Geographical journey

Exploring the best potential locations for PHA production

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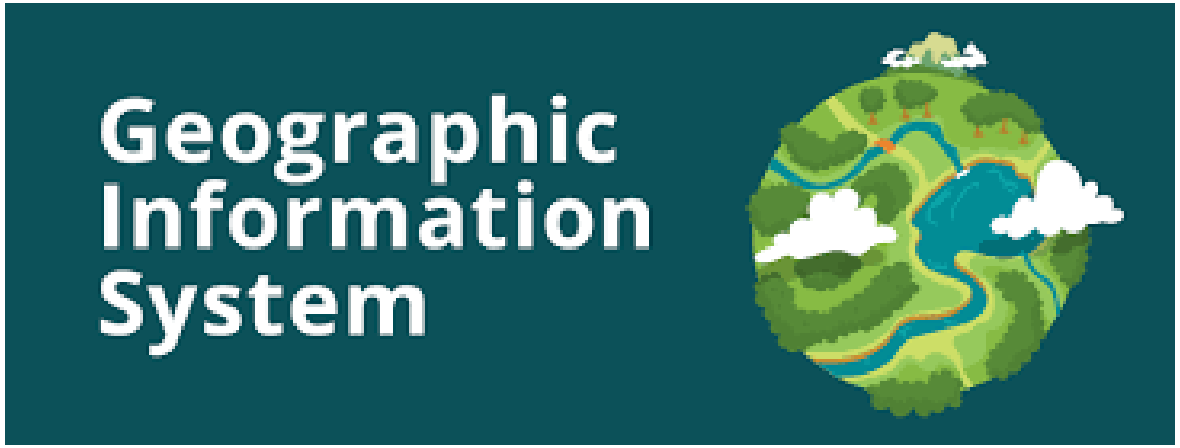
Goal of the journey

Using geographical information system (GIS) to define the **most feasible location(s)** for a PHA production facility in three different regions

Taking into account: capacity and transport (sustainability)



