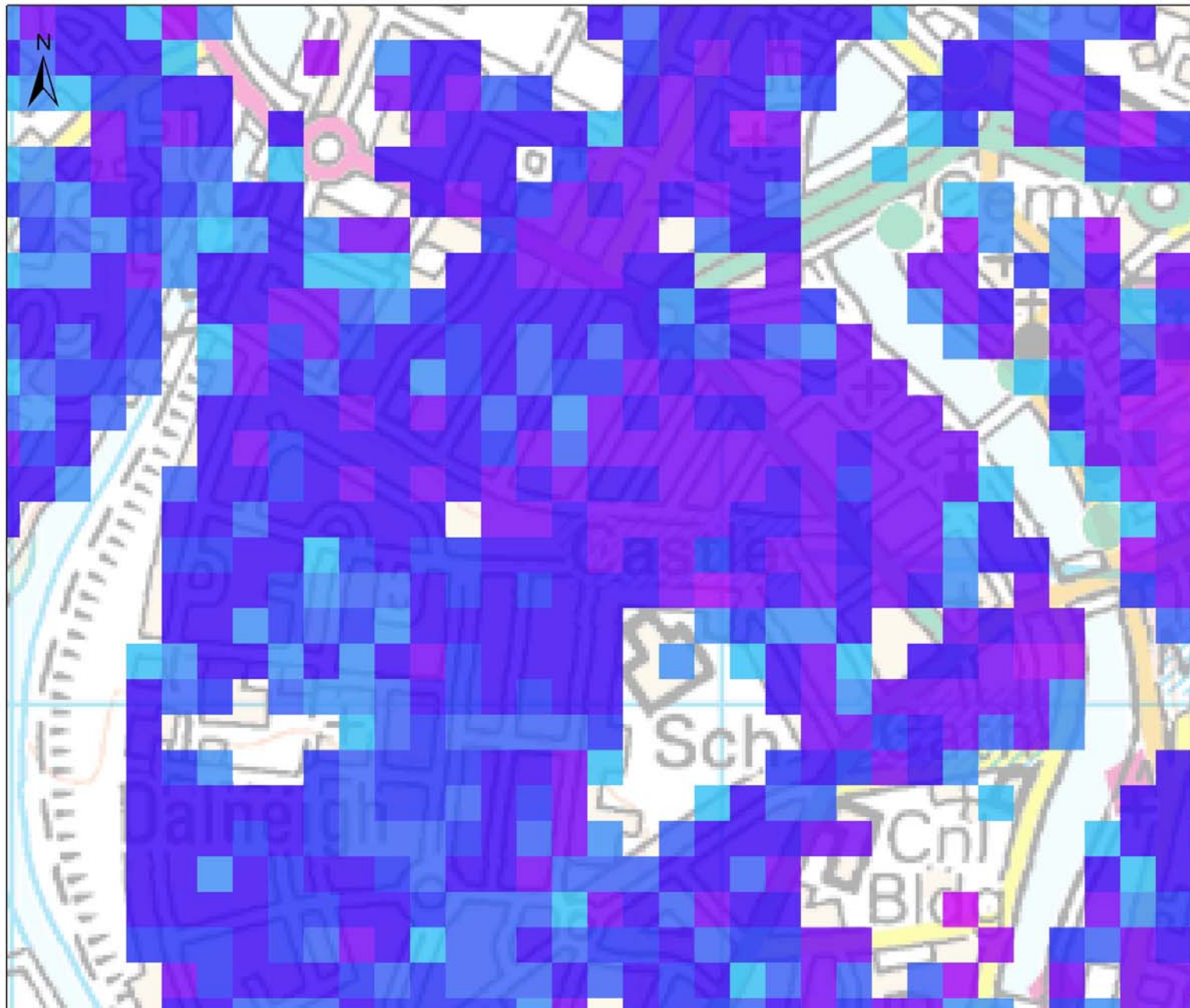


Methodology – Calculating Heat Demand

The methodology was designed with the following factors in mind:

- Spatial accuracy
- Repeatability across Scottish LA's
- Access to data
- Consistency
- Ability to be updated

The Heat Demand Model is based upon assigning an **energy value** to **every address** with a **potential demand** for **heat** within the Highland Council area



