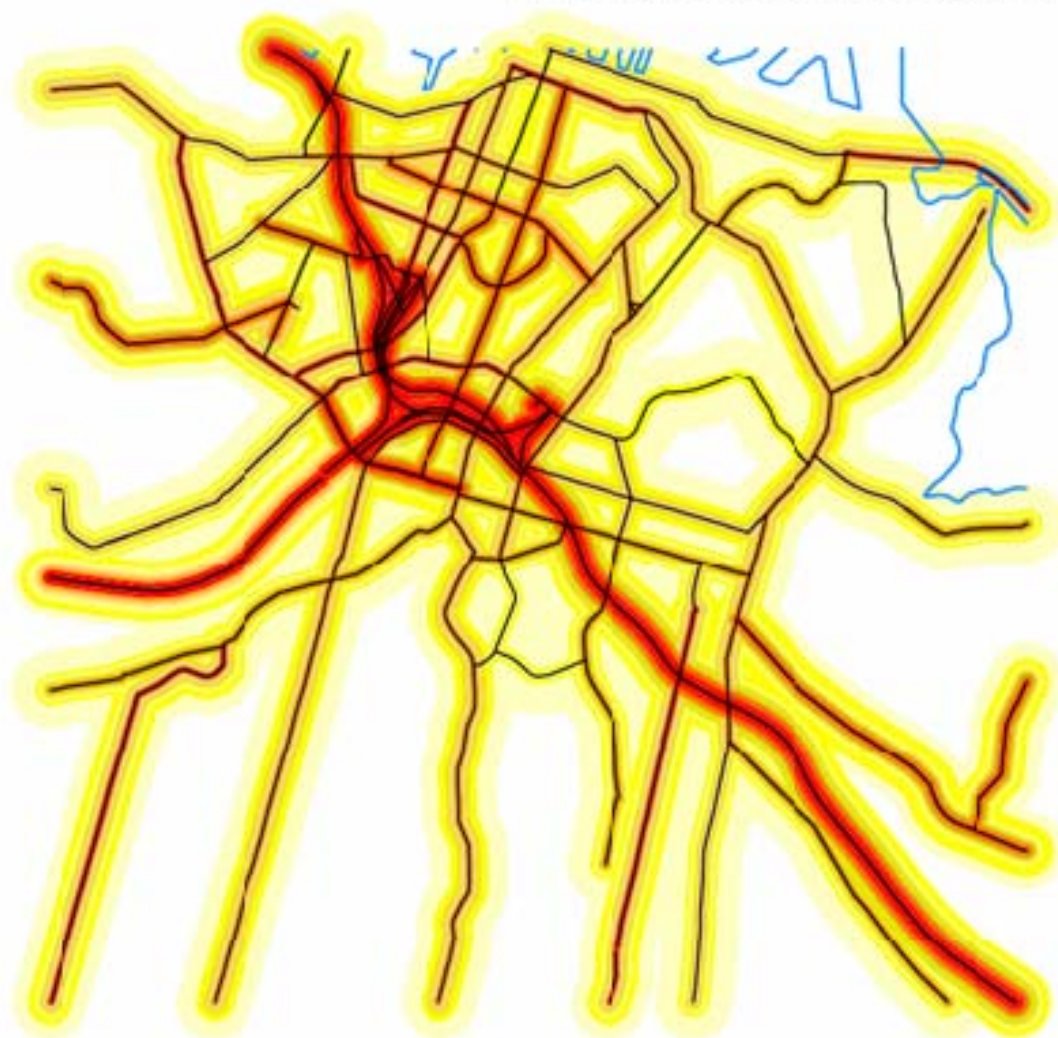
SCALE: 5914.5



WINDOW N:
664467 / 477774
671168 / 482801



CO Concentrations generated by Vehicles, Central Auckland City (Urban) during Peak Morning Traffic