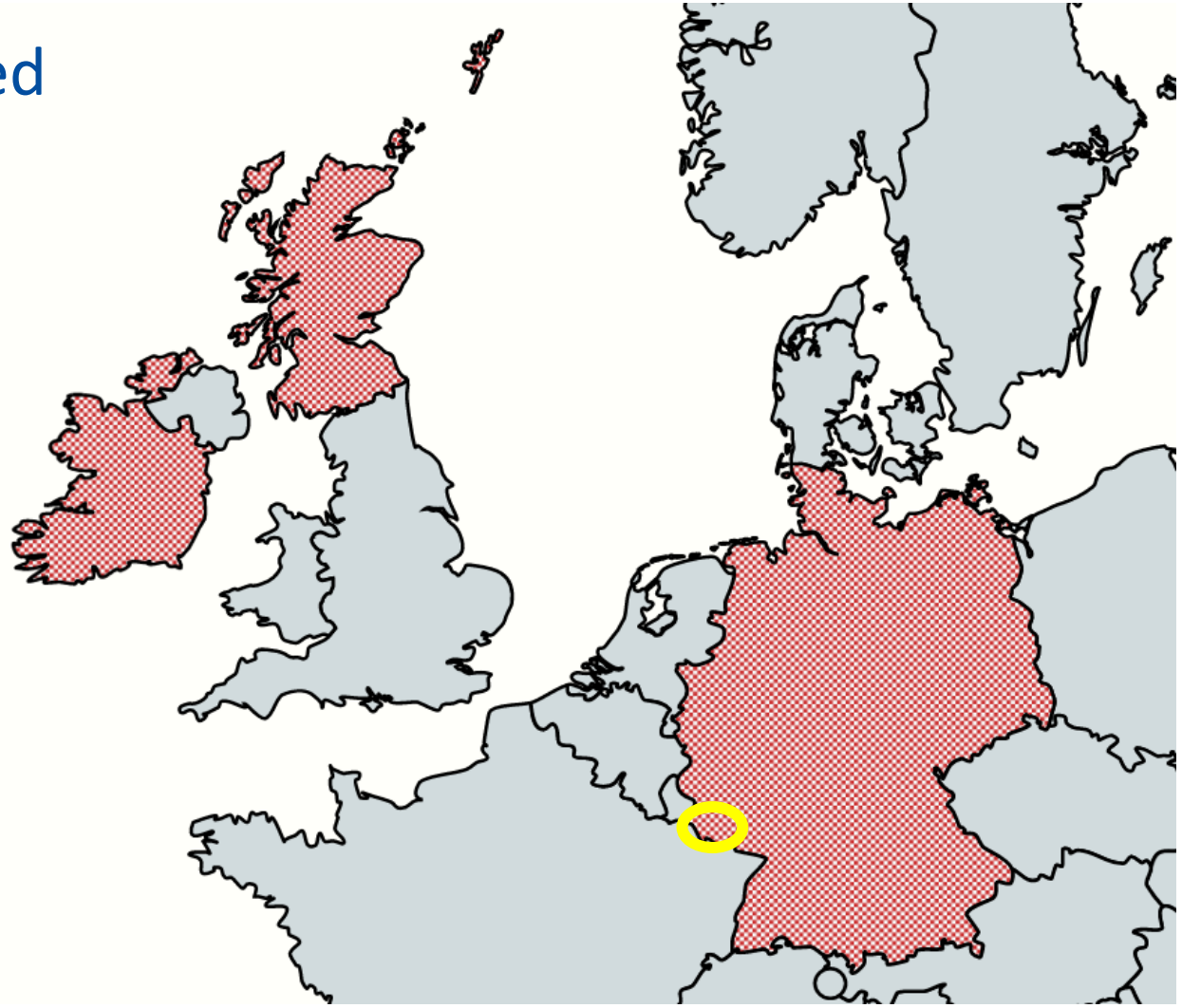
Journey picks its locations

Three different regions were selected (based on project involvement and data gathering):

Scotland

Ireland

Germany (Saarland)



