APPENDIX 15-4

LINK CAPACITY ASSESSMENT

ALAN LIPSCOMBE
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BALLYDERMOT WIND FARM

County Offaly and County Kildare

Preliminary Capacity Assessment for Delivery Routes

Version D - 22/10/26

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1 INTRODUCTION

The purpose of this note is to present the findings of a preliminary capacity assessment of the potential construction delivery routes that have been identified for the proposed Ballydermot Wind Farm (ie the Proposed Project) located in County Offaly and County Kildare. While the results of the assessment will inform the delivery strategy and construction program for the Proposed Wind Farm, a detailed assessment of the construction traffic generation and the traffic related impacts on the final construction traffic delivery routes will be included as part of the EIAR.

2 METHOD FOR ASSESSMENT

The method for the preliminary delivery route capacity assessment is as follows.

Existing and 2025 and 2030 construction year traffic flows

Base year 2025 daily traffic flows were obtained from automatic traffic counts and classified turning counts undertaken at 32 locations on the potential delivery routes for the Ballydermot Wind Farm in November 2025 and March 2026. These flows were then factored to a potential construction year of 2030 using growth factors produced by TII. It is noted that there are different 2025 to 2030 factors for County Offaly (1.060) and for County Kildare (1.088), with the latter higher growth factor adopted for the assessment. The background traffic volumes were established in terms of 2-way vehicles per day.

Preliminary construction traffic flows

A preliminary estimate of daily construction traffic volumes was based on the following;

- A preliminary estimate of the requirement to important 700,000m3 of stone to the site,
- Based on 2.4 tonnes per m3 of stone, and 20 tonnes per HGV load, it is estimated that this equates to 84,000 loads,
- Based on 255 delivery days per year and 510 days in 2 years, there will be an average of 165 loads per day, or 170 including other materials.
- Based on each trip being 2 way and a HGV to pcu factor of 2.4, this results in an additional traffic flow of 816 pcus being generated on a typical construction day.

The above was the basis for Test Scenario 1. Additional tests have been undertaken for 3 additional scenarios based on the importation of an increased volume of imported stone (1,108,828 m3) and for 3 variations of construction duration. The 4 scenarios tested are as follows;

- **Scenario 1** – 700,000m3 of material, 24 month construction period, 170 loads per day
- **Scenario 2** – 1,108,828m3 of material, 24 month construction period, 261 loads per day
- **Scenario 3** – 1,108,828m3 of material, 30 month construction period, 209 loads per day
- **Scenario 4** – 1,108,828m3 of material, 36 month construction period, 176 loads per day

Link capacities

The daily capacity for each location was based on an estimate of the carriageway width and the Rural Road Link Design Guidelines prepared by TII (DN-GEO-03031, June 2017), with the definition of link capacity at Service Level D being as follows;

"Speeds begin to decline slightly with a slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic streams is more noticeably limited, and the driver experiences reduced comfort levels".

Information shown for each location in link assessment figures

The statistics for each of the 4 test scenarios are shown separately in Figures A to D, while a summary for all 4 is included in Table 1. Information shown for each of the test scenarios is as follows;

- **Flow** = The total daily flow in pcus forecast in 2030 including background traffic and construction generated traffic.
- **Capacity** = A sample daily capacity of the road at each location.
- **% Capacity** = This is the % of capacity that is forecast to be utilised on each link on the days that the construction traffic is present. A traffic light colour system is used to illustrate the information graphically as follows; For locations where the link is forecast to operate within capacity (<100%), the cell is shaded green. For links that are forecast to operate between 100% and 130%, that is at a level which may be considered acceptable, they are shown as amber, and for links forecast to operate over 130% of capacity, they are shown as red. Red does not necessarily mean the link cannot be used for construction traffic, but a more detailed assessment will require to be undertaken.
- **% Increase** = This is the percentage increase in traffic volumes forecast at each location as a result of the presence of the construction traffic. For this criteria, if the additional construction traffic results in an increase of +10% or less it is indicated as green. This corresponds to the +10% threshold set by TII, which if not exceeded by a proposed development, does not require further assessment. For a forecast increase of between +10% and +30%, this is shown as amber. This indicates further assessment will be required but should be considered in tandem with the % of capacity being utilised, as discussed above. For over +30% this is shown as a significant increase and should be

considered together with the % capacity being utilised and the potential requirement for detailed junction modelling.