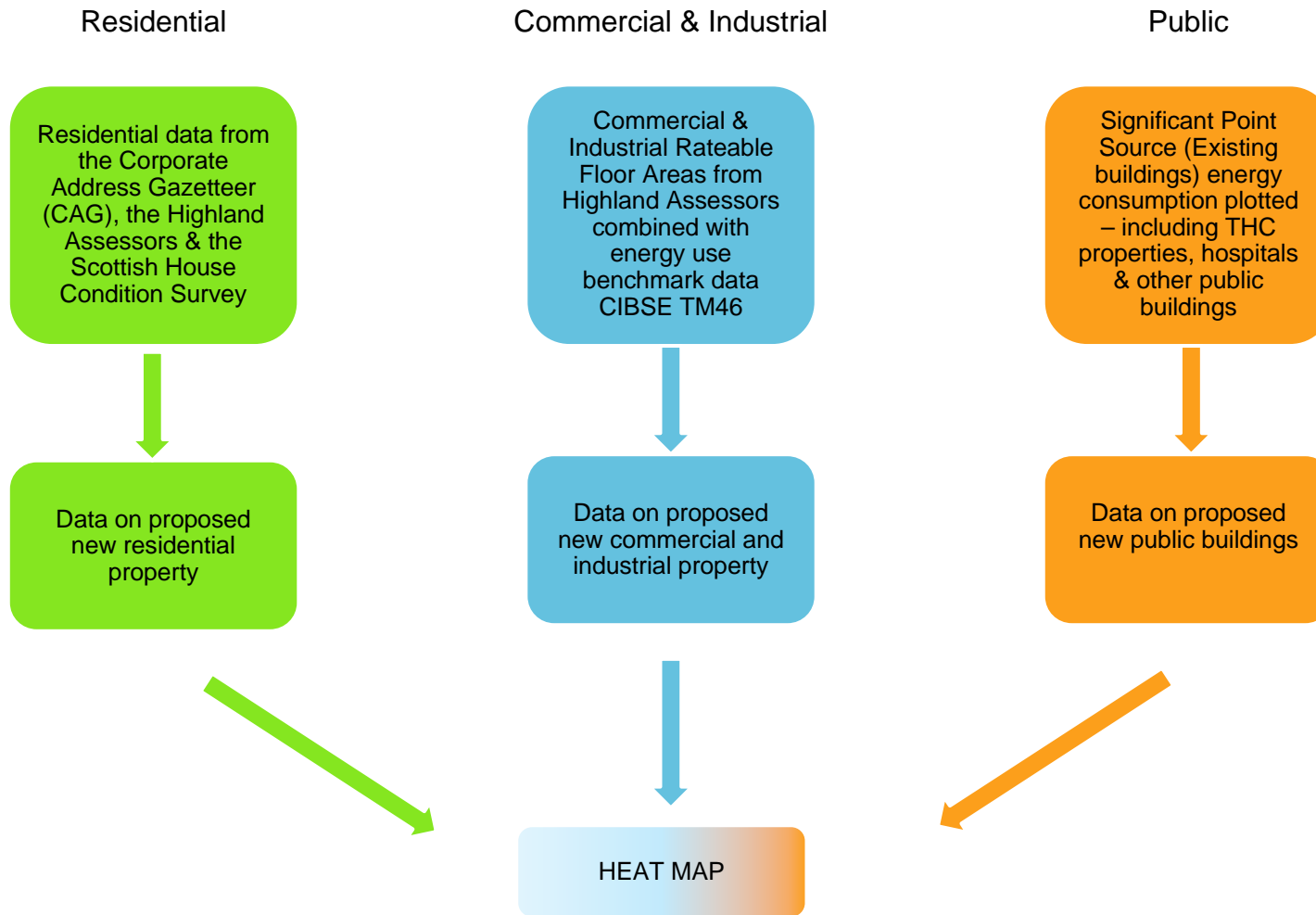
Highland Heat Mapping

Address Points
Heat Demand - 50m resolution

Legend

Scale: 1: 15,000
0 0.0375 0.075 0.15Km

Heat Demand Methodology



Heat Map - Data Sources

Heat Demand	Potential Heat Supply	Skills & Technology	Opportunities & Constraints
<p>Corporate Address Gazetteer (CAG) The Highland Council</p> <p>Assessors data The Highland Assessor</p> <p>Public buildings energy consumption The Highland Council</p> <p>Hospitals NHS Highland</p> <p>Energy benchmarks Chartered Institution of Building Services Engineers (CIBSE)</p> <p>Scottish Household Condition Survey Scottish Government</p>	<p>Fossil fuel suppliers yell</p> <p>Woodfuel suppliers Usewoodfuelscotland</p> <p>Existing District Heating networks</p> <p>Gas network Scotia Gas</p> <p>Existing industrial heat production SPRI</p> <p>Existing landfill sites SPRI</p>	<p>Suppliers Microgeneration Certification Scheme</p> <p>Education</p>	<p>Designations SNH</p> <p>Flood Risk SEPA</p> <p>Highland Forest and Woodland Strategy The Highland Council</p> <p>Expansion/regeneration opportunities The Highland Council</p> <p>Planning applications The Highland Council</p>



