

Data Input	Description	Model Component	Data Available (Y/N)?	Dataset(s) identified	Known/potential risk(s) identified	Alternative dataset(s) - if required	Comment
Terrain (breaklines)	Polyline features which can be used to represent terrain elevations which vary along the line	Propagation model	Y	Enhanced DTM	None	OSNI Fusion layers (e.g. transportcasing)	Enhanced DTM breaklines may not be suitable by themselves. OSNI Fusion contains vector layers which could supplement the Enhanced DTM.
Terrain (equal height contours)	Polyline features which can be used to represent a single terrain elevation per line	Propagation model	Y	OSNI Open Data 10m Digital Terrain Model (DTM)	Possible elevation mismatch with Enhanced DTM		10m DTM raster can be used to generate equal height contours. Need to check that elevations will match with Enhanced DTM breaklines
Terrain (Spot heights)	Point features which can be used to represent heights at specific points	Propagation model	Y	OSNI Open Data 10m Digital Terrain Model (DTM)	Possible elevation mismatch with Enhanced DTM		10m DTM raster can be used to generate spot heights. Need to check that elevations will match with Enhanced DTM breaklines
Bridges	Polygon features representing bridge decks	Propagation model	Y	OSNI Fusion STRUCTUREPOLYGON			STRUCTUREPOLYGON layer includes polygon features representing bridge deck
Barriers	Polyline features which can be used to represent walls or purpose-built noise barriers which would be expected to reduce noise levels	Propagation model	Y	Round 1 noise barriers	Barrier dataset is old, therefore will need reviewing and checking still relevant		Will need to review R1 barriers, then supplement with additional barriers - to be digitised manually using street view/aerial imagery
Buildings	Polygon features representing building footprints, attributed with building heights, identified residential, hospital and school buildings and populations & no. of dwellings assigned to residential buildings	Propagation model	Y	OSNI Fusion BUILDINGS Census 2021 Data Zones and population statistics OSNI Pointer LiDAR DTM and DSM rasters	Data currency of DTM/DSM vs BUILDINGS may result in some building heights not able to be calculated - default building heights may need to be assumed for some buildings Robustness of OSNI Pointer linking with OSNI Fusion BUILDINGS unknown at this stage		LiDAR DTM/DSM used to calculate building height, OSNI Pointer used to determine building uses and number of dwellings, Census 2021 population statistics and Data Zones to estimate population per dwelling
Ground cover	Polygon features representing ground surfaces	Propagation model	Y	OSNI Fusion GROUNDCOVER	Does not provide full coverage required. Does not include road/rail carriageway/track	OSNI Fusion TRANSPORTCASING and CORINE ground cover	CORINE ground cover and OSNI Fusion TRANSPORTCASING can be used to supplement GROUNDCOVER layer and provide full coverage required
Meteorological inputs	Data providing required met parameter inputs	Propagation model	Y	METARs and Synoptic sites across Northern Ireland (13 sites identified)	Relatively small amount of met sites for whole country, but should be enough to derive suitable met profiles on a county basis		Looking at geographical spread of met sites and the data they contain, it ought to be possible to derive the required met parameters on a county basis
Façade receivers	Point features at building façades indicating the location at which the model will calculate noise levels	Propagation model	Y	OSNI Fusion BUILDINGS (used to generate façade receivers)	Miss-allocation of building uses may result in some façade receivers not being generated on correct buildings		Once residential/school/hospital buildings are identified, they can be extracted and used to generate façade receivers in accordance with CNOSSOS-EU methodology
Road centreline geometries	Polyline features representing the centre of road carriageways	Road source emission model	Y	OSNI Fusion ROADLINK	Level of road classification detail is too low to accurately apply traffic flow rules	OSM Highways centrelines	OSNI Fusion provides road centrelines across Northern Ireland. OSM Highways road classifications attribute can be joined with Fusion centrelines to improve detail
Road traffic flows	Annual average hourly road traffic flows for each reference period (day, evening, night) – split by vehicle category (as defined in CNOSSOS-EU:2020)	Road source emission model	Y	Permanent and Temporary traffic count sites and data	Small number of traffic count sites to accurately quantify traffic flows across NI	Statistical model developed by J.Gulliver and C.Jephcote to estimate traffic flows where data is lacking.	Annual average daily traffic (AADT) flows estimated by the statistical model on road centrelines are assigned hourly and vehicle category flow proportions from the nearest validated count site of the same road classification
Road traffic speeds	Annual average road traffic speed for each reference period (day, evening, night) – split by vehicle category	Road source emission model	Y	Permanent and Temporary traffic count sites and data	Small number of traffic count sites to accurately quantify traffic speeds across NI		Road centrelines are assigned hourly and vehicle category speeds from the nearest validated count site of the same road classification
Road surface	Dataset to indicate where different road surfaces are applied in NI	Road source emission model	N	N/A	May not be possible to determine road surface for all modelled roads, therefore increasing uncertainty in calculation of road source emission		Possibly will need to assume single road surface (which is confirmed as most prevalent road surface across Northern Ireland)
Road gradient	Defines the slope of the road	Road source emission model	Y	All terrain datasets (breaklines, equal height contours, spot heights)			Road gradient calculated in the model once centrelines have been draped
Road temperature	Defines the temperature of the road	Road source emission model	Y	METARs and Synoptic site data			Temp will be defined on county basis and used in the calculation of road source emission