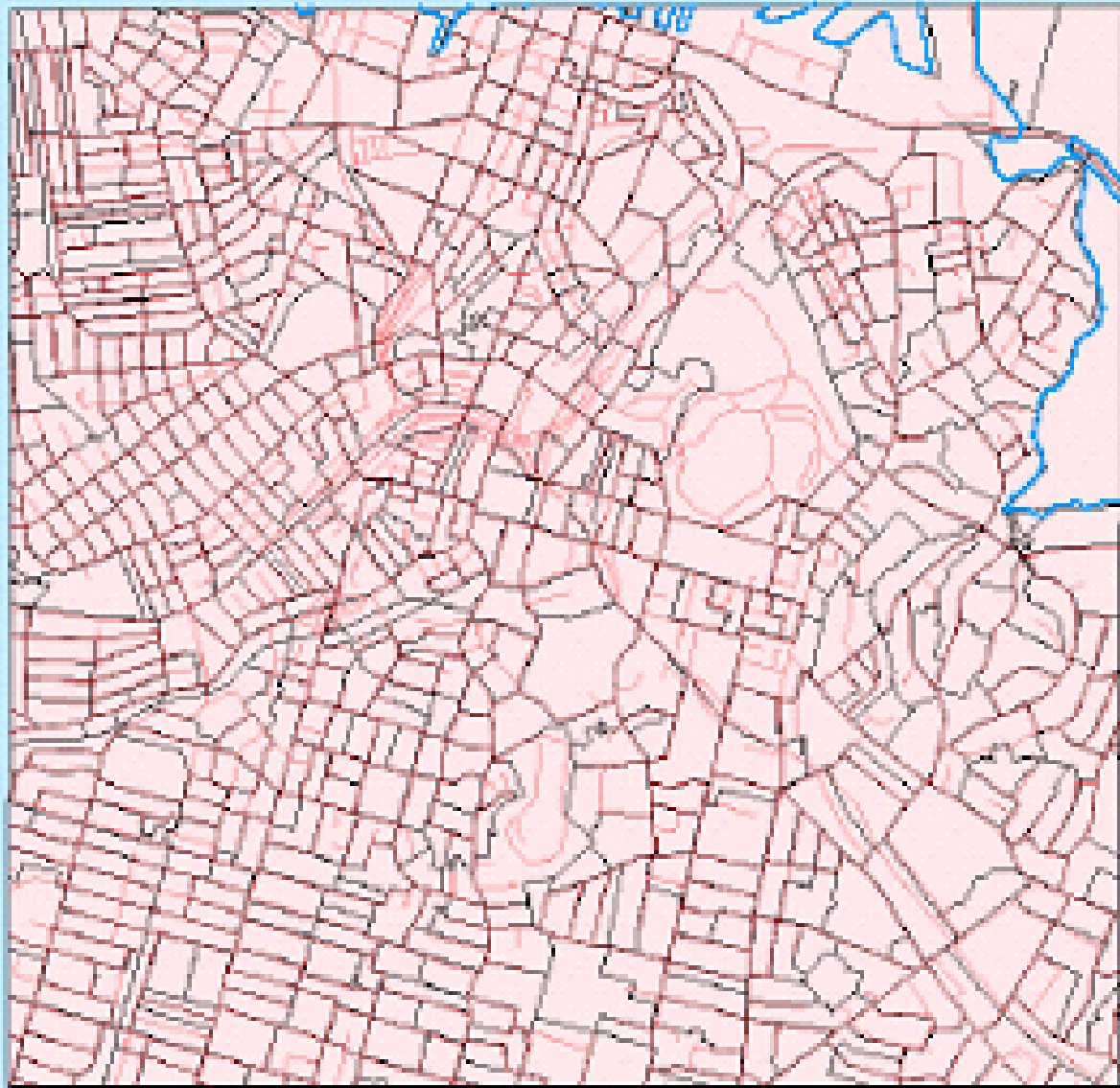


Legend

- Roads
- Coastline
- Vehicle Flow Morning Peak 7001-15000
- Vehicle Flow Morning Peak 4501-7000
- Vehicle Flow Morning Peak 2501-4500
- Vehicle Flow Morning Peak 2001-2500
- Vehicle Flow Morning Peak 1501-2000
- Vehicle Flow Morning Peak 1001-1500
- Vehicle Flow Morning Peak 501-1000
- Vehicle Flow Morning Peak 301-500
- Vehicle Flow Morning Peak 101-300
- Vehicle Flow Morning Peak 0-100