Heat Demand – Key Issue & Solution

Key dataset

Highland Assessors data

Advantages

Provides good quality information about:

- property type
- property age
- internal floor area

Disadvantages

- Data completeness
- Data currency

Solution

- Use of weighted averages
- Future planned updates



Heat Demand Model

Scottish House Condition Survey (2009)

The SHCS has been used to predict a range of heat energy predictions for different types and ages of property. The data in SHCS indicate the following energy intensities (kWh/m²/yr for space and water heating) for the 20 different categories:

	Pre 1919	1919- 1944	1945- 1964	1965- 1982	Post 1983
Detached	594	627	505	404	276
Semi	456	350	305	249	181
Terrace	349	251	249	204	149
Flats	268	203	156	129	106

Heat Demand Model - Predictions

Scottish House Condition Survey (2009)

The Heat Map can also be used to predict the impact of development on future heat demand in an area. We have taken the basic philosophy that users can input their own values based on the timing and design of the development.

Otherwise default values can be calculated for **residential** development using the following figures:

2011 – 2016: 65 kWh/m² per annum

2017 onwards:

Flats and Terraces – 39 kWh/m² per annum

Detached & Semi-detached – 46 kWh/ m² per annum

For non-domestic properties, values would be calculated as a % of the CIBSE benchmark figures:

2011 – 2016: 70% reduction (e.g. restaurant 111 kWh/m² from 370 kWh/m²)

2017 onwards: 95% reduction

Results

The base data used for the map is the CAG. For the Highland Council area this provided a total of 142,730 CAG records. Each record was then assigned a heat demand value. The method for assigning this value is broken down below:

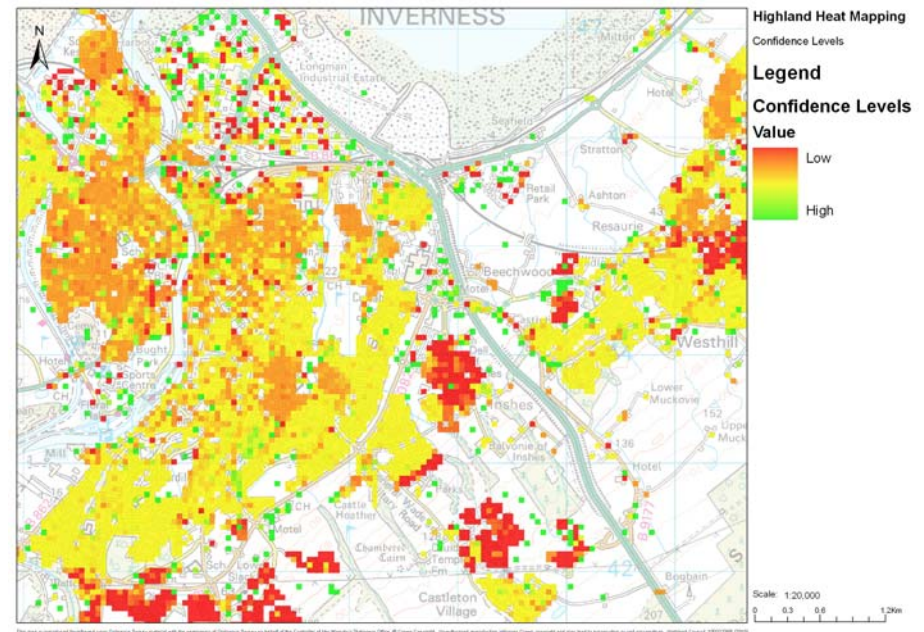
- 93296 Assessors records – demand predicted using floor area, age and property type
- 788 HC properties – actual energy consumption used
- 18 NHS properties
- 5661 benchmarked properties – using floor areas derived from Assessors data or MasterMap footprints
- 11506 CAG records without energy demand
- 136 records – unquantifiable demand
- 212 records – possible heat supply and/or demand