A combination of the above are included in the circle shown at each point, which is again shown as green, amber or red, and indicates the overall suitability for inclusion as a delivery route based on the preliminary assessment. The overall colour takes account of the following;

- For all cases where the % capacity was determined to be significantly over, (>+130%), the link was allocated red and would require further assessment.
- For all links where the % increase was established to have a significant impact in terms of % increase in traffic flows (ie >+30% increase), but the link was established to remain within capacity (ie <100%) the link was allocated amber.
- For all other links they were allocated the colour determined for both categories.

It is noted that this assessment is intended to provide one tool in the decision making process with respect to the selection of the optimum delivery strategy, and a detailed assessment will be undertaken as part of the EIAR.

Summary of results

For all scenarios the results of the preliminary assessment confirm the better suitability of the access routes from the north and west of the site, and the slightly greater challenges associated with the routes from the south and the east.

As the results of the capacity assessment are dependent on the number of HGV loads per day, it is noted that Scenario 1 (170 loads/day and shown in Figure A), which is the preliminary test based on 700,000m3 of materials and a construction period of 24 months, is very similar to Scenario 4 (176 loads/day and shown in Figure D), which is based on the revised volume of materials (1,108,828m3) and the longest construction period of 36 months. As the 700,000m3 stone volume estimate is no longer being considered, Scenario 1 is not considered further.

Compared to Scenario 4 (36 months), which has the least impact on links of the options tested, Scenario 2, which is based on the same volume of materials (1,108,828m3) and the shortest construction period (24 months), has the highest concentration of loads day (261 loads/day, shown in Figure B) and therefore the greatest impact. In terms of differences compared to Scenario 4, the locations where the overall colour code allocated to a particular link changes for Scenario 2 are circled in black in Figure B. The links impacted are 2 locations on the R402 that changing from amber to red, and a further location on the same road that increases from green to amber. As Scenario 2 represents a 48% increase in construction traffic over a shorter period of time compared to Scenario 4, the % of capacity utilising each link increases accordingly.

In terms of impacts on construction generated traffic flows Scenario 3 (30 months) lies in the middle of on the Scenarios 4 (36 months) and 2 (24 months). Compared to Scenario 4, which has the lowest daily loads (176 load per day), Scenario 3 would result in 209 loads per day. Compared to Scenario 4, the reduction of the construction period from 36 month to 30 month will result in 2 locations on R402 changing from orange to red.

While the impact of increasing the construction period from 24 to 30 months, or to 36 months does not appear to have significant implications in terms of the results of this preliminary assessment, the reduction in the number of HGV trips generated on a daily basis will be noticeable on the ground. This would however be off-set by the increased duration that the public would be required to incur the traffic related impacts. Considering the scale of the proposed development, and that the additional volumes of HGVs will not travel on the same parts of the network for the full period, the longer construction periods of 30 or 36 month should be considered.

It is noted that the above assumes that the delivery of the abnormally sized loads will be undertaken concurrently at night. Based of 46 turbines, with 8 large component parts for each (3 blades, 3 tower sections and 1 nacelle) this will result in the delivery of 368 abnormally sized loads, with one convoy of 3 being transported in one night, which will take 123 nights during this period. It is noted that the above assessment does not take account of the construction of the grid connection.