Journey picks its locations

Data from the Urban WasteWater treatment Directive (UWWTD) website:

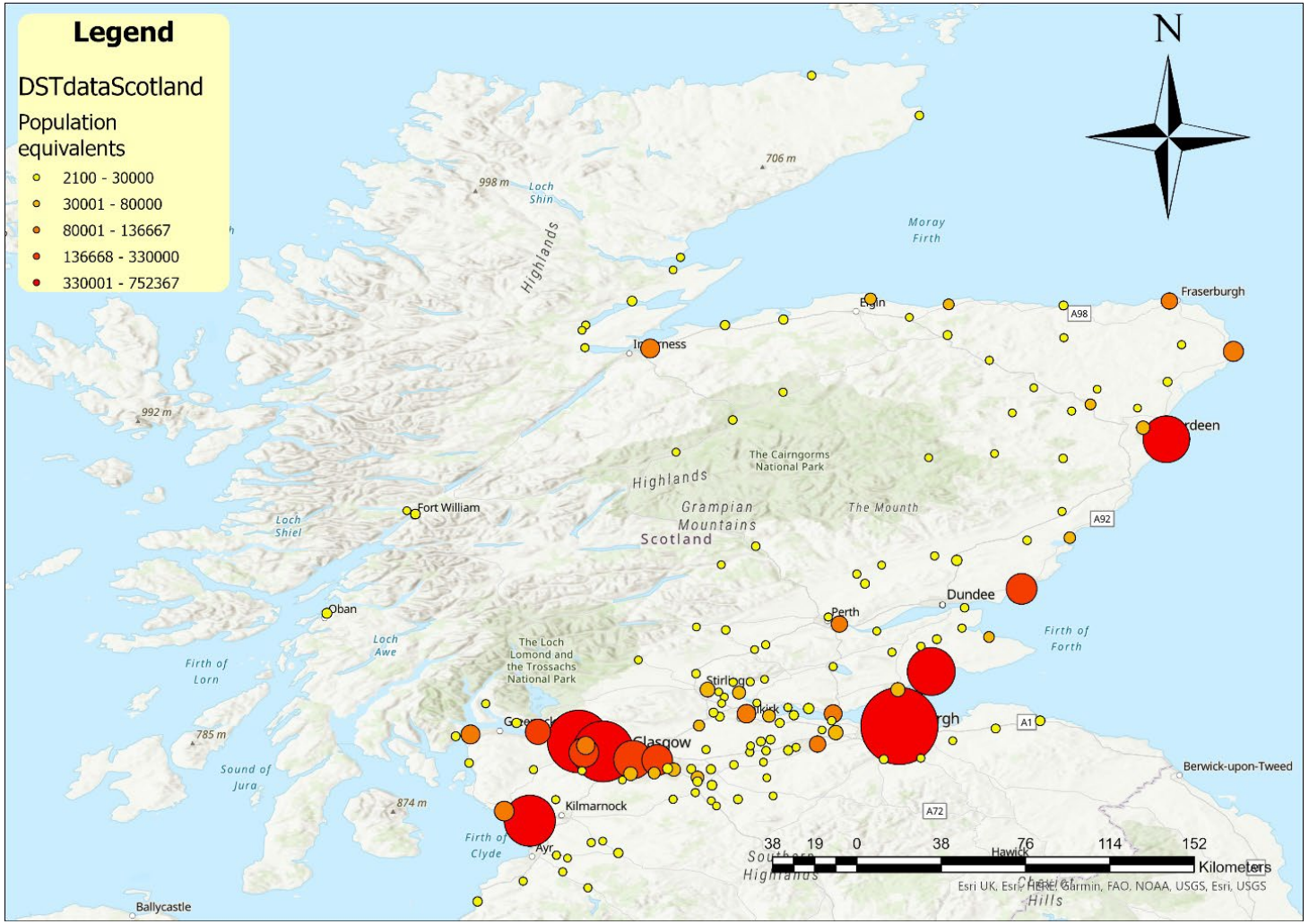
All facilities for the investigated regions, including capacity in people equivalent (PE)

