2.1 Building Footprints using Google Open Buildings

2.1.1 Stepwise Process Flow Details

- Step 1: Access the Data Source

  - o Start by visiting the Google Open Buildings website at https://sites.research.google/open-buildings/
  - o Here you'll find all necessary resources, tools, and information about the building database you'll be working with.

- Step 2: Define your Study Area

  - o Next, define the region of interest for which you want to extract building data. To do this, visit the polygon selection website at https://arthur-e.github.io/Wicket/sandbox-gmaps3.html
  - o Use the "Draw a shape tool" to draw your study area, and then copy the resulting code that defines this polygon.

  - Step 3: Use the Colab Python Notebook Script

    - o Now, open the Colab Python Notebook script at open_buildings_spatial_analysis_examples.ipynb - Colaboratory (google.com)
    - o Paste the code of your study area (from Step 2) into the designated area in the Colab notebook. After that, run the script. This will initiate the process of extracting data for buildings located within your selected area.

- Step 4: Authenticate your Google Drive

  o The script requires access to your Google Drive to store the resulting data. Follow the prompts of the script to authenticate your Google Drive. This will typically involve clicking on a link, signing into your Google account, and then copying and pasting an authentication code back into the script.

- Step 5: Extract and Save the Building Data

  o Upon successful authentication, the script will then proceed to extract the building data and save it into your Google Drive in a CSV (comma-separated values) format.

  - Step 6: Download and Load the Data into QGIS

    o Next, go to your Google Drive, find the saved CSV file, and download it onto your computer. Then, open your QGIS software, and load the CSV file into it.

- Step 7: Validate the Data

  o To ensure the data is accurate and up to date, overlay the building boundaries onto the latest Google imagery available in QGIS. Check each building and make sure they are correctly represented. If there are any missing buildings, you can add them manually.

  - Step 8: Export the Data

    o After validation, you can now prepare your data for further use. Export the building data as a shapefile, which is a common format used for geospatial vector data.

- Step 9: Clip the Data to your Study Area

  o The last step is to clip the data to your defined study area. Select "Vector" > "Geoprocessing Tools" > "Clip" from the top menu. Select the Input layer as the building data shapefile and the Overlay layer as your study area boundary. This will remove any buildings that fall outside of your region of interest, resulting in a clean and concise dataset that only includes the buildings you are interested in.
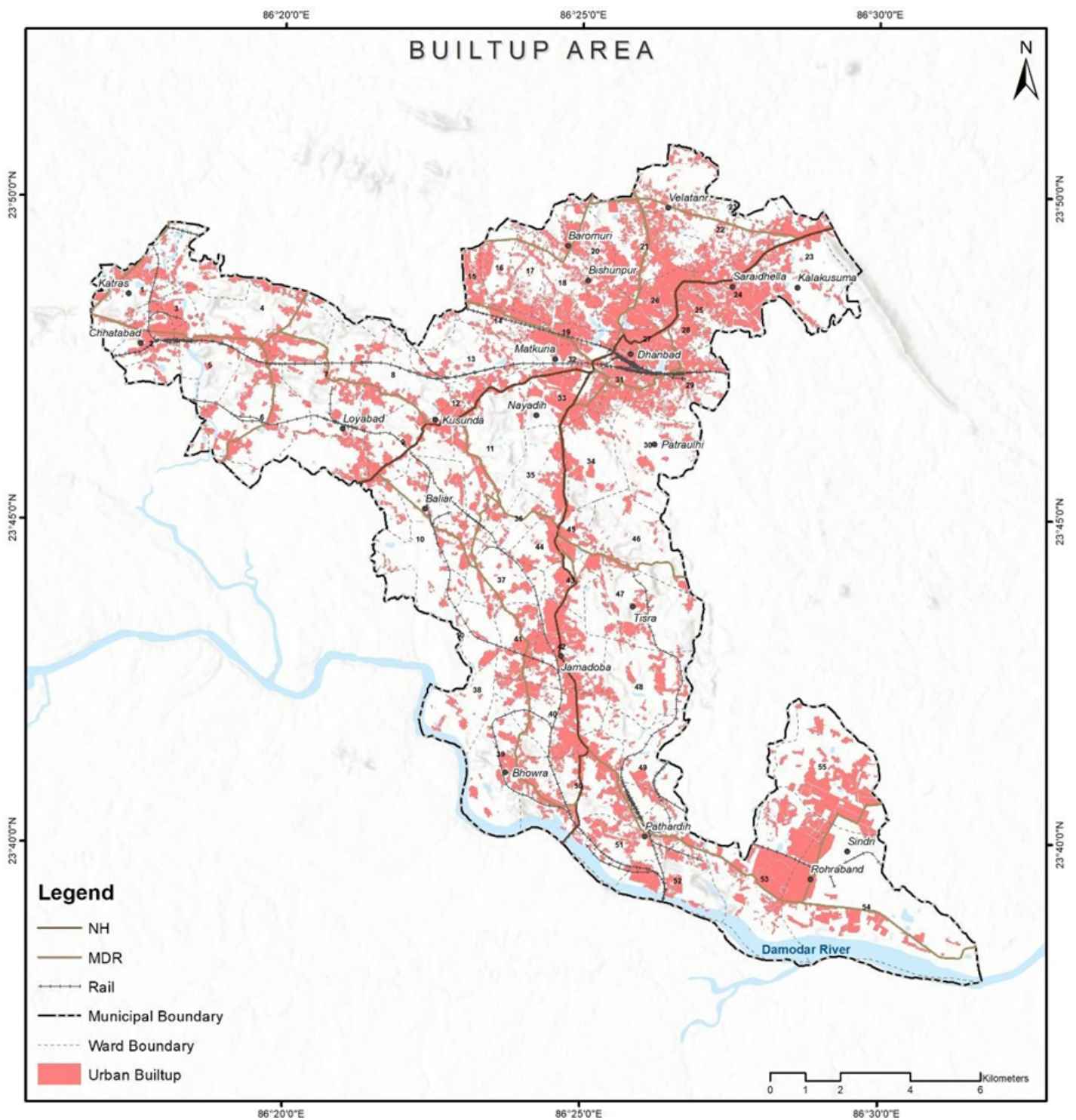
2.1.2   Output Illustrations

Figure 3 Illustrations of built-up extractions, Dhanbad (India). Source – Dhanbad spatial analysis, Innpact Solutions and GWSC