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## **Digital Switchover (DSO) Programme**

# **Radio DSO Block 12D Southend & Chelmsford**

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Company Confidential

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Author	Denis Ripley				
Verifier	Brian Tait				
Owner	Glenn Doel				
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# 1 Southend & Chelmsford (12D) DSO Narrative

Block 12D assigned to Southend & Chelmsford is an existing allocation with six existing transmitters 'On Air' :-

Transmitter	ERP (kW)
Sudbury	1.0
Harlow (Rye Hill)	0.25
Bakers Wood	1.0
Colchester	0.5
Benfleet	1.2
Maitland House (Southend)	1.0

There are nine proposed Block 12D allocations throughout UK :-

N. Ireland

Edinburgh

Leeds

West & Mid Wales

Stoke

Coventry

Reading & Basingstoke

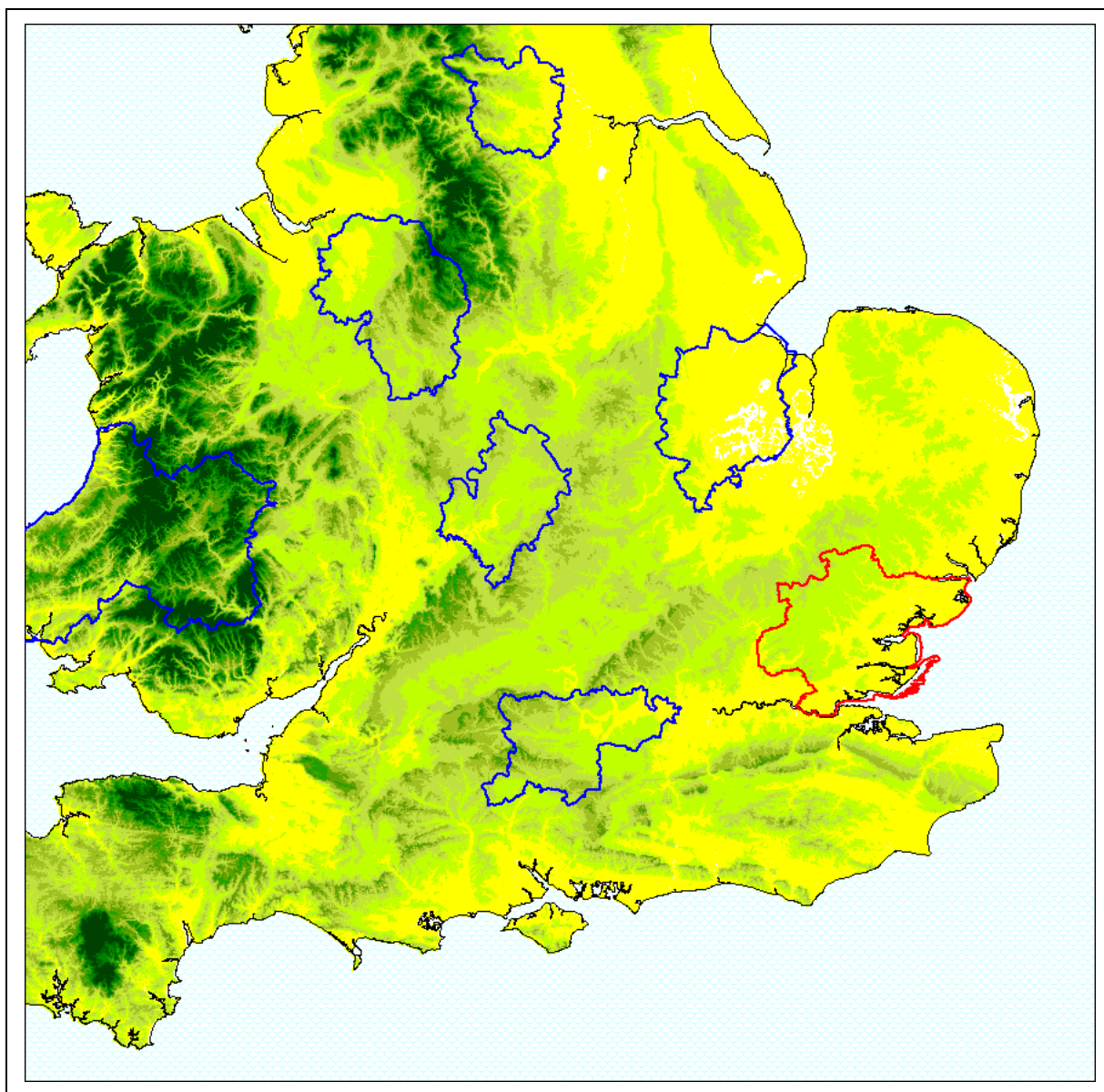
Peterborough

Southend & Chelmsford

All these multiplexes above, with the exception of West & Mid Wales (12D), are currently radiating on block 12D. In addition, West Wilts(12D) is also currently radiating, but the area covered by this multiplex is to be re-allocated to another block.