Locations of roundabouts and junctions	Allows CNOSSOS-EU method to account for the effect on source emission of traffic slowing down/speeding up	Road source emission model	Y	OSM Traffic Signals OSNI Fusion ROADLINK layer	OSM traffic signals may not align precisely with OSNI Fusion ROADLINK crossings, resulting in slightly offset junction node locations		OSM Traffic Signals provides location of traffic lights (for identifying traffic lighted junctions), ROADLINK includes attribution for identifying roundabouts
Railway centreline geometries	Polyline features representing the centre of each railway line	Rail source emission model	Y	OSNI Fusion STRUCTURELINE layer	Includes single rail line per rail head which is too detailed for noise modelling purposes. Also includes gaps where there is interaction with other features (roads/bridges)	OSM rail centrelines	OSM rail centrelines considered preferable - topology more suited for modelling purposes and includes helpful attribution for identifying segments of rail in tunned or on bridge
Railway traffic flows	Annual average hourly rail traffic flows for each reference period (day, evening, night) – split by rail vehicle type	Rail source emission model	Y	Translink Timetables OSM Rail Stations			OSM rail station locations used to assign timing points on rail centrelines which align with timetable data
Railway traffic speeds	Annual average rail traffic speeds for each reference period (day, evening, night) – split by rail vehicle type	Rail source emission model	Y	Translink On-Train Monitoring Recorder (OTMR) Speed Trace Tables Translink IPD railway track centrelines	Speed traces represent only a single movement measurement per route. In reality there may be variations in speed across different movements throughout the year		
Railway vehicle parameters	Vehicle types described by braking system, wheel diameter, traction system	Rail source emission model	Y	N/A	Default CNOSSOS-EU parameter spectra used may not accurately representing condition of Translink rolling stock		
Railway track parameters	Track types described by track base, railhead roughness, rail pad type, and curvature	Rail source emission model	Y	N/A	Default CNOSSOS-EU parameter spectra used may not accurately representing condition of railway track		
Locations of rail crossings and switches	Allows CNOSSOS-EU method to account for the effect of impact noise on source emission as rail vehicles pass joints in the railway track	Rail source emission model	Y	OSM Railway Nodes			
Construction material of underline rail bridges	Allows CNOSSOS-EU method to account for the effect of additional noise radiation that occurs on steel bridges as rail vehicles pass	Rail source emission model	Y	Translink bridge dataset	Location data within bridge construction dataset may not align precisely with rail centreline bridge geometries and processing relies on matching the nearest one		
Location of industry sites	Point and polygon features representative of industrial site boundary containing permit information.	Industry source model	Y	Round 3 Industry Noise contours IPRI PPC Point and Boundary data OSNI Fusion BUILDINGS			
Sound power emission levels	Flat 1/1 Octave band spectra adjusted to sound power level of Round 3 sources.	Industry source model	Y	Emissions adopted from from Round 3 sources and WG-AEN Toolkit 10			
Operational hours	Site operational hours informed by a manual review of publicly available information.	Industry source model	N		Risk of outputting noise levels from industry source during period where in reality it does not operate	Web searches to seek online information on operational hours	Where operational hours cannot be determined, 24-hour operation will be assumed.
Aircraft movement data	Datasets providing information on the number of aircraft movement specifying on aircraft type, runway, arrival/departure, date and time, flight number and destination/origin airport.	Aviation model	Y	Belfast international Airport - Operational logs from airport, AODB report showing all flight movements for 2021; George Best Belfast City Airport - Movements data extracted from EEPS logs			
Noise records from monitoring terminals	Logs containing the associated noise metrics for the recorded noise events	Aviation model	N		Cannot validate model without noise monitoring terminal data		
Locations of monitoring terminals	Data specifying the coordinates of the noise monitoring terminals	Aviation model	N		As above		

Meteorological data	Data providing required met parameter inputs	Aviation model	Y	Belfast international Airport - Met data provided from Stations Intersection, Apron and Bravo; George Best Belfast City Airport - Wind data from the Noise monitoring Terminals	Required met parameters were partially available and weather data provided only for a period of two years.		
Airport ARP coordinates and elevation	Data giving details about the airport centre point coordinates and other airport physical features	Aviation model	Y	Aeronautical Information Publication (AIP)			
Runway information	Data having information about the location of runways and its geometry	Aviation model	Y	Aeronautical Information Publication (AIP)			
Aeronautical charts/geospatial information providing aircraft flight paths	Datasets producing information about the routes taken by the aircraft during arrival and departures	Aviation model	N		Arrival/dep routes will need to be assumed or determined thorough consultation with airports		