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**Digital Switchover (DSO) Programme**

**Radio DSO Block 10C Gloucester**

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**Document Reference:** Radio DSO Gloucester-1.0

**Release Date:** 8 February 2011

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## Document Details

General Detail				
Abstract	Radio DSO plan and details of the Gloucester local multiplex on Block 10C			
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Optional Information				
Author Defined Reference No	Not used	Project No	951230	
Cross Reference				

Document History		
Ver	Date	Amendment
1.0	8/02/11	Draft version for review.
1.1		Initial release
2.0	14/02/11	Road Miles now km (was 100s m); Terrain map pasted to enable PDFs

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## 1 Gloucester DSO Narrative

Block 10C for Gloucester is an existing allocation which has not been implemented. Transmission characteristics three stations previously allocated to Gloucester are shown below :-

Name	ERP kW	Antenna	Antenna Height mAGL
Churchdown Hill	2.5	Dipole 330	25.3
Cirencester	2.0	Dipole/yagi array	30.0
Stockend Wood	2.0	Dipole	30.0

Although these proposed transmitters remain in the new plan, characteristics have changed; in the case of Churchdown Hill & Stockend Wood, existing (BBC National & Digital One) antennas have been specified. ERPs have changed too in order that Gloucester may co-exist with the other co-block 10C Allocations.

There are editorial area overlaps with the adjacent allocations of :-

**Bath & Bristol (11B)** - to the south-west, including Wotton-under-Edge.

**Swindon (11C)** - to the south and south-east; this overlap is a substantial one encompassing Cirencester and the high ground to its north

In addition the following multiplexes about the Gloucester Editorial Area :-

**Cardiff & Newport (11C)** - to the west

**Hereford & Worcester (10B)**, to the north. . There is considerable predicted overspill coverage from Hereford & Worcester serving large areas of Tewkesbury, Gloucester and Cheltenham.

**Coventry (12D)** - to north-east

**Oxford (5A)** - to the east.

The proposed Block 10C allocations including Liverpool, North Yorkshire, North Devon, Northampton, Surrey and Gloucester are shown Fig 1.1 below. This also gives an idea of the terrain in the Gloucester editorial area in relation to the other co-block allocations. The rising ground from Cirencester towards Gloucester is difficult to protect from interference from co-block Surrey. The area to the north-west is difficult to protect from interference from co-block Northampton. Some elevated areas within the Gloucester editorial area to the south west, including Wotton-under-Edge are susceptible to interference from co-block North Devon.

FM Radio coverage is provided by BBC Gloucester (from Churchdown Hill, Stroud & Cirencester) and Heart Gloucester (from Churchdown Hill & Stroud)

Planning coverage for this multiplex will remain challenging; the hilly terrain in the Forest of Dean/Wye Valley is difficult and will perhaps require five additional transmitters to serve the roads and some smaller villages (there are 10 UHF TV relays operating within the Forest of Dean/Wye Valley to give some idea of the difficulty – excl Monmouth and Chepstow); the hilly and upland terrain along the Cotwolds, susceptible to co-block interference may have no solution other than a comparatively dense network of low power relays along the roads – similar to that used for cellular 'phones.