Fig 1.1 shows these proposed multiplexes in the area surrounding Southend & Chelmsford (12D). This also gives an idea of the terrain in the editorial area in relation to the other co-block allocations.

The close proximity and interposing terrain between Southend & Chelmsford (12D) and Peterborough (12D) is particularly challenging and has required compromises to enable these multiplexes to co-exist in an effective manner. Other multiplexes which have an affect upon or are affected by Southend & Chelmsford (12D) are Reading & Basingstoke (12D), Coventry (12D) and Stoke (12D). The more distant multiplexes of N. Ireland (12D), West & Mid Wales (12D), Leeds (12D) and Edinburgh (12D), using the characteristics proposed, have little or no affect upon Southend & Chelmsford (12D). Similarly, Southend & Chelmsford (12D) has little or no affect upon these distant multiplexes.



*Figure 1.1: Proposed Block 12D allocations*

There is a substantial editorial area overlaps with London (future Block 10C), this is shown on map, Figure 1.2 overleaf :-

In addition there are four further abutting allocations where overspill is possible :-

*Suffolk (future Block 5A) to north*

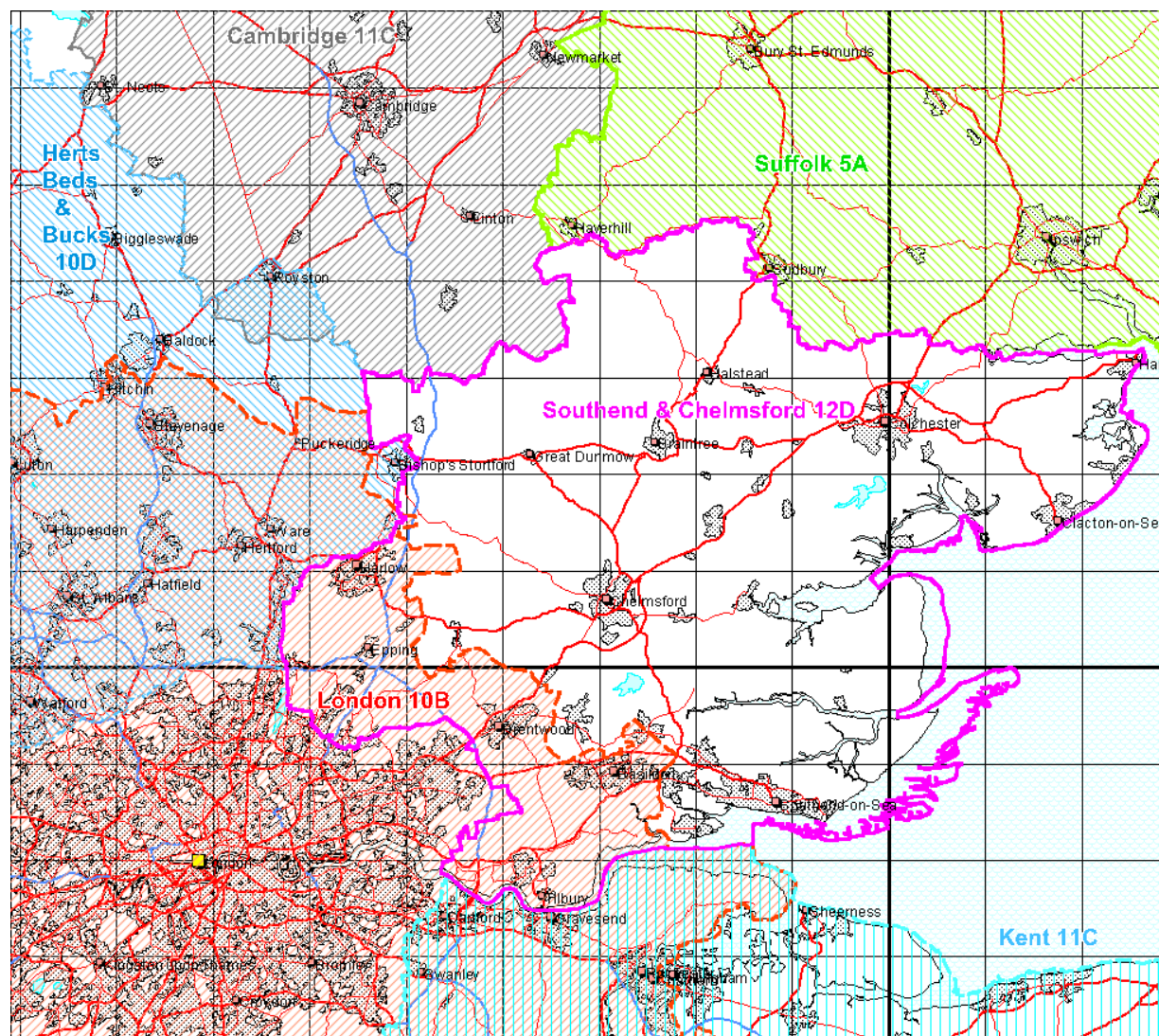
*Cambridge (11C) to north-west*

*Herts, Beds & Bucks (10D) to east*

*Kent (11C) to south*

FM Radio coverage is currently provided by BBC Essex (from *Great Braxted & South Benfleet* transmitters) and Heart Essex (from *Wivenhoe Park, Maitland House, Bakers Wood and Harlow (Rye Hill)* transmitters). The editorial area is generally well served by these combined services; the major exception being the area around the M25 corridor which is generally poorly served.

The proposed Editorial Area has changed; the town of Sudbury – currently served by the existing on-air Sudbury transmitter - in the north, no longer lies within the Editorial Area.



**Figure 1.2:** *Southend & Chelmsford (12D) Editorial Area with Surrounding Multiplexes*

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

*Figures 2-1 & 2-2* shows the current 'on-air' situation in Southend & Chelmsford (12D). There are six transmitters on-air, listed at beginning of *Section 1*, and the antenna horizontal radiation patterns (HRPs) are overlaid. Outdoor interference limited coverage is surprisingly poor given that the predicted noise limited coverage is near universal within the Editorial Area except for the Clacton/Harwich area.