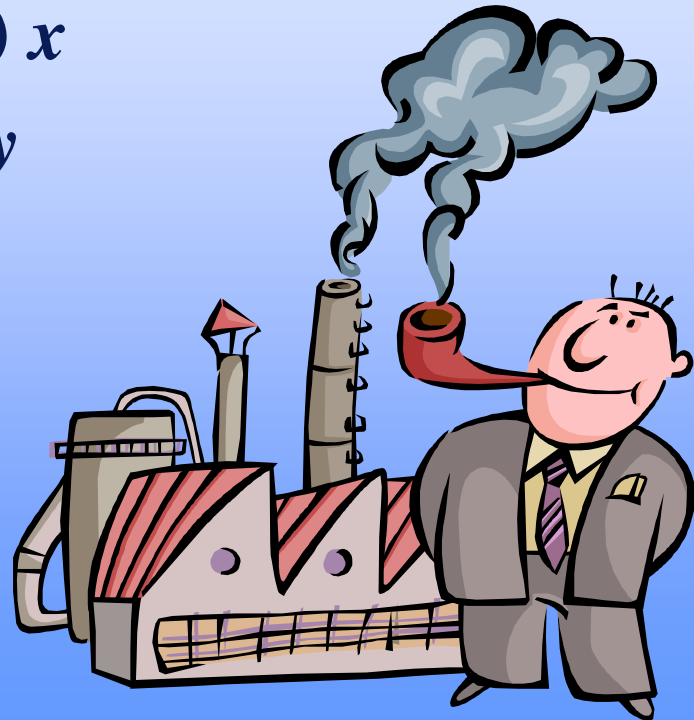


0 430 860 1,720 Meters

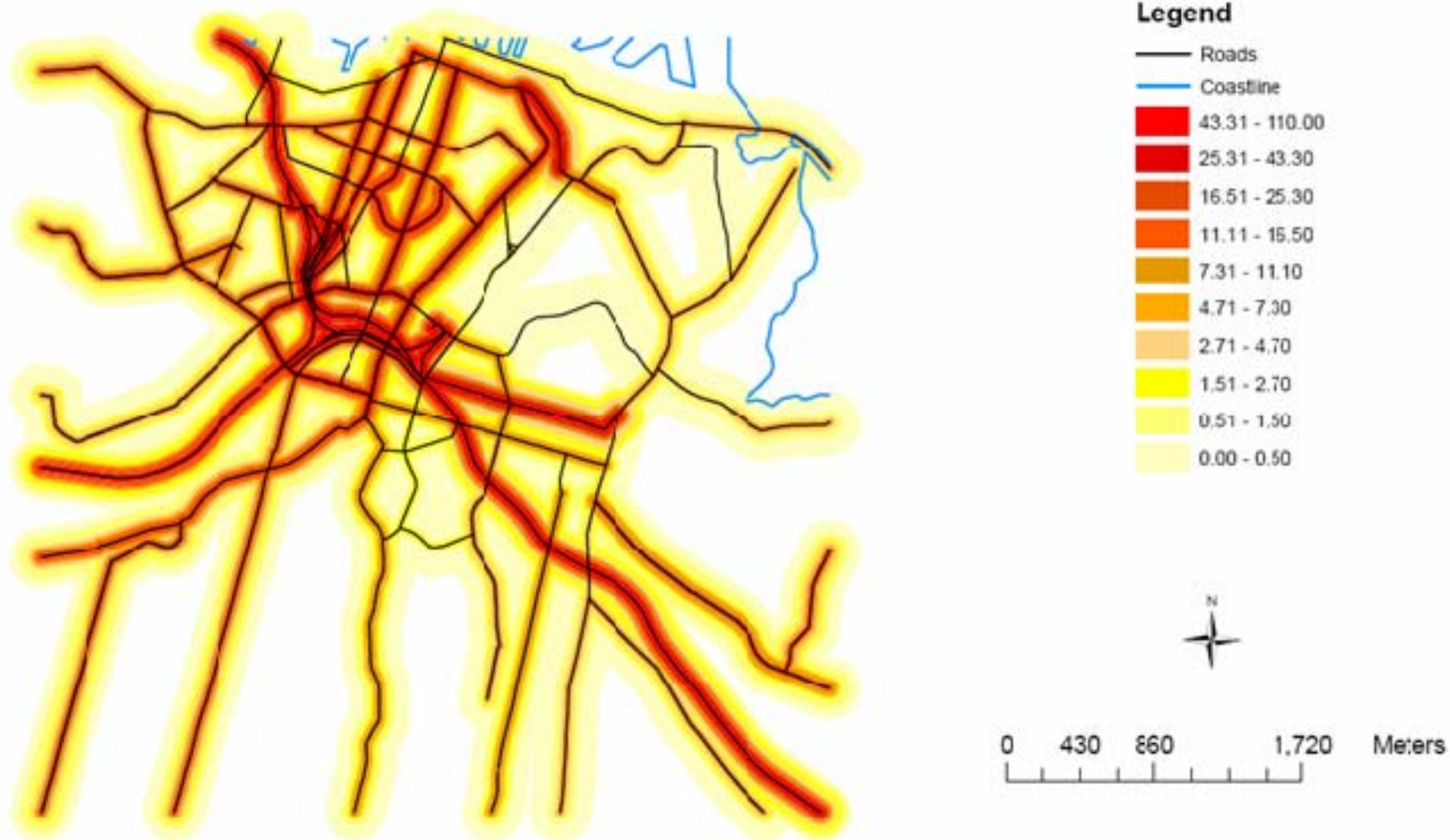


Air Pollution Exposure Index (APEI)

- *Air Pollution Exposure Index (APEI) =*
 - ◆ *Vehicle flow x*
 - ◆ *Effect (CO curve) x*
 - ◆ *Population density*



APEI of CO Concentrations generated by Vehicles, Central Auckland City (Urban) during Peak Morning Traffic