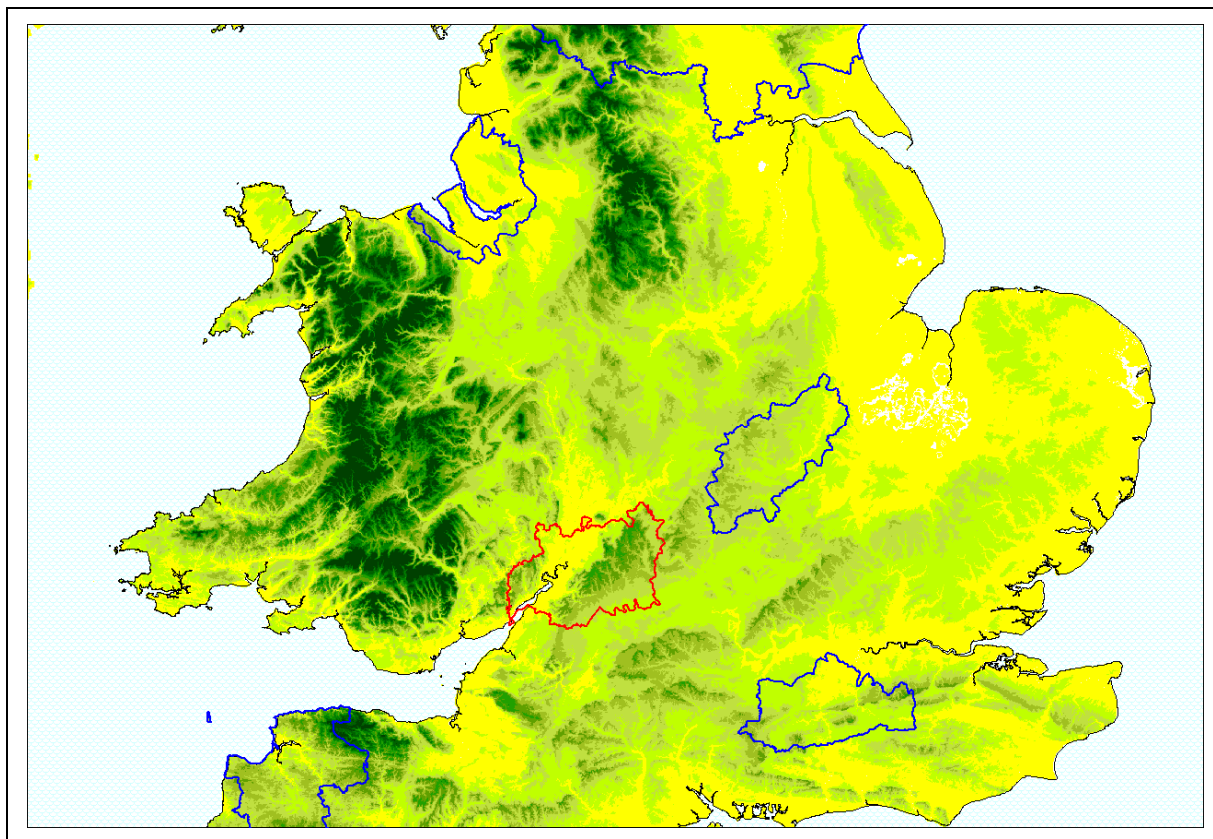


Figure 1.1: Proposed Block 10C allocations

In planning for each multiplex Ofcom have required coverage assessments:

- For each area four sets of maps should be produced as follows:
  1. **Current Situation** - Map showing current actual coverage (or launch plans where a multiplex hasn't yet launched), including any transmitters which are required as part of the current licence, but which are not yet operational.
  2. **Modified Network 1** - Map showing the above, plus any improvements to existing infrastructure.
  3. **Modified Network 2** - Map of the above, plus additional smaller infill transmitters focused on areas where FM coverage is robust.
  4. **Modified Network 3** - Map of the above, plus additional transmitters to provide near universal coverage.

For case 1: Current situation

Not applicable

#### For case 2: Modified network 1

Consists of the three transmitters proposed in the original allocation, but characteristics have been changed in order to co-exist with other co-block 10C allocation proposals. Figure 2-1 shows the indoor/outdoor coverage using 1% time interference; Figure 2-2 shows Outdoor Only 1% time interference and Figure 2-3 shows Outdoor Only 5% time interference.

#### For case 3: Modified Network 2

In this it was required to cover areas where existing local FM provision (BBC Gloucester and Independent Heart Gloucester) is robust. This is already achieved in implementing Case 2 Modified Network 2. above.

#### For case 4: Modified Network 3

For this case it was required to 'fill' the multiplex to achieve near universal coverage (within practical planning limits). To achieve this coverage a further 8 sites will be required, bringing the total number to 11 sites. This is shown in *Figure 2-4* (Indoor/Outdoor, 1% time interference), *Figure 2-5* (Outdoor Only 1% time interference) & *Figure 2-6* (Outdoor Only 5% time interference)

#### Some additional notes:

### **1.1 Incoming interference and sensitivity to other co-block multiplexes**

The general 'Benchmark' for indoor and outdoor co-block interference protection is for 99% time. An additional 'outdoor' prediction has been made at 5% time interference from all the 10C Co-Block multiplexes in order to illustrate the improvement. Even so, with 11 Transmitters, outdoor road coverage remains well below 90% with just 71.82% coverage (1% Time interference) and this improves to 82.94% (5% Time interference). Indoor Coverage is 85.80% of population within the Editorial Area.

Predictions for the 11 Transmitters, Indoor Coverage at 5% Time interference resulted in an improvement of 2.68 percentage points from 85.8% (1% Time) to 88.48% (5% time)

### **1.2 Outgoing interference to other co-block multiplexes**

There is an impact to other co-block allocations from the proposals contained in this report, primarily to Northampton (where the proximity of Editorial Areas is only about 20km distant), but also to the north coast of North Devon and to Surrey.