Requirement of 2,000,000 PE (≈ 5,000 ton PHA) for feasibility

All wastewater treatment plants (WWTPs) > 50,000 PE considered

Journey through Scotland

- 153 WWTPs (7,698,322 PE)
- 30 WWTPs > 50,000 PE

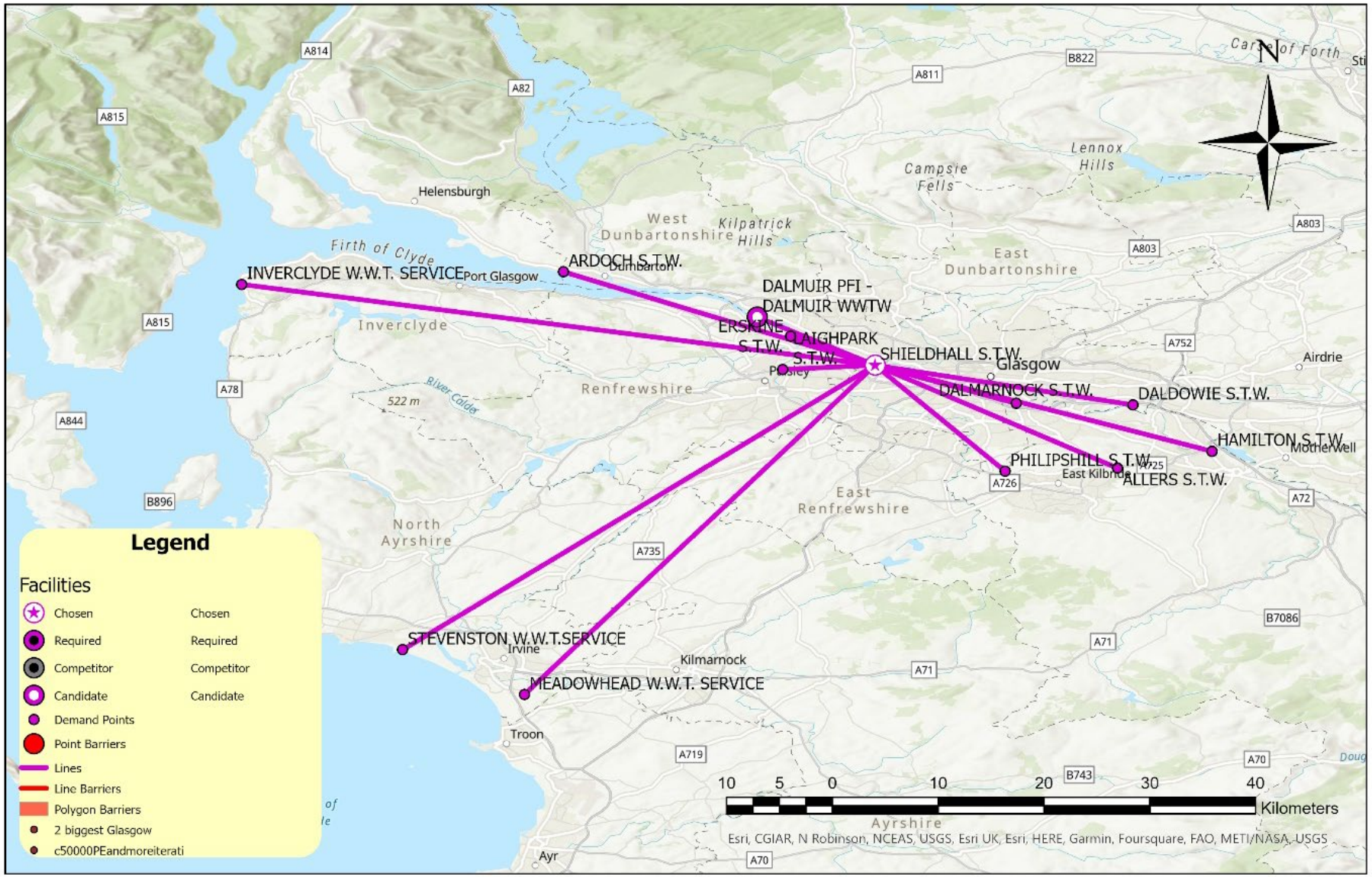


Journey through Scotland

Analysis for:

- Aberdeen →Not viable – max PE count not over 900,000 PE (within 160km)