#### For case 2: Modified network 1

The Sudbury Transmitter HRP has been changed in order to reduce outgoing interference to Peterborough (12D) and also to improve coverage for Suffolk (5A) from the proposal to share antenna. It also improves isolation towards the French coast (Recommendation 1547, maximum of 27dBV/m).

The Maitland House antenna has been rotated slightly in order to improve coverage to Southend.

Baker's Wood has also been modified from cardioids to dipoles and an increase in height (removing current C5 antenna and replacing with dipoles).

These 'improvement' must be viewed in the context of the overall 12D Plan together with additional transmitters required within the Southend & Chelmsford (12D) multiplex. Taken on their own, these changes results in lower population and road coverage as may be determined from *Table 2-1*. *Figures 2-4 & 2-5 show the predicted coverage's*.

#### For case 3: Modified Network 2

In this it was required to cover areas where existing local FM. The area is generally well served by FM except, perversely, Harlow which is currently well served from the Harlow (Rye Hill) transmitter of Southend & Chelmsford (12D). In order to overcome interference from other 12D multiplexes, it is necessary to deploy a relatively large number of additional



transmitters - all of the transmitters planned for Modified Network 2 (Robust FM coverage); four further sites are required. *Figures 2-5 & 2-6* shows the coverage which broadly matches the FM coverage. The difficulties encountered from co-block interference, predominantly from Peterborough (12D), makes serving the area to the north-west of the Editorial Area extremely difficult. It could be overcome by installing a large number of smaller relays.

#### 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). This case remains the same as 'Case 3' above although further transmitters could be added to the network.

The proposals for London (Future Block 10B) that serves much of the overlap area to the south of the Southend & Chelmsford (12D) editorial area – in the region of the M25. This area will remain unserved by proposals for Southend & Chelmsford (12D) within this document. In order to serve this area from transmitters within the 12D multiplex, and also protect Peterborough (12D) and Reading & Basingstoke (12D), a number of smaller relays would be required. This is likely to prove difficult in light of the built up nature of the area which would undoubtedly require additional infill transmitters on 10B and the national Blocks 12B and 11D in order to preclude local blocking.