## 2 Coverage of the Multiplex

### 2.1 Coverage Maps

Coverage maps for the DAB are generally presented with three colours unless otherwise stated:

Blue = Mobile coverage (99% locations at 99% time)

Dark Green = Indoor coverage (80-95% locations at 99% time)

Light Green = Robust indoor coverage (>95% locations at 99% time)

*Figure 2-1* Modified Network 1 & 2

*Figure 2-2* Modified Network 1 & 2 – Outdoor Only 1% Time Interference

*Figure 2-3* Modified Network 1 & 2 – Outdoor Only 5% Time Interference -

*Figure 2-4* Modified Network 3

*Figure 2-5* Modified Network 3 -- Outdoor Only 1% Time Interference

*Figure 2-6* Modified Network 3 – Outdoor Only 5%Time Interference

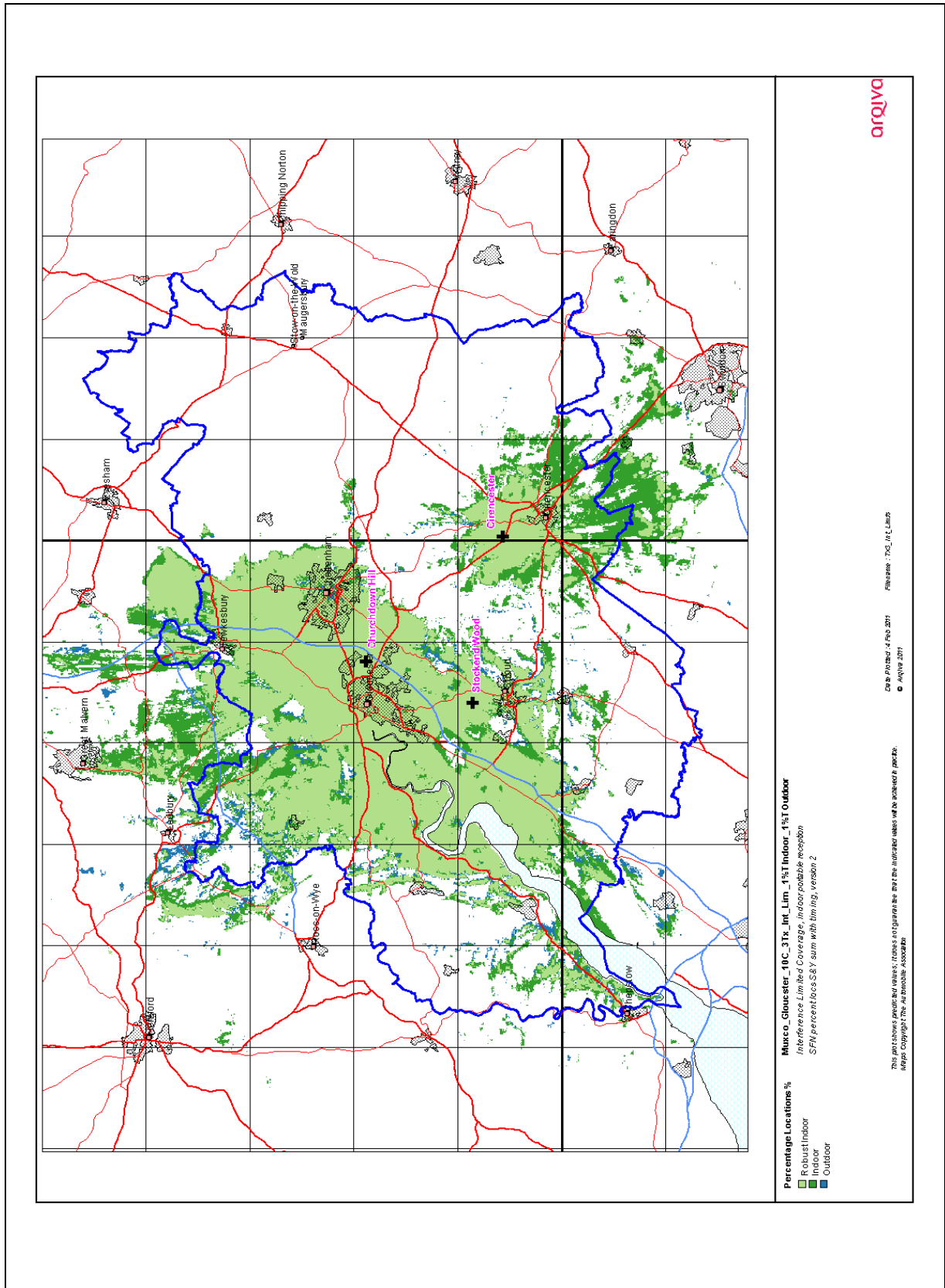


Figure 2-1. Modified Network 2



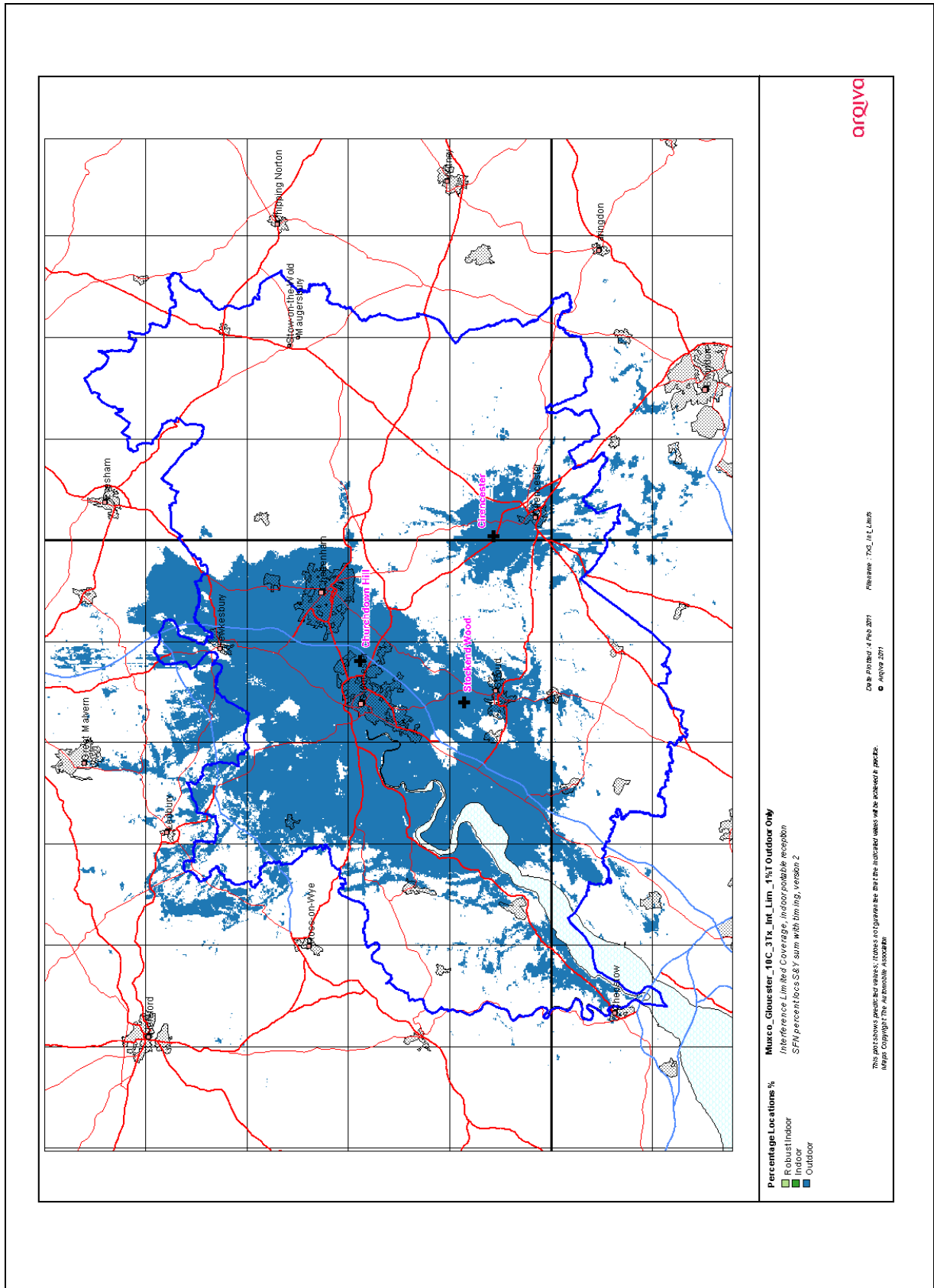


Figure 2-2. Modified Network 2- Outdoor Only 1% Time Interference