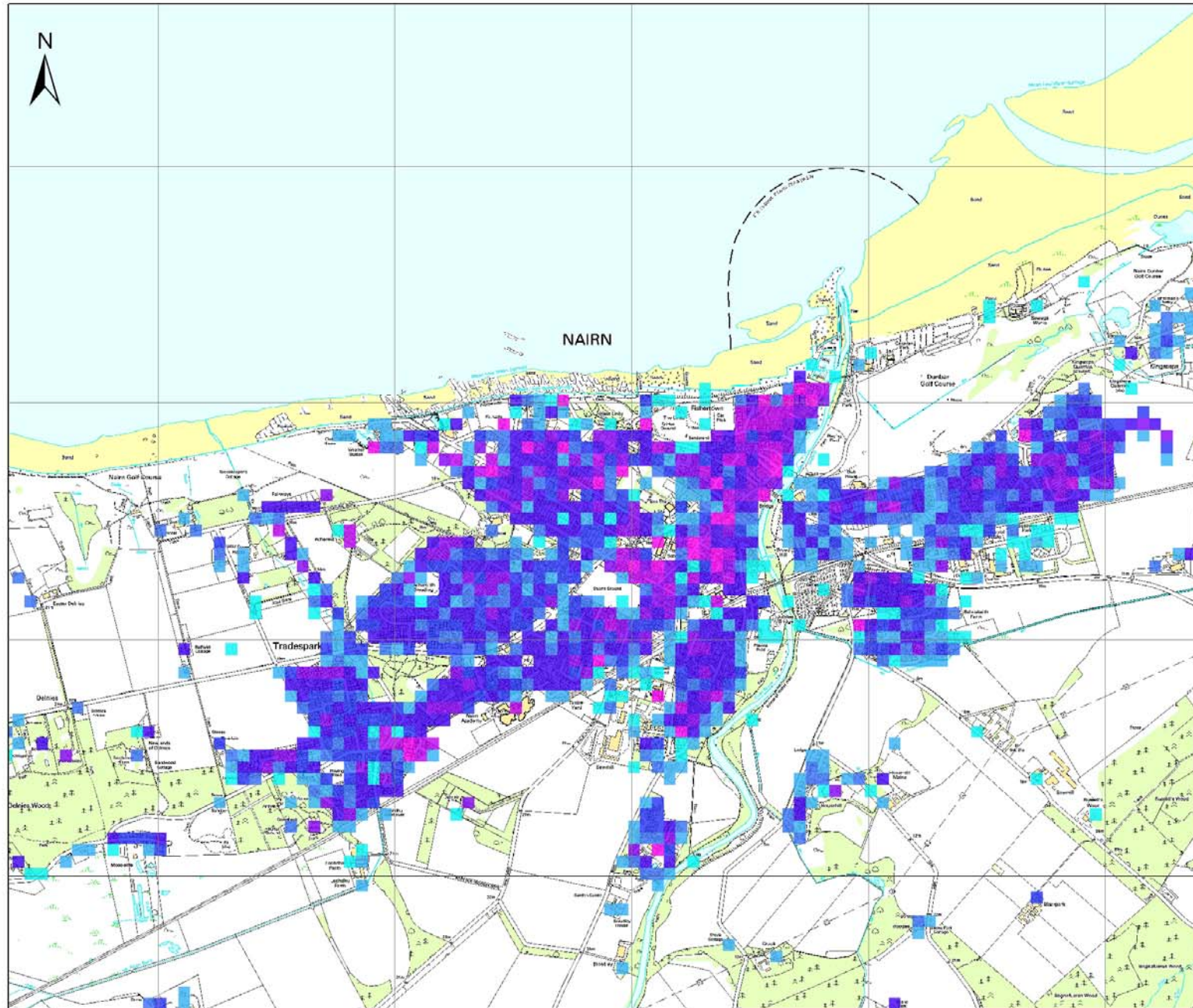
Confidence Levels

During the development of the Heat Map it was clear that some information was more reliable than others.

A confidence layer was developed to allow users to understand the degree of accuracy associated with different locations on the map.

The confidence levels will improve over time as new and updated information is added to the map





Highland Heat Mapping

Pilot Area - Nairn
Heat Demand - 50m resolution

Legend

kW/km²

Light Blue	0 - 1,500
Blue	1,500 - 3,000
Dark Blue	3,000 - 4,500
Indigo	4,500 - 6,000
Violet	6,000 - 10,000
Dark Purple	10,000 - 15,000
Magenta	15,000 - 20,000
Dark Magenta	> 20,000

Scale: 1: 15,000
0 0.1 0.2 0.4Km

This map is reproduced from/based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highland Council, 100023369 (2010)



Highland Heat Mapping

Pilot Area - Nairn
Heat Demand - 50m resolution

Legend

- Nairn Properties
- kW/km²**
- 0 - 1,500
- 1,500 - 3,000
- 3,000 - 4,500
- 4,500 - 6,000
- 6,000 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- > 20,000

Scale: 1: 15,000
0 0.010.02 0.04Km

This map is reproduced from/based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highland Council, 100023369 (2010)