Proposals for a Felixstowe transmitter (Suffolk future Block 5A) will serve the port of Harwich in the east of the area; although a bespoke transmitter affiliated to Southend & Chelmsford (12D) could be considered.

## **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. With 10 Transmitters, outdoor road coverage remains below 60% with 58.4% coverage (1% Time interference). Indoor Coverage is 76.15% of population within the planned Editorial Area; if changes are made to this Editorial Area in the south and north-west, the population would improve significantly.

The most significant interfering co-block multiplex is Peterborough (12D), although Reading & Basingstoke (12D) and Coventry (12D) impact upon Southend & Chelmsford (12D). Stoke (12D) has a very slight affect. N Ireland (12D), West & Mid Wales (12D), Leeds (12D) and Edinburgh (12D) have no impact.

## **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 the outdoor coverage to Peterborough (12D) because of its close proximity to Peterborough (12D). This has been mitigated slightly by changing the Sudbury pattern.

Limiting the HRP of the Sudbury transmitter would give some benefit to Peterborough (12D) in terms of reduced interference. The Sudbury transmitter essentially serves the significant town of Sudbury which lies just outside the new Southend & Chelmsford editorial area boundary. (This town lies within the current Southend & Chelmsford editorial area boundary although it is only served to mono/marginal levels at FM.)

An alternative strategy enabling Peterborough (12D) and Southend & Chelmsford (12D) to co-exist may be to limit the radiation of Peterborough (Peterborough 12D) towards Southend & Chelmsford (12D) but this in turn would have a significant impact upon coverage to Peterborough (12D). The relative merits of various solutions/compromises may require further discussion in the context of a completed DAB Plan