- Edinburgh →Not viable – max PE count not over 1,500,000 PE before overlap with Glasgow
- Glasgow → Viable – max distance of 45km over 2,600,000 PE available

Journey around Glasgow



Chosen facility:

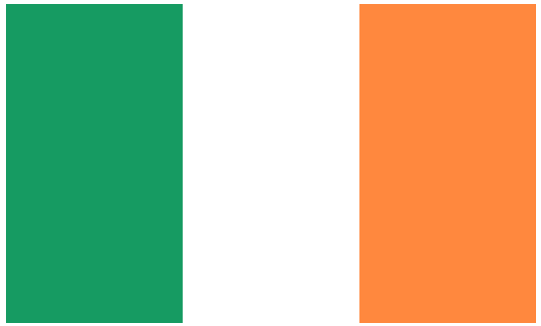
WWTP Shieldhall

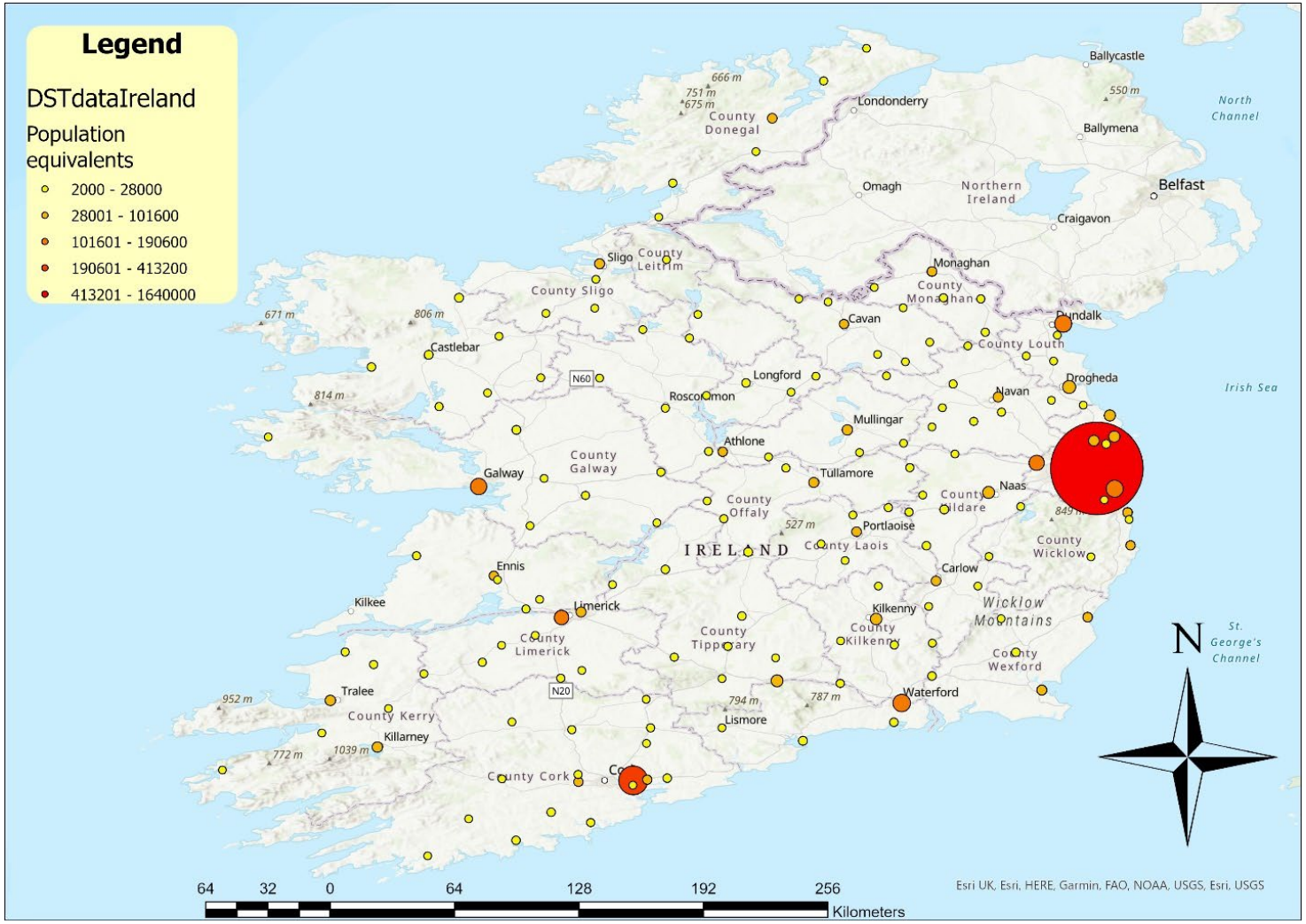
12 contributing facilities within 45km distance