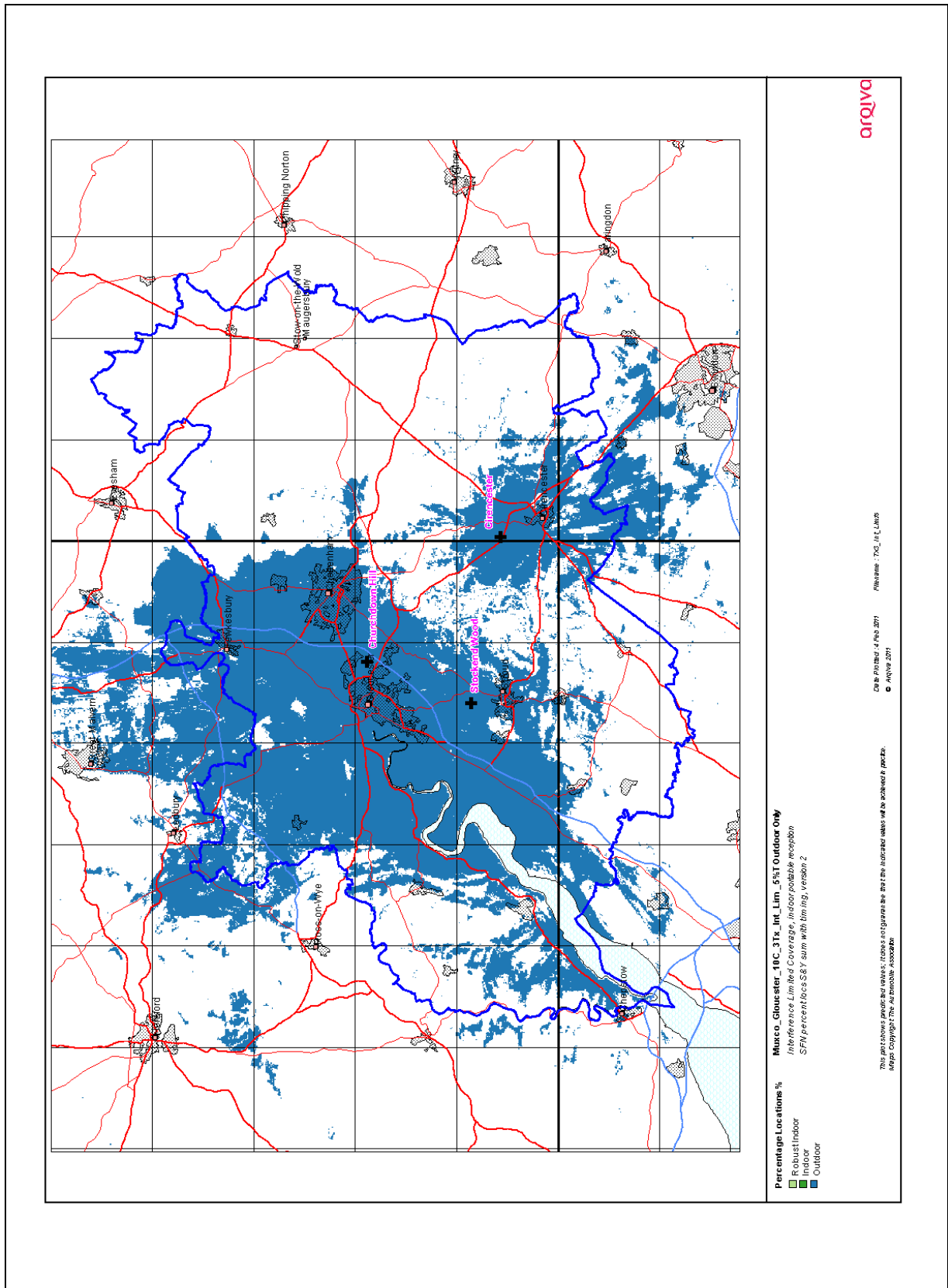


Figure 2-3. Modified Network 2 – Outdoor Only 5% Time Interference

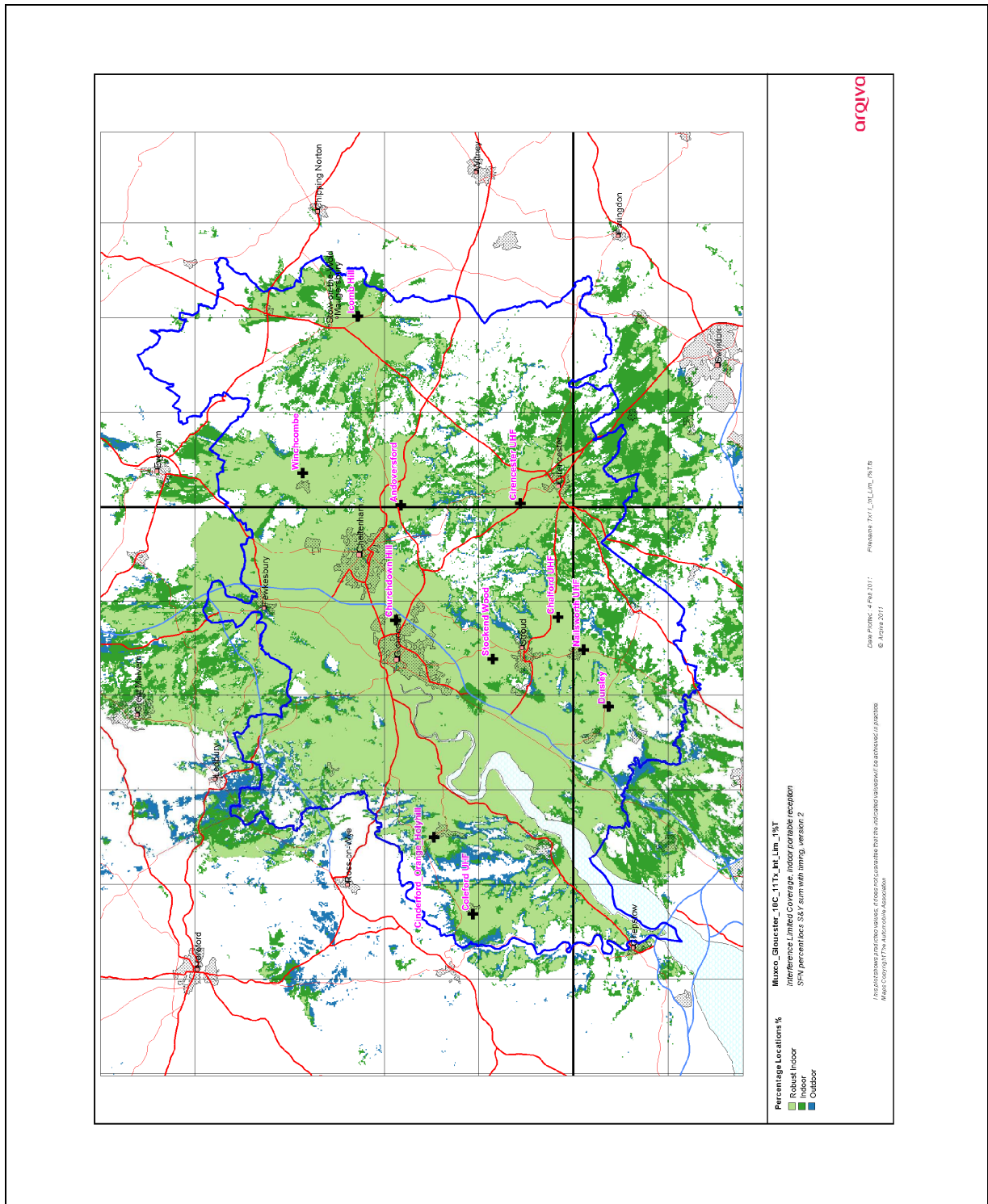


Figure 2-4. Modified Network 3 – 1% Time Interference

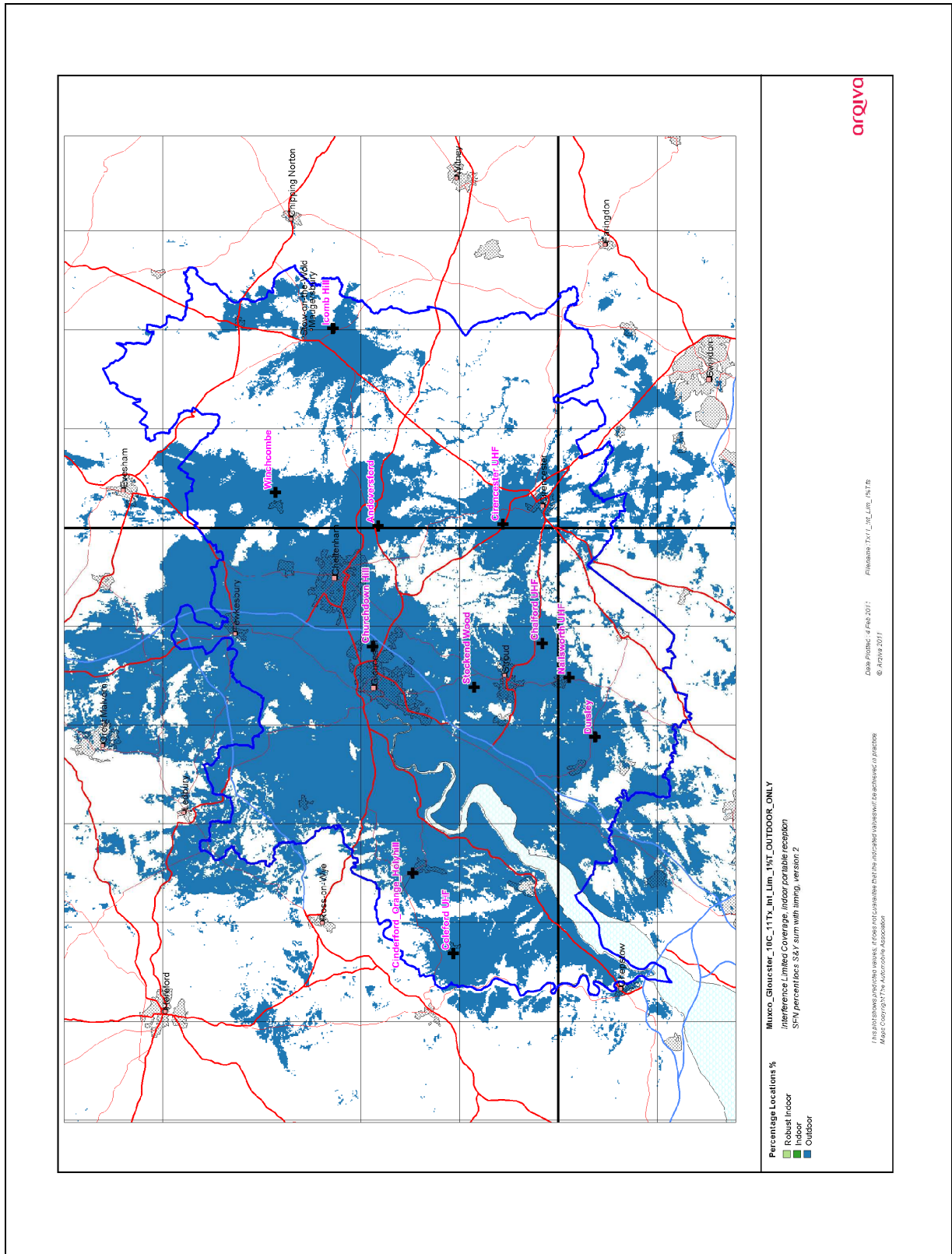


Figure 2-5. Modified Network 3 – Outdoor Only 1% Time Interference

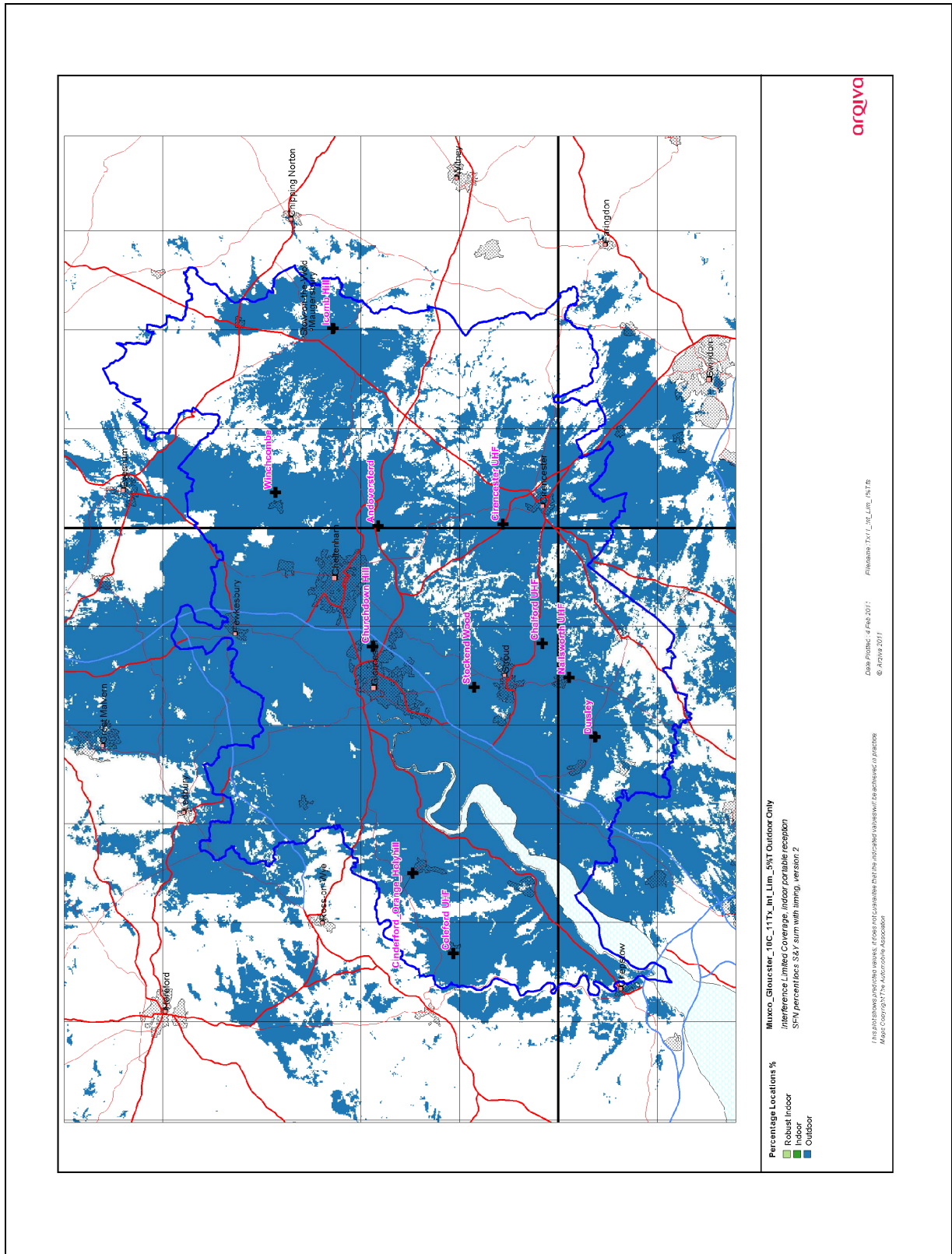


Figure 2-6. Modified Network 3 – Outdoor Only 5% Time Interference

## 2.2 Population Coverage tables within Editorial Area

Table 2-1 Population coverage proportional indoor: Total 265,975 households

Site Scenario and Incremental Additional Sites	Site Type	Individual Gross Interference Limited Coverage within Editorial Area	Number of Households within Editorial Area	Increase in Number of Households	Incremental Percentage Increase of Population (%)	Percentage of Editorial Area (%)