## 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* Existing Situation

*Figure 2-2* Existing Situation – Outdoor Only: 1% Time Interference

*Figure 2-3* Modified Network 1

*Figure 2-4* Modified Network 1 – Outdoor Only: 1% Time Interference

*Figure 2-5* Modified Network 2

*Figure 2-6* Modified Network 2 – Outdoor Only: 1% Time Interference

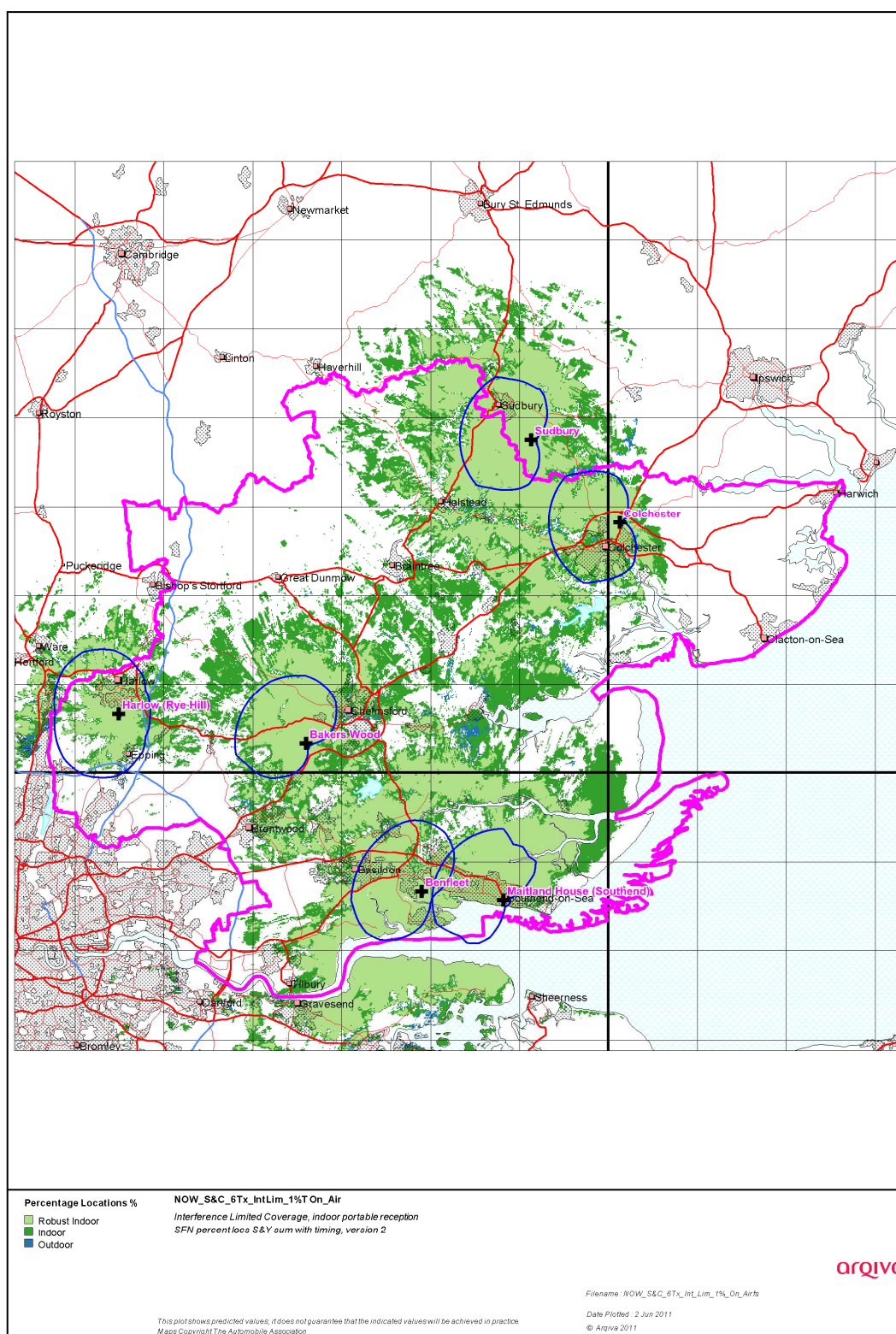