Total 2,600,000 PE

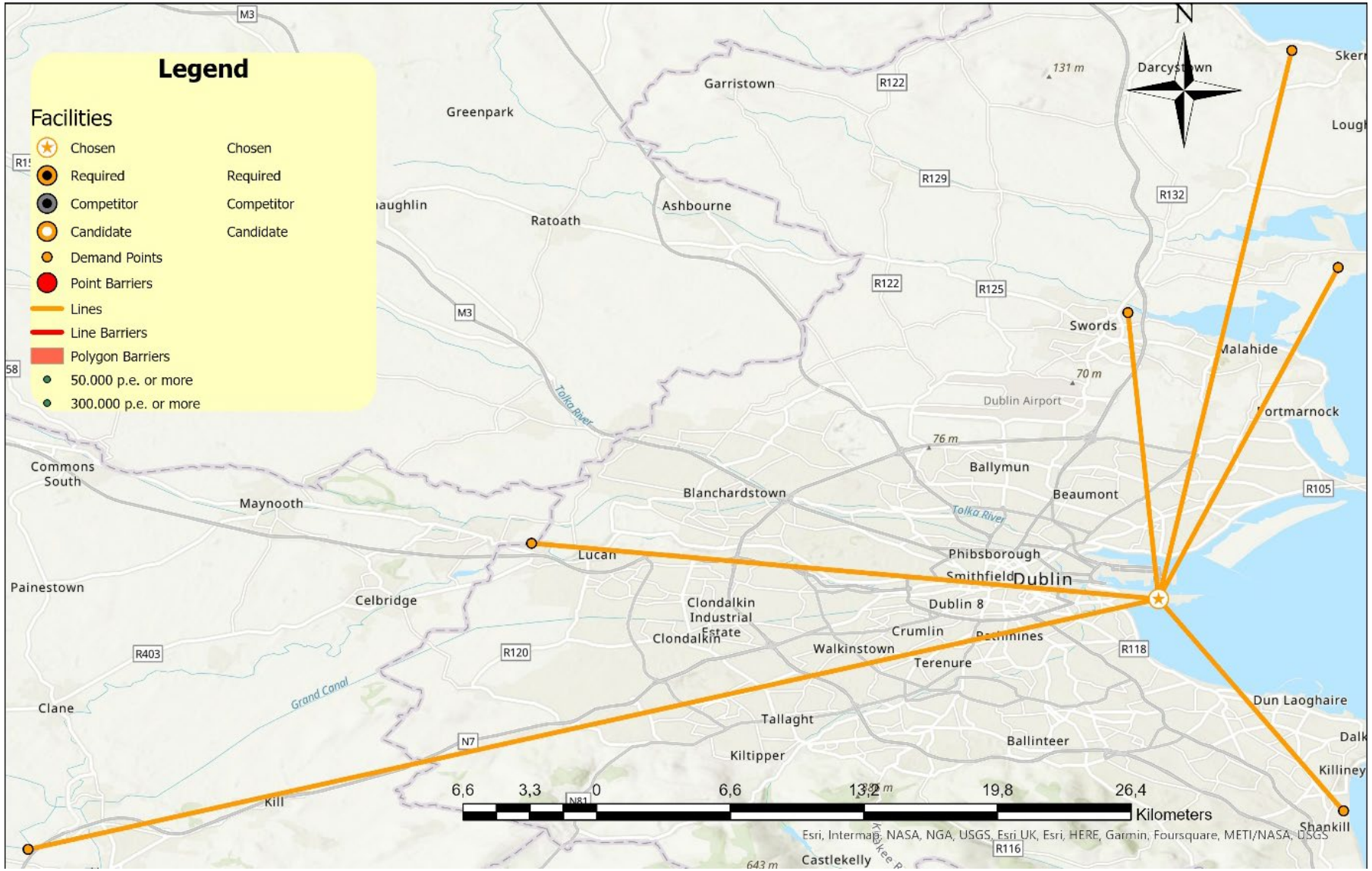
Journey through Ireland

- 163 WWTPs (5,447,495 PE PE)
- 18 WWTPs > 50,000 PE





Journey around Dublin



Chosen facility:

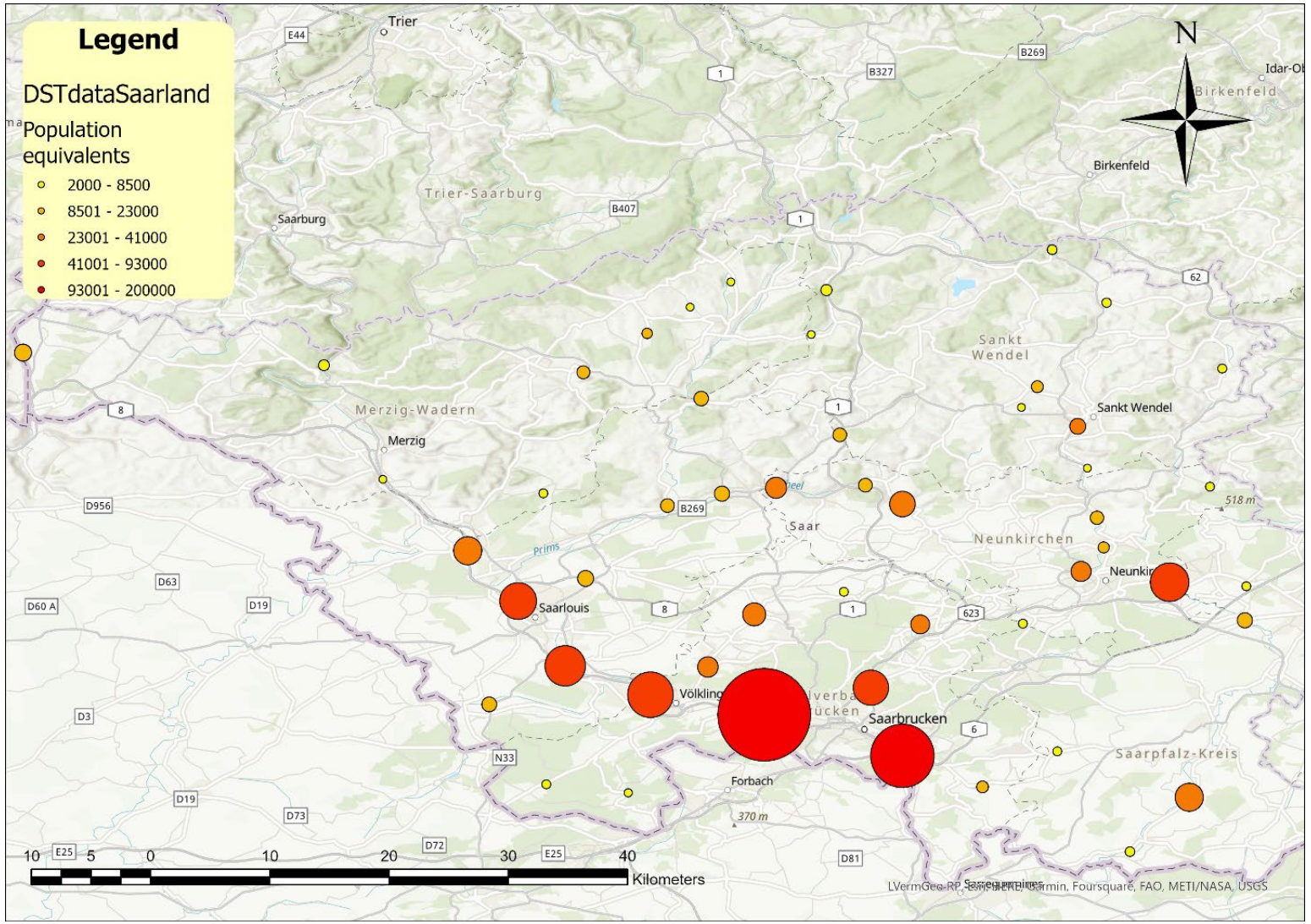
WWTP Ringsend

6 contributing facilities within 40km distance

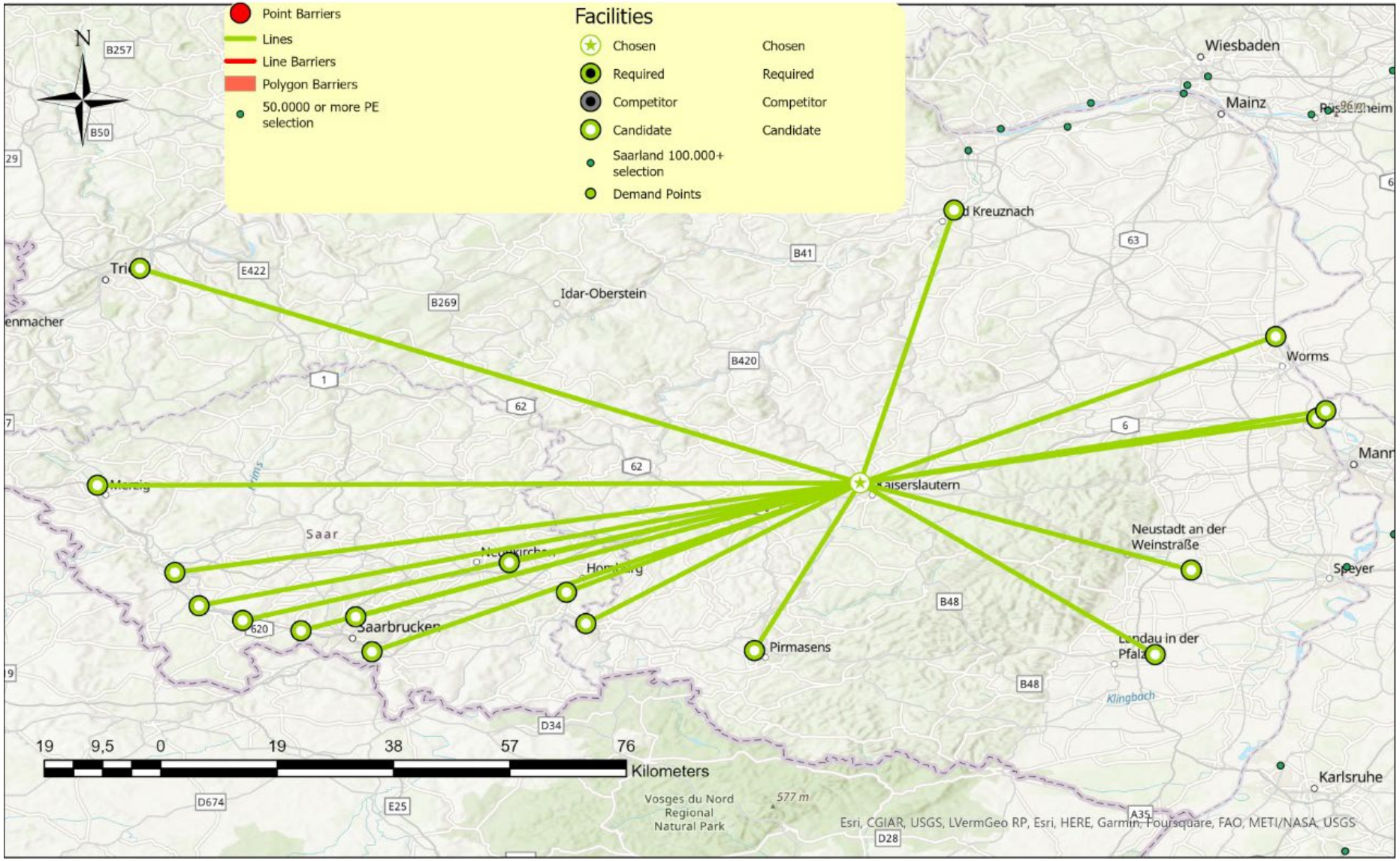
Total 2,251,000 PE

Journey through Saarland

- 60 WWTPs (1,477,900 PE)
- 9 WWTPs > 50,000 PE



Journey around Saarland



Interreg North-West Europe WOW!