Churchdown Hill	New - Existing in use Infrastructure	137,675 (51.76%)	137,675	137,675	51.76	51.76
Stockend Wood	New - Existing in use Infrastructure	53,085 (19.96%)	167,701	30,026	11.29%	63.05
Cirencester	New	11,643 (4.38%)	180,187	12,486	4.70	67.75
Icomb Hill	New	6,189 (2.33%)	187,225	7,038	2.64	70.39
Dursley	New - Existing in use Infrastructure	30,682 (11.54%)	198,189	10,964	4.12	74.51
Coleford	New	5,371 (2.02)	204,628	6,439	2.43	76.94
Cinderford	New	5,022 (1.89%)	208,994	4,366	1.64%	78.58
Winchcombe	New	3,455 (1.03)	212,819	3,825	1.43	80.01
Andoversford	New	32,567 (12.24%)	219,012	6,193	2.33	82.34
Chalford	New	6,783 (2.55%)	225,495	6,483	2.44	84.78
Nailsworth	New	7,396 (2.78%)	228,196	2,701	1.02	85.80

Case 1		Light yellow	Existing Network – Not applicable
Case 2	-	Purple	Modified Network 1
Case 3	-	Purple + Blue	Modified Network 2 – As Case 2
Case 4	-	Purple + Blue + Green	Modified Network 3

Table 2-2. Road coverage 99% Locations and 99% Time: Total roads 663.4 km

Site Scenario and Incremental Additional Sites	Site Type	Total Road Length (km)	Increase in Road Length (km)	Incremental Percentage of Road Length (%)	Percentage of Roads within Editorial Area (%)
Churchdown Hill	New - Existing in use Infrastructure	218.2	218.2	32.90	32.90
Stockend Wood	New - Existing in use Infrastructure	299.8	81.6	12.30	42.20
Cirencester	New	339.6	39.8	5.99	51.19
Icomb Hill	New	371.5	31.9	4.81	56.00
Dursley	New - Existing in use Infrastructure	405.7	34.2	4.16	61.16
Coleford	New	415.7	10.0	1.51	62.67
Cinderford	New	424.5	8.8	1.32	63.99
Winchcombe	New	426.5	2.0	0.3	64.29
Andoversford	New	460.5	34.0	5.12	69.41
Chalford	New	473.8	13.3	2.02	71.43
Nailsworth	New	476.5	2.7	0.39	71.82

Case 1		Light yellow	Existing Network - Not Applicable