Massey West

Lincoln

Te Atatu Peninsula

Te Atatu South

Harbour View

Waiwatu Bay

Henderson Creek

The Concourse Strand

Daytona Strand

Central Park

Central Park

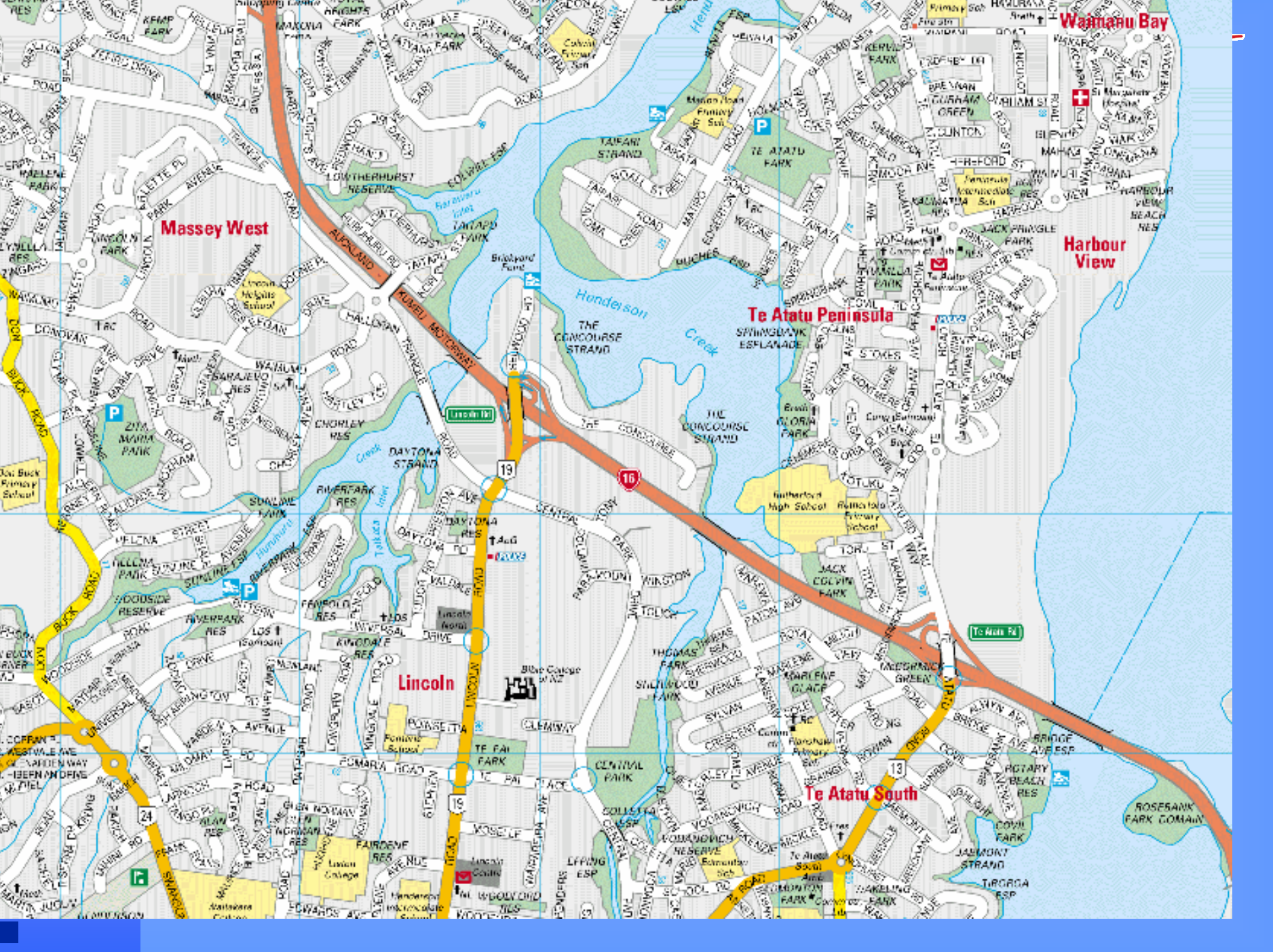
Central Park