European Regional Development Fund

Saarland not viable

Extended with surroundings

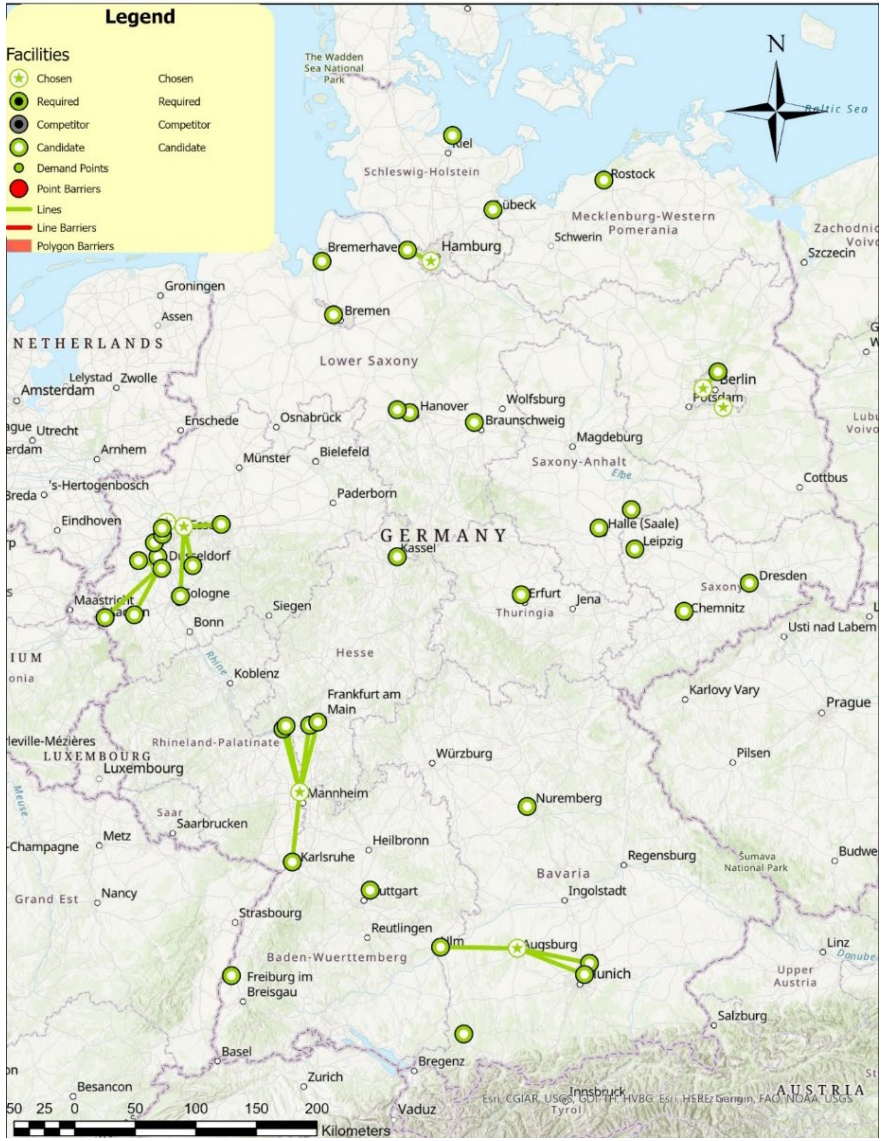
Chosen facility:

WWTP Kaiserslautern

18 contributing facilities within 125km distance

Total 2,314,000 PE

Journey through Germany



- Only WWTPs > 300,000 considered
- Minimum 2,000,000 PE
- Maximum 3,500,000 PE
- Maximum 45km distance and 7 contributing WWTPs

→ 8 possibilities

Germany 300.000 PE or more only				
Name	**FacilityType**	**Weight**	**DemandCount**	**DemandWeight**
Kläranlage Mannheim	Chosen	517.255	6	3.266.266
Augsburg	Chosen	500.997	4	2.635.853
Neuss-Ost	Chosen	389.233	7	3.496.169
Bottrop	Chosen	1.150.304	4	3.392.448
Emscherkläranlage	Chosen	1.830.977	3	2.521.237
Klärwerksverbund Köhlbrandhöft Dradenau	Chosen	2.500.000	2	3.391.439
Ruhleben	Chosen	1.901.188	2	2.742.277
Waßmannsdorf	Chosen	2.023.000	1	2.023.000

Journey not on its end

You'd logically say GIS each time picks the largest facility, but:

→ Sometimes multiple equal size facilities close by

→ Weighing transport (distance x amount of sludge)

→ Next step taken is WWTPs > 300,000 (could) have dryer onsite to transport dried sludge

Also:

→ Circularity assessment of different scenarios

Up next…

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PHA production from residual streams

How the substrate composition influences the final product