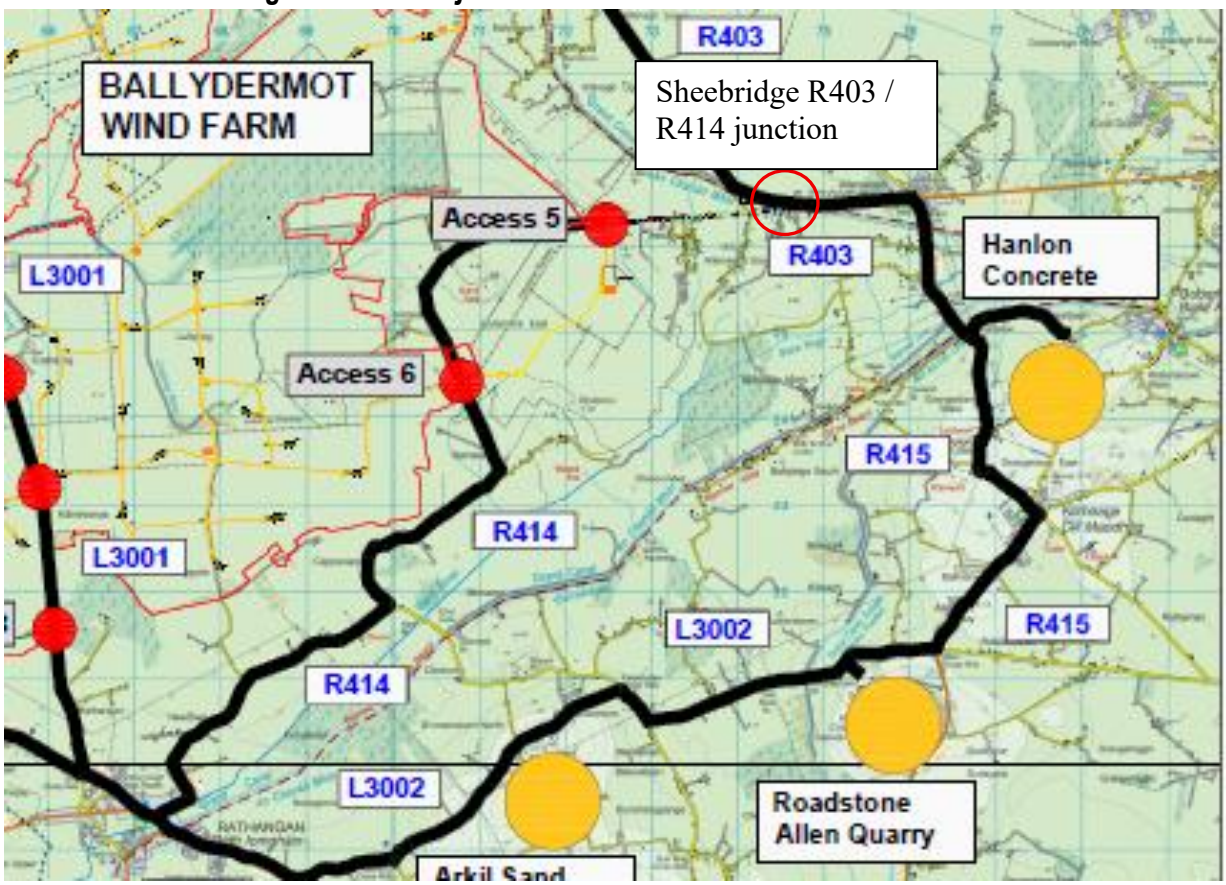
With respect to the implications for the access 8 wind farm access junctions (reduced to 7 in the EIAR), it is expected that all will be found to operate within capacity for the 3 scenarios tested as part of the detailed junction capacity tests that will be undertaken for the EIAR. In relation to the test for existing junctions, this will only be established during the detailed capacity tests.

3 OTHER CONSIDERATIONS FOR CONSTRUCTION ROUTES

Sheebridge R403 / R414 junction – Due to the restricted geometry, vertical alignment and severe restrictions to visibility on the approach to this junction, it is recommended that development generated traffic is not required to travel between the 2 regional roads at this location. This will result in all traffic requiring access to the substation to travel north on the R414 from Rathangan to turn in via Access 5 (updated to Access 6 in the EIAR), or to travel via the Proposed Wind Farm site and a crossing at Access 6 (updated to Access 5 in the EIAR). It is noted that the latter is the preferred option and would significantly reduce traffic impacts on the R414.

Humpbacked bridges on the R415 between Hanlon Concrete and the R403 – There are 4 humped-back bridges on the section of the R415 between Hanlon Concrete and the R403. While this must be a route regularly used by the quarry it is noted that forward visibility is restricted at these locations. This should be a minor consideration in determining the optimum construction delivery routes.

Location of Sheebridge R403 / R414 junction



Sheebridge R403 / R414 junction



Access consideration for quarries from direction of Tullamore on the Proposed Turbine Delivery Route – It is noted that for ATC links 14 (N52 east bypass of Tullamore), 15 (R420 east of Tullamore) and 16 (R402 between Tullamore and Daingean) on the Proposed Turbine Delivery Route are forecast to operate at or over link capacity for construction scenarios 2 to 4. This does not rule out material being delivered from this direction, although this should be considered when developing the construction delivery strategy.

Access consideration for quarries from direction of Kinnegad – Together with the R403 to the west of Prosperous, which is not on the delivery route for the Proposed Wind Farm site (but is on the Proposed Grid Connection underground electrical cabling route, so should be noted), the R148 through Kinnegad is under the most pressure in terms of link capacity (273% – 282% capacity for all scenarios) of all the links. Again, while deliveries from this direction need not be ruled out at this stage, this should be considered when determining the preferred delivery strategy for the Ballydermot Wind Farm and will require a more detailed analysis.