Figure 2-1. Current Situation

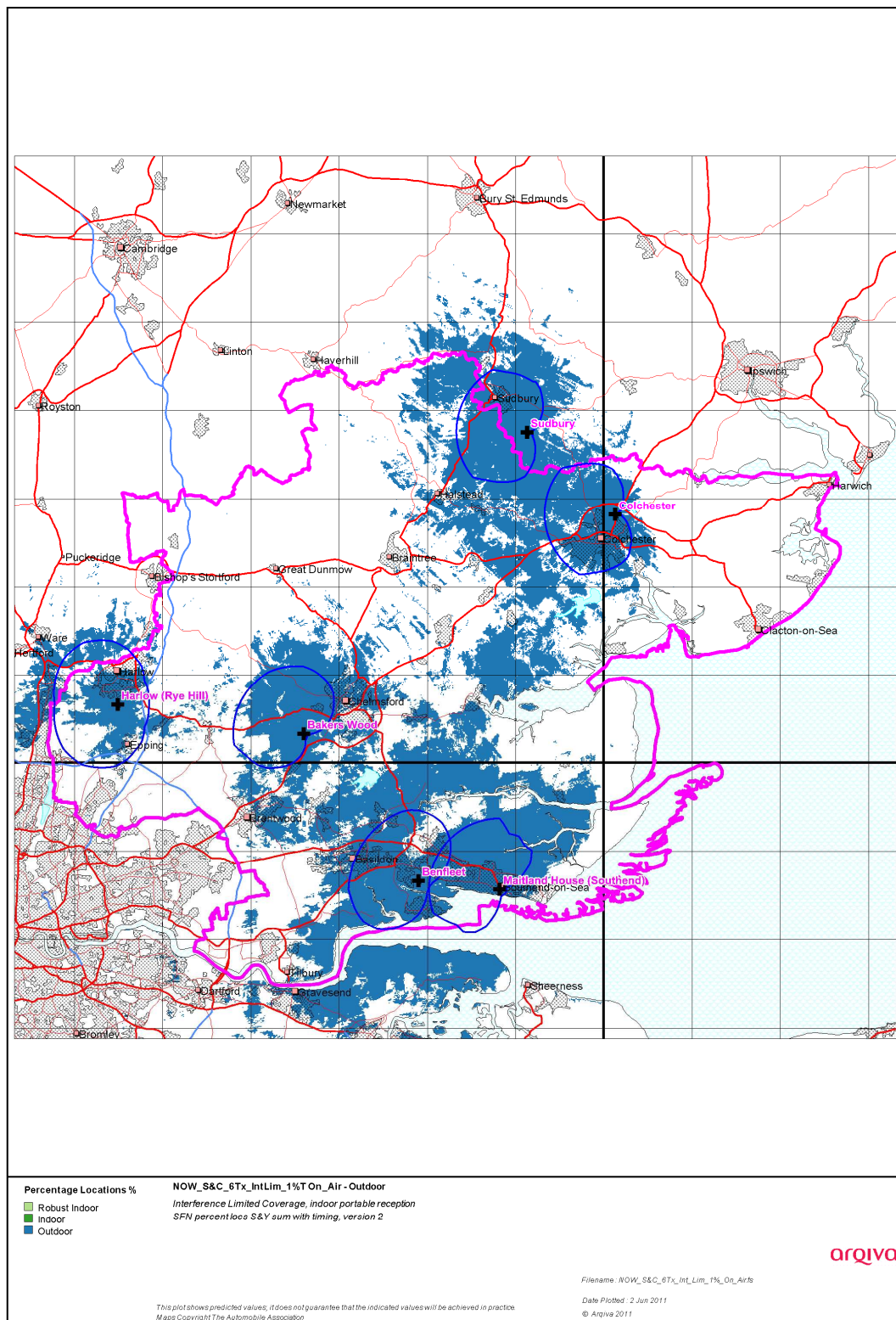


Figure 2-2. Current Situation – Outdoor Only 1% Time Interference



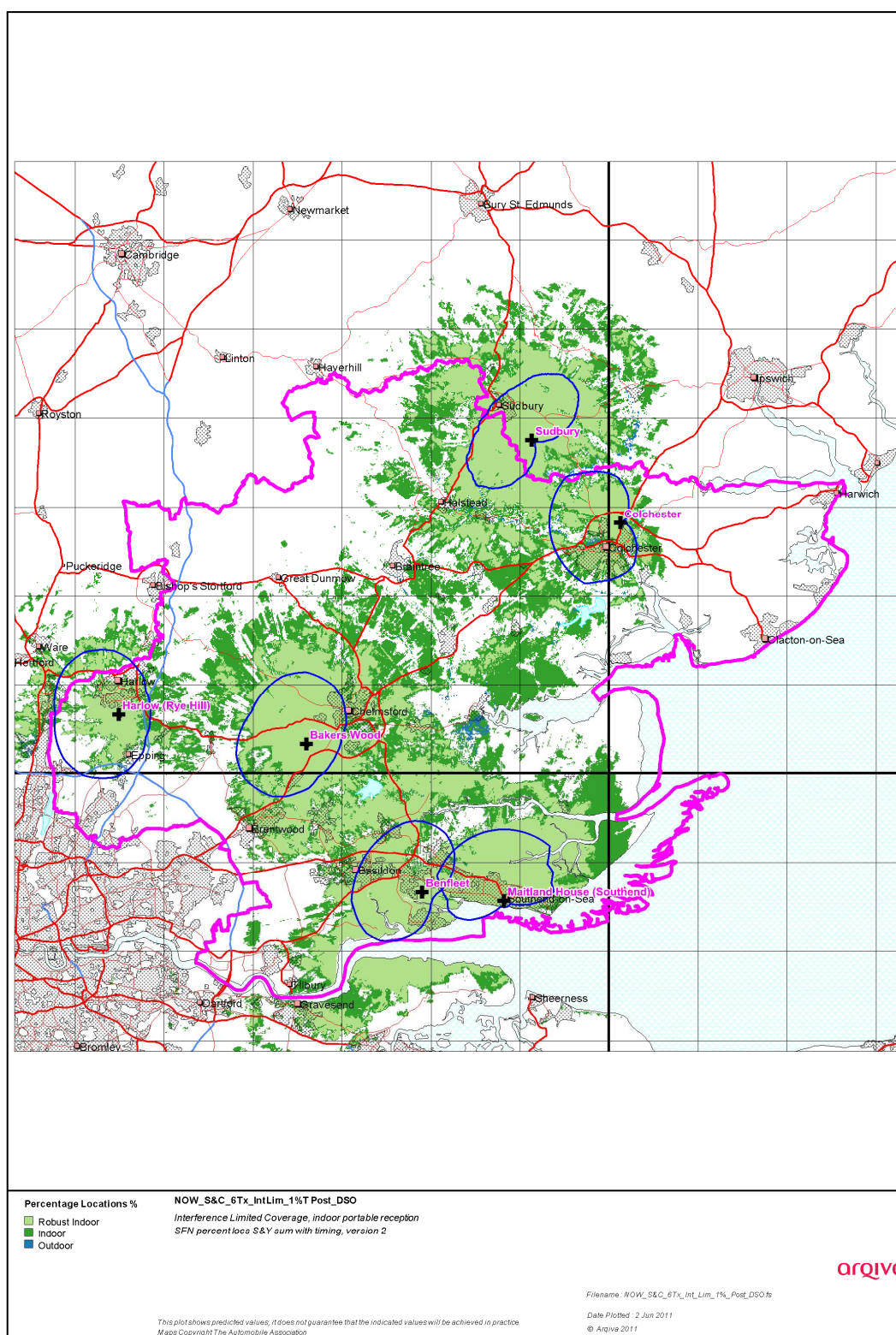


Figure 2-4. Modified Network 1