Case 2	-	Purple	Modified Network 1
Case 3	-	Purple + Blue	Modified Network 2 –As Case 2
Case 4	-	Purple + Blue + Green	Modified Network 3

Table 2-3. Road coverage 99% Locations and 95% Time: Total roads 663.4 km

Site Scenario and Incremental Additional Sites	Site Type	Total Road Length (km)	Increase in Road Length (km)	Incremental Percentage of Road Length (%)	Percentage of Roads within Editorial Area (%)
Churchdown Hill	New - Existing in use Infrastructure	258.0	258.0	38.90	38.90
Stockend Wood	New - Existing in use Infrastructure	332.7	74.7	11.26	50.16
Cirencester	New	393.4	60.7	9.14	59.30
Icomb Hill	New	441.6	48.2	7.28	66.58
Dursley	New - Existing in use Infrastructure	479.4	37.8	5.69	72.27
Coleford	New	488.9	9.5	1.44	73.71
Cinderford	New	495.1	6.2	0.93	74.64
Winchcombe	New	497.7	2.6	0.39	75.03
Andoversford	New	535.6	37.9	5.71	80.74
Chalford	New	548.7	13.1	1.97	82.71
Nailsworth	New	550.2	1.5	0.23	82.94

Case 1		Light yellow	Existing Network - Not Applicable
Case 2	-	Purple	Modified Network 1
Case 3	-	Purple + Blue	Modified Network 2 –As Case 2
Case 4	-	Purple + Blue + Green	Modified Network 3



Table 2-4. Summary of Coverage within Editorial Area for each case

Case	Indoor Households & (percentage coverage) <i>Proportional &amp; 99% Time Interference Protection</i>	Mobile Coverage km & percentage coverage <i>99% Locations &amp; 99% Time Interference Protection</i>	Mobile Coverage km & percentage coverage <i>99% Locations &amp; 95% Time Interference Protection</i>
1	n/a	n/a	n/a
2	180,187 (67.75%)	339.6 (51.19%)	393.4 (59.3%)
3	180,187 (67.75%)	339.6 (51.19%)	393.4 (59.3%)
4	228,196 (85.80%)	476.5 (71.82%)	550.2 (82.94%)

Note; Case 4, Indoor Population Proportional & 95% Time Protection, is 235,327 (88.48%)