4 NEXT STEPS

The next steps are as follows;

Development of trip generation estimates - Up to 6 typical days during the construction of the Proposed Project will be considered based on combinations of different construction tasks being done simultaneously. This will be done with input from BnM.

Develop delivery strategy – This should be done by route / access junction and time period in the construction program. This will again require significant input from BnM.

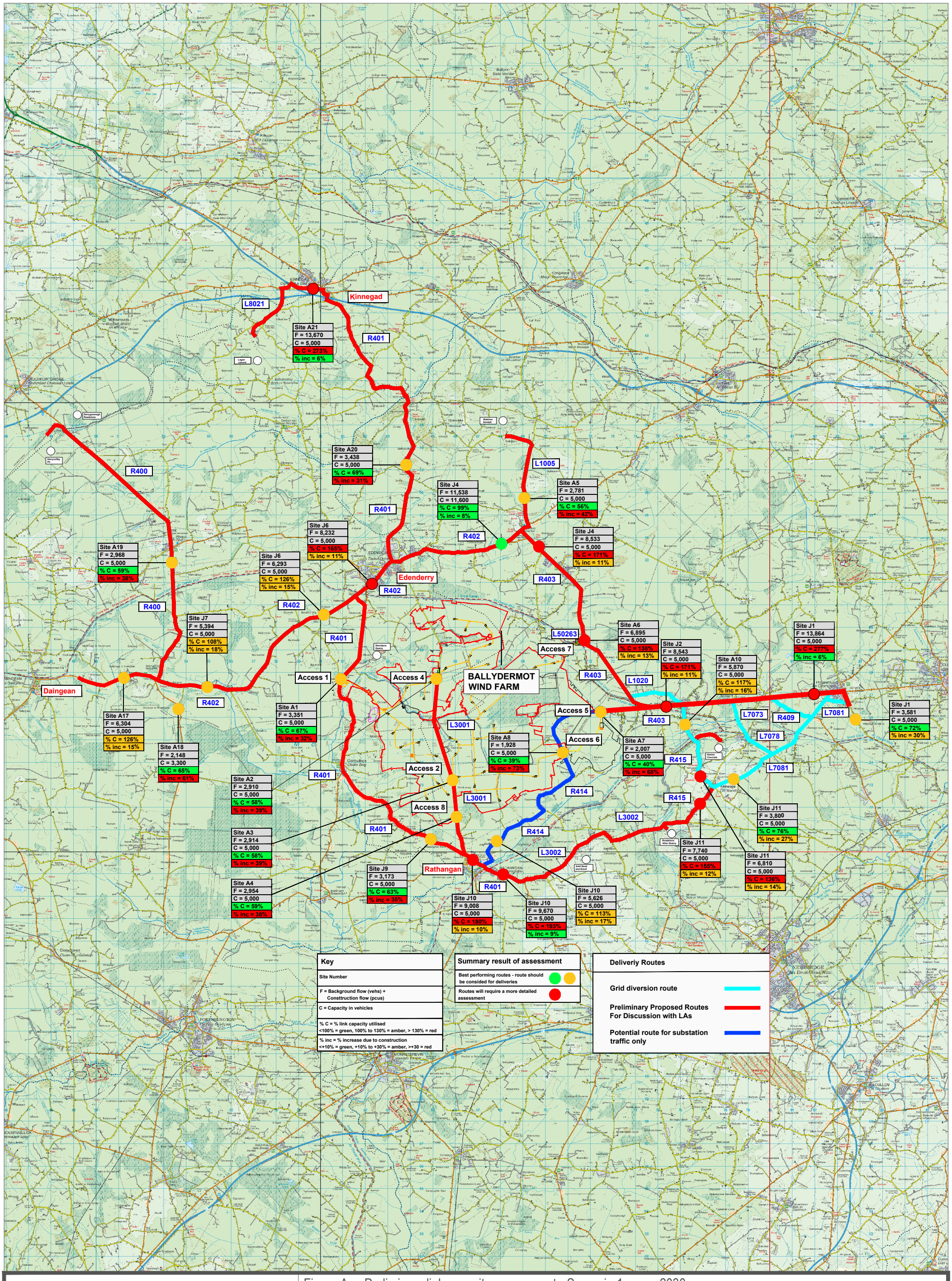
Junction design – Progress reviews of BnM junction designs. The design of Site Access 1 off the R401 will be priority.

Once the above are developed to a sufficient level of detail it is recommended that further consultation is held with the Road Sections of Offaly and Kildare County Councils.

Table 1 - Summary results of link capacity assessment by construction scenario

ATC Site No	Location	Scenario 1 - 170 loads / day				Scenario 2 - 261 loads / day				Scenario 3 - 209 loads / day				Scenario 4 - 176 loads / day			
		24 months - 700,000m3 - with construction traffic				24 months - 1,108,828m3 - with construction traffic				30 months - 1,108,828m3 - with construction traffic				36 months - 1,108,828m3 - with construction traffic			
		pcus	% capacity	% increase	Combined	pcus	% capacity	% increase	Combined	pcus	% capacity	% increase	Combined	pcus	% capacity	% increase	Combined
ATC No 1	R401	3,351	67%	32%		3,788	76%	49%		3,538	71%	40%		3,370	67%	33%	
ATC No 2	L1001	2,910	58%	39%		3,347	67%	60%		3,098	62%	48%		2,930	59%	40%	
ATC No 3	L3001	2,914	58%	39%		3,350	67%	60%		3,101	62%	48%		2,933	59%	40%	
ATC No 4	L3001	2,954	59%	38%		3,391	68%	59%		3,141	63%	47%		2,973	59%	39%	
ATC No 5	L1005	2,781	56%	42%		3,218	64%	64%		2,968	59%	51%		2,800	56%	43%	
ATC No 6	R403	6,895	138%	13%		7,331	147%	21%		7,082	142%	17%		6,914	138%	14%	
ATC No 7	R414	2,007	40%	68%		2,444	49%	105%		2,195	44%	84%		2,027	41%	70%	
ATC No 8	R414	1,928	39%	73%		2,365	47%	113%		2,115	42%	90%		1,947	39%	75%	
ATC No 9 (grid diversion)	L1020	965	NA	NA		965	NA	NA		965	NA	NA		965	NA	NA	
ATC No 10	R415	5,870	117%	16%		6,307	126%	25%		6,057	121%	20%		5,889	118%	17%	
ATC No 11 (grid diversion)	L7073	1,798	NA	NA		1,798	NA	NA		1,798	NA	NA		1,798	NA	NA	
ATC No 12 (grid diversion)	L7081	3,556	NA	NA		3,556	NA	NA		3,556	NA	NA		3,556	NA	NA	
ATC No 13 (grid diversion)	R409	4,907	NA	NA		4,907	NA	NA		4,907	NA	NA		4,907	NA	NA	
ATC No 14 (TDR)	N52	19,900	172%	4%		20,336	175%	7%		20,087	173%	5%		19,919	172%	4%	
ATC No 15 (TDR)	R420	10,974	128%	8%		11,410	133%	12%		11,161	130%	10%		10,993	128%	8%	
ATC No 16 (TDR)	R402	7,828	157%	12%		8,265	165%	18%		8,015	160%	14%		7,847	157%	12%	
ATC No 17	R402	6,304	126%	15%		6,741	135%	23%		6,491	130%	18%		6,323	126%	15%	
ATC No 18	L1003	2,148	65%	61%		2,585	78%	94%		2,335	71%	75%		2,167	66%	63%	
ATC No 19	R400	2,968	59%	38%		3,405	68%	58%		3,155	63%	47%		2,987	60%	39%	
ATC No 20	R401	3,438	69%	31%		3,875	77%	48%		3,625	73%	38%		3,457	69%	32%	
ATC No 21**	R148 Kinnegad	13,670	273%	6%		14,106	282%	10%		13,857	277%	8%		13,689	274%	6%	
Junction 1**	R403 west	13,864	277%	6%		14,301	286%	10%		14,052	281%	8%		13,884	278%	6%	
Junction 1	L7081 south	3,581	72%	30%		4,017	80%	45%		3,768	75%	36%		3,600	72%	30%	
Junction 2	R403 east	8,543	171%	11%		8,980	180%	16%		8,730	175%	13%		8,562	171%	11%	
Junction 4	R402 west	11,538	99%	8%		11,975	103%	12%		11,725	101%	9%		11,557	100%	8%	
Junction 4	R403 south	8,533	171%	11%		8,970	179%	16%		8,720	174%	13%		8,552	171%	11%	
Junction 6	R402 west	6,293	126%	15%		6,730	135%	23%		6,480	130%	18%		6,312	126%	15%	
Junction 6	R402 east	8,232	165%	11%		8,669	173%	17%		8,419	168%	14%		8,251	165%	11%	
Junction 7	R402 east	5,394	108%	18%		5,831	117%	27%		5,582	112%	22%		5,414	108%	18%	
Junction 9	R401 west	3,173	63%	35%		3,609	72%	53%		3,360	67%	43%		3,192	64%	35%	
Junction 10	R401 west	9,008	180%	10%		9,444	189%	15%		9,195	184%	12%		9,027	181%	10%	
Junction 10	R414 north	5,626	113%	17%		6,063	121%	26%		5,813	116%	21%		5,645	113%	17%	
Junction 10	R401 east	9,670	193%	9%		10,107	202%	14%		9,857	197%	11%		9,689	194%	9%	
Junction 11	R415 west	7,740	155%	12%		8,177	164%	18%		7,927	159%	14%		7,759	155%	12%	
Junction 11	R415 north	6,810	136%	14%		7,247	145%	21%		6,997	140%	17%		6,829	137%	14%	
Junction 11	L7081 east	3,800	76%	27%		4,237	85%	42%		3,988	80%	34%		3,820	76%	28%	