Central Park

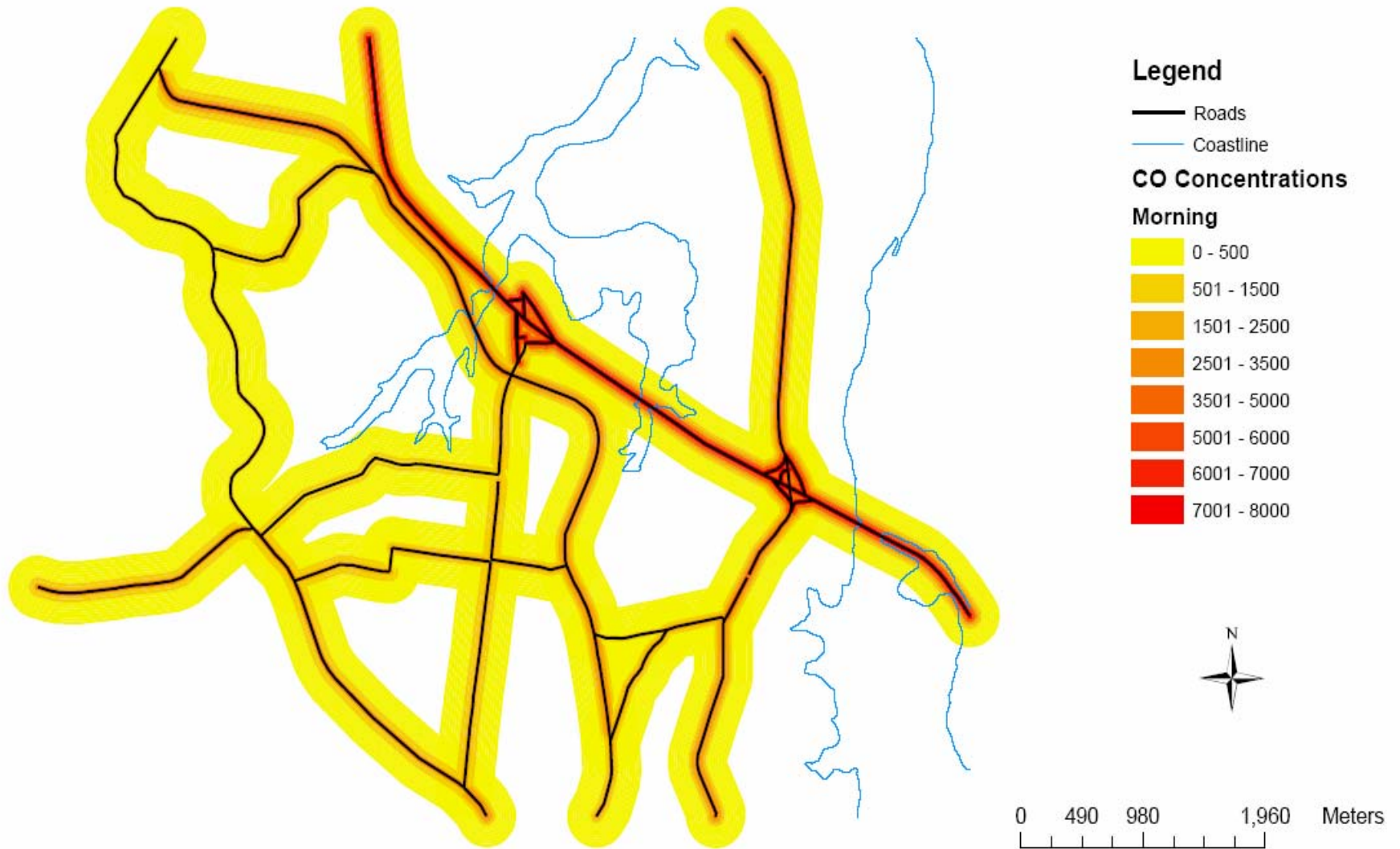
Central Park

Central Park

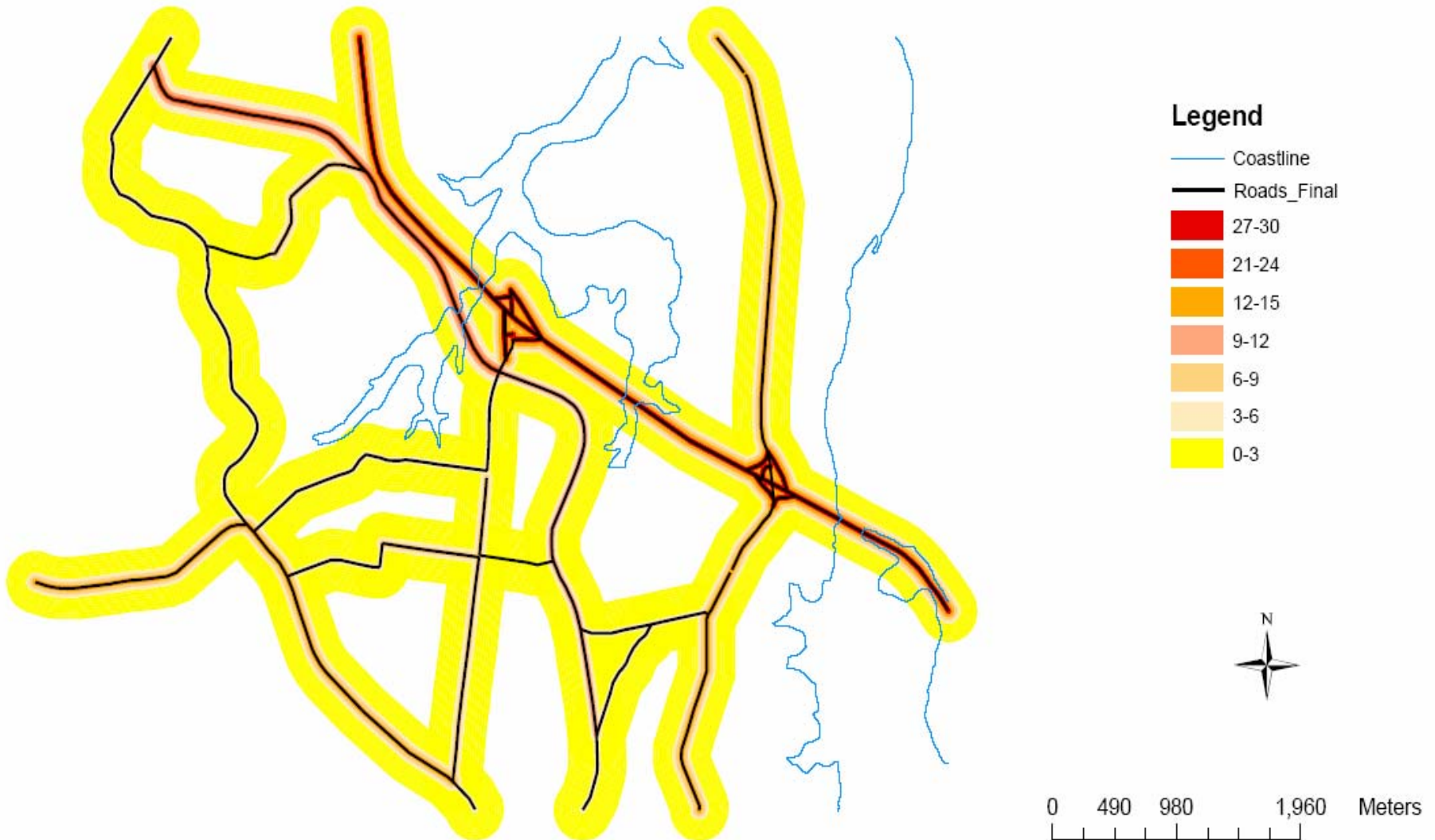
Central Park



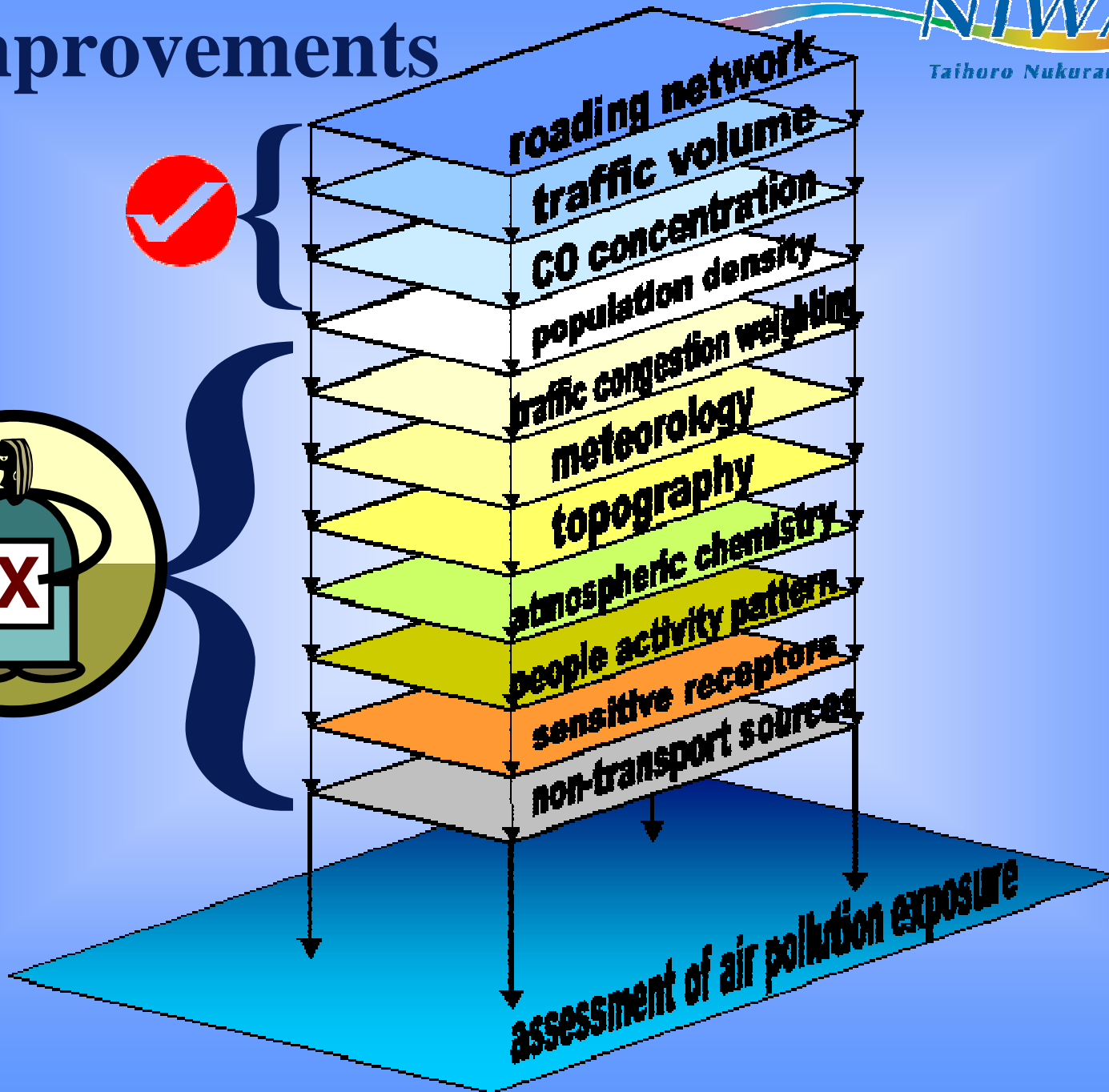
CO Concentrations generated by Vehicles, Auckland (Suburban) during Peak Morning Traffic



APEI of CO Concentrations generated by Vehicles, Auckland (Suburban) during Peak Morning Traffic



Improvements



Preliminary Investigations into Quantifying Exposure to Air Pollution

NIWA
Tahiro Nukurangi



- Stuffed Animals
- WREDM
- Composite Mapping – ARC
- Employ a more comprehensive method (other presentations)
- NIWA secret Experiments – The Green Machine