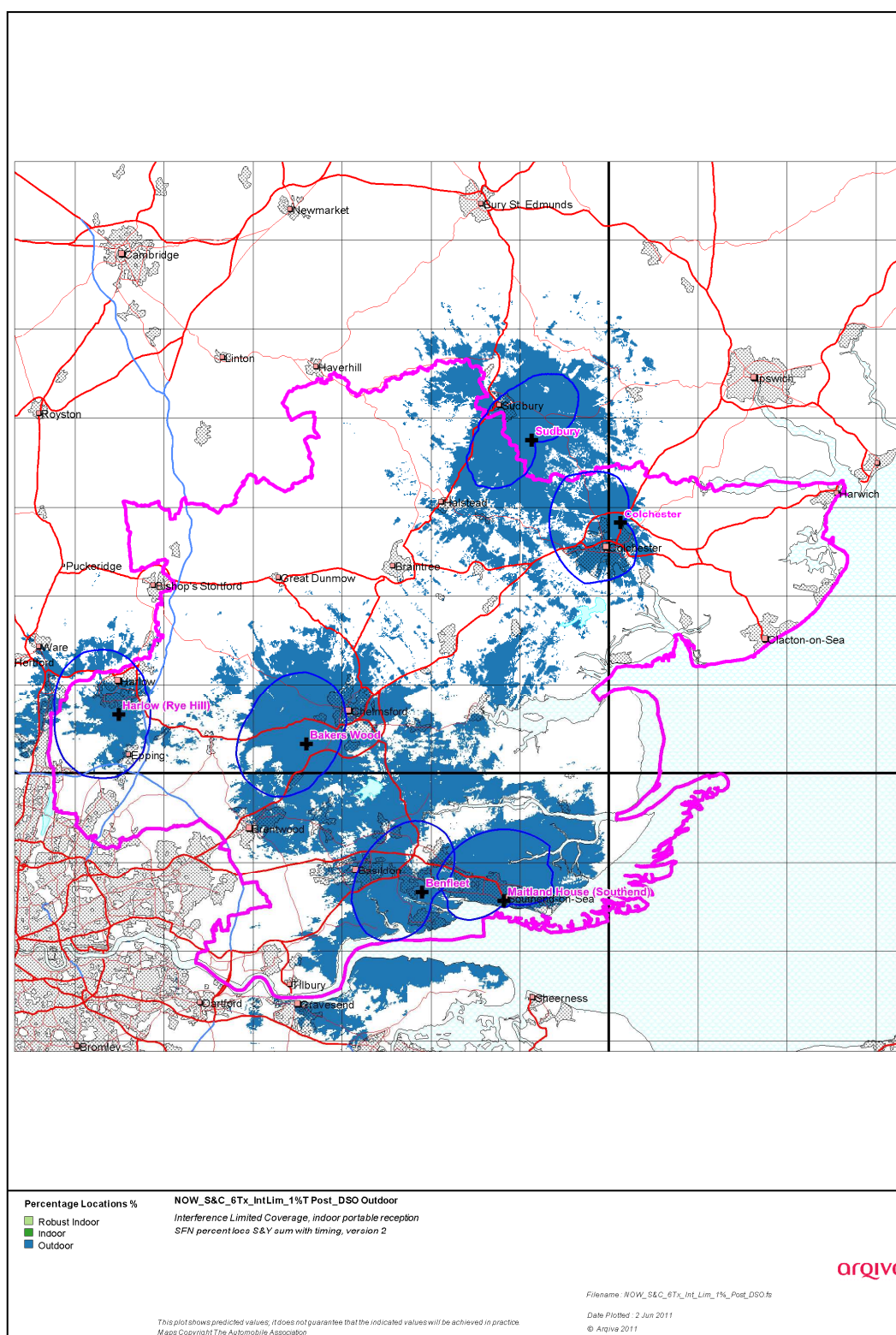


Figure 2-5. Modified Network 1 – Outdoor Only, 1% Time Interference



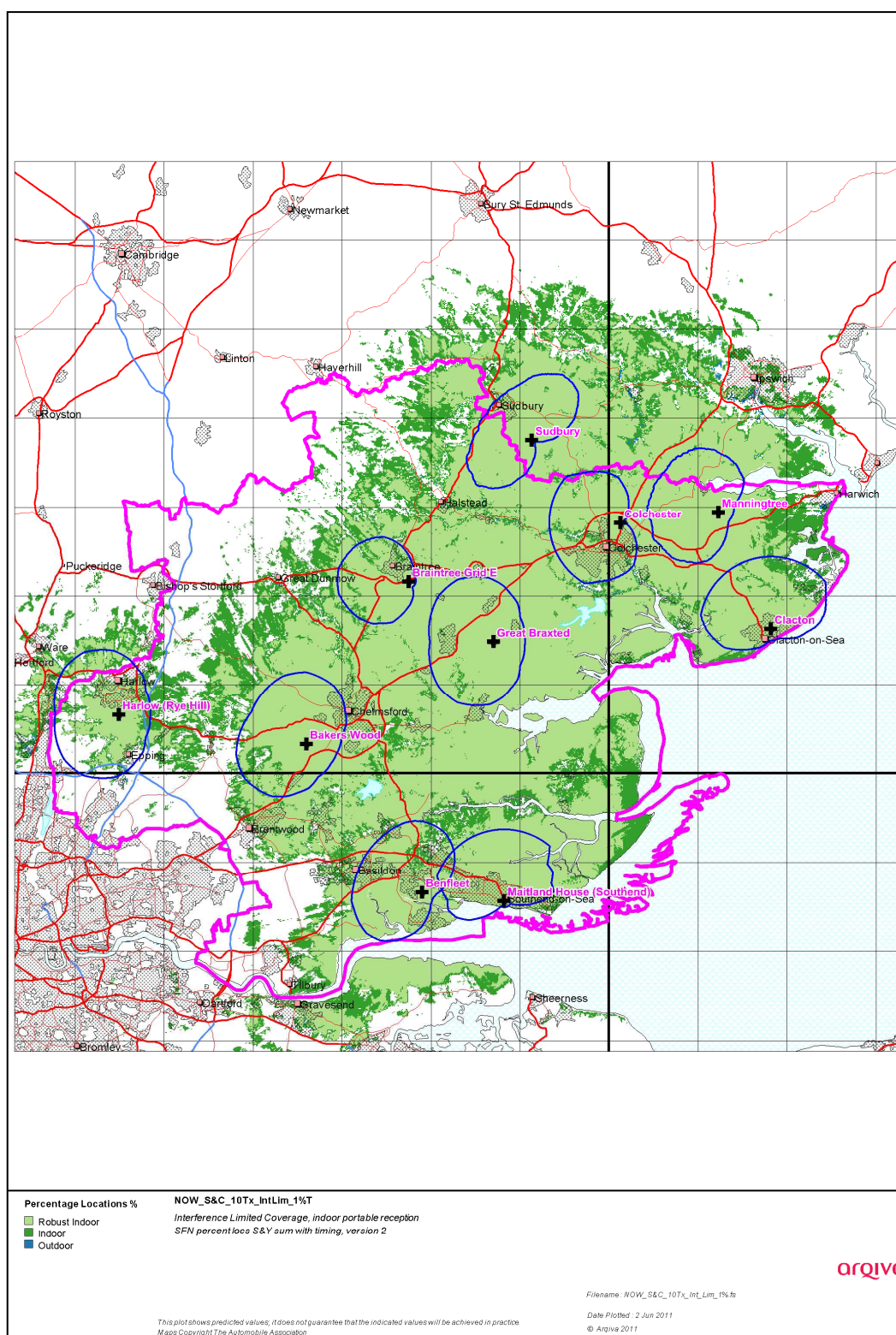


Figure 2-7. Modified Network 2