< 100%	< 10%
<130%	<30%
>130%	>30%



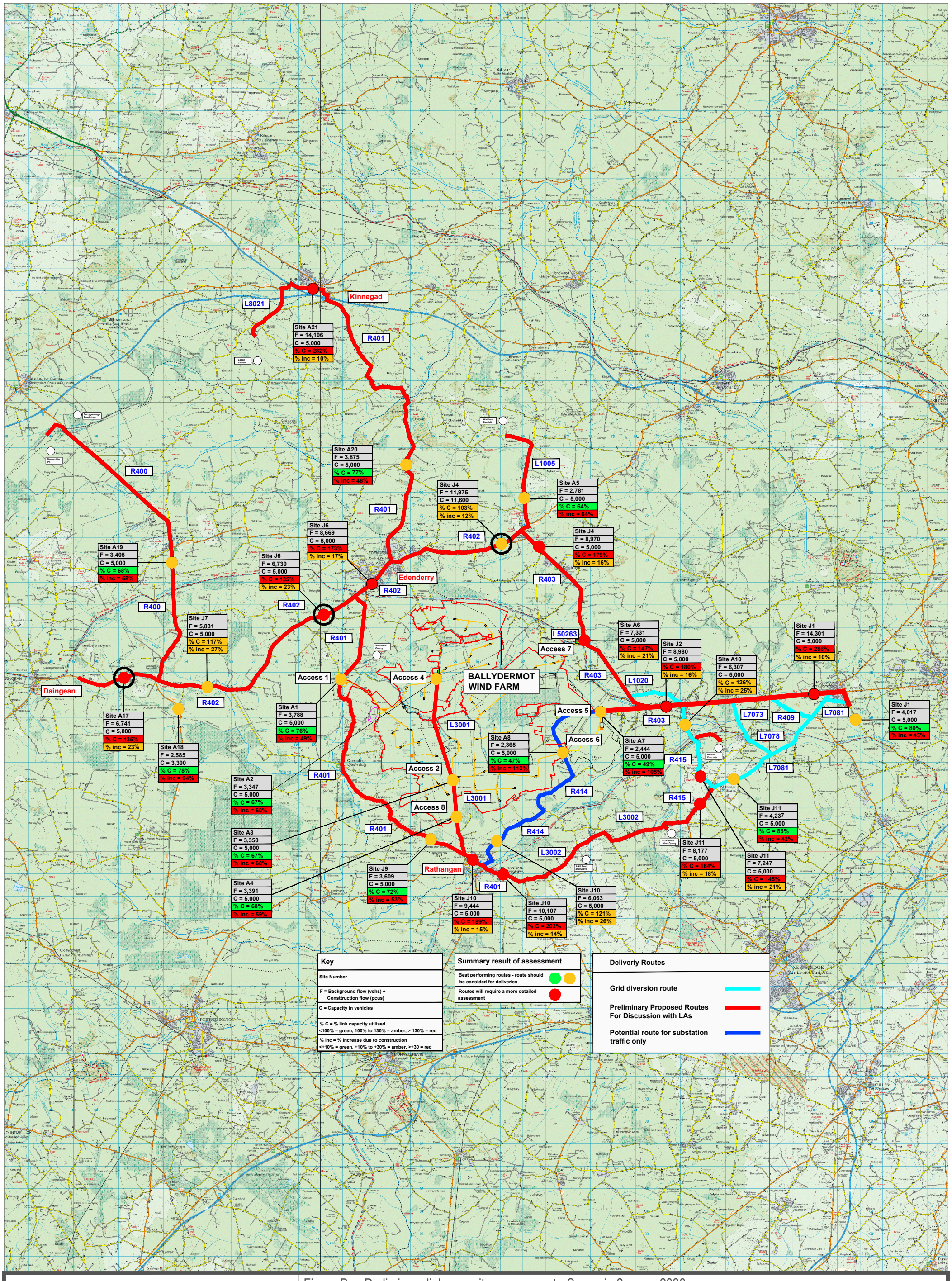
NOTES:

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Figure A Preliminary link capacity assessment - Scenario 1 - year 2030
24 month construction period, 700,000m3 material, 170 loads per day

PROJECT:	Ballydermot Wind Farm		
CLIENT:	Bord na Mona	SCALE:	NTS
PROJECT NO: 8570	DATE: 17.12.25	DRAWN BY:	AL

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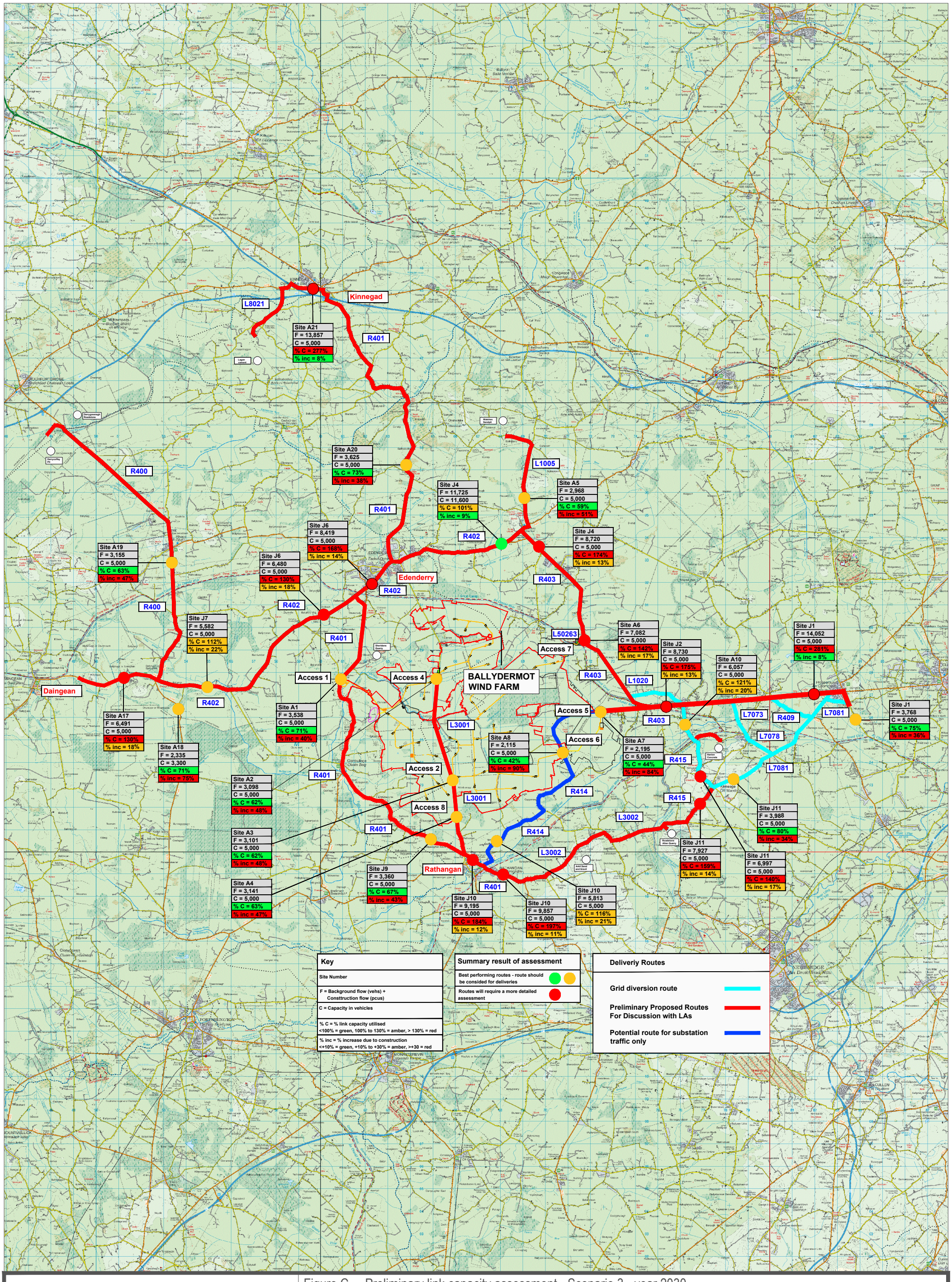
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Figure B Preliminary link capacity assessment - Scenario 2 - year 2030
24 month construction period, 1,108,828m3 material, 261 loads per day

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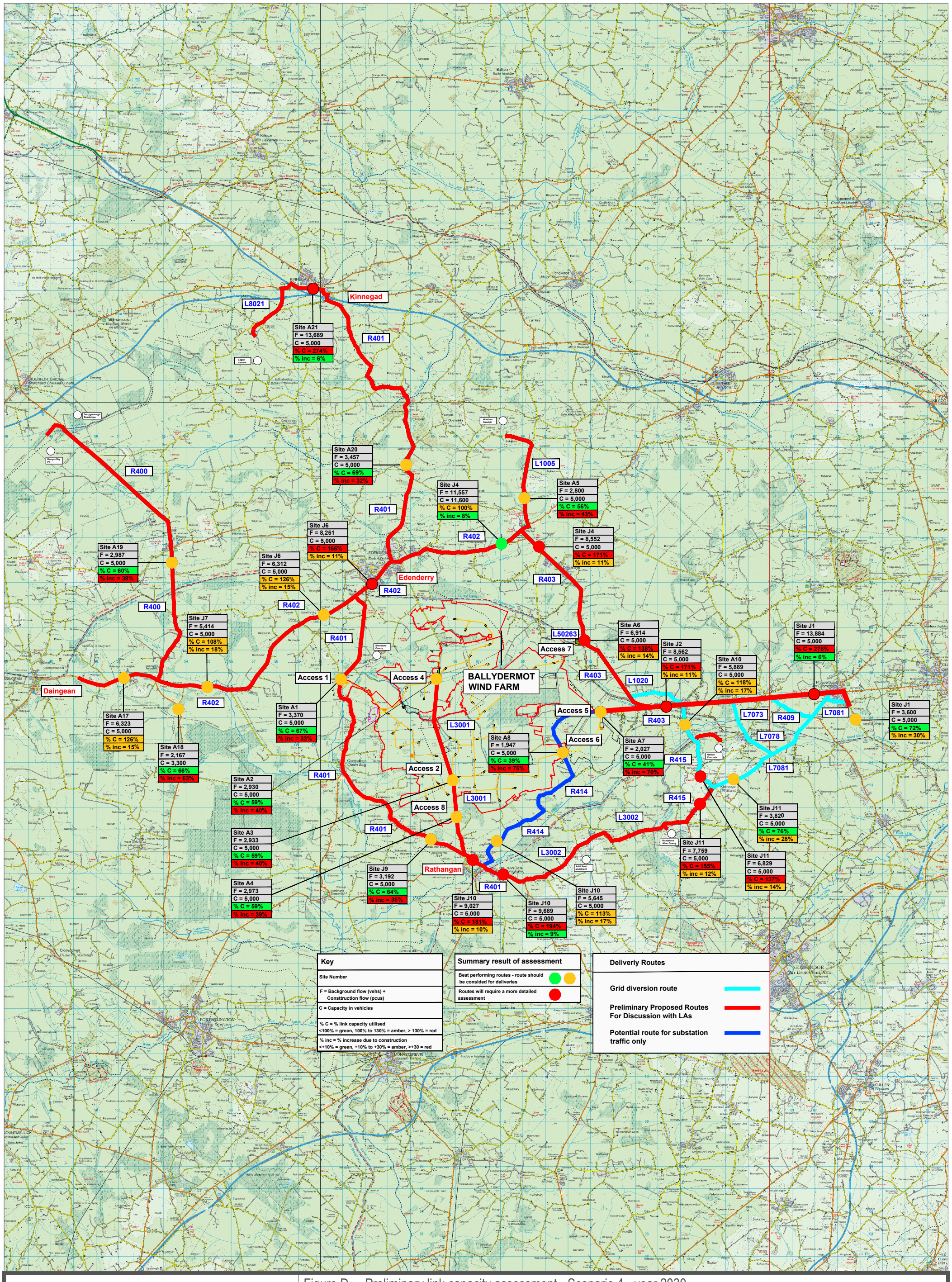
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Figure C Preliminary link capacity assessment - Scenario 3 - year 2030
30 month construction period, 1,108,828m3 material, 209 loads per day

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Figure D Preliminary link capacity assessment - Scenario 4 - year 2030
36 month construction period, 1,108,828m3 material, 176 loads per day

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PROJECT NO: 8570	DATE: 17.12.25	DRAWN BY:	AL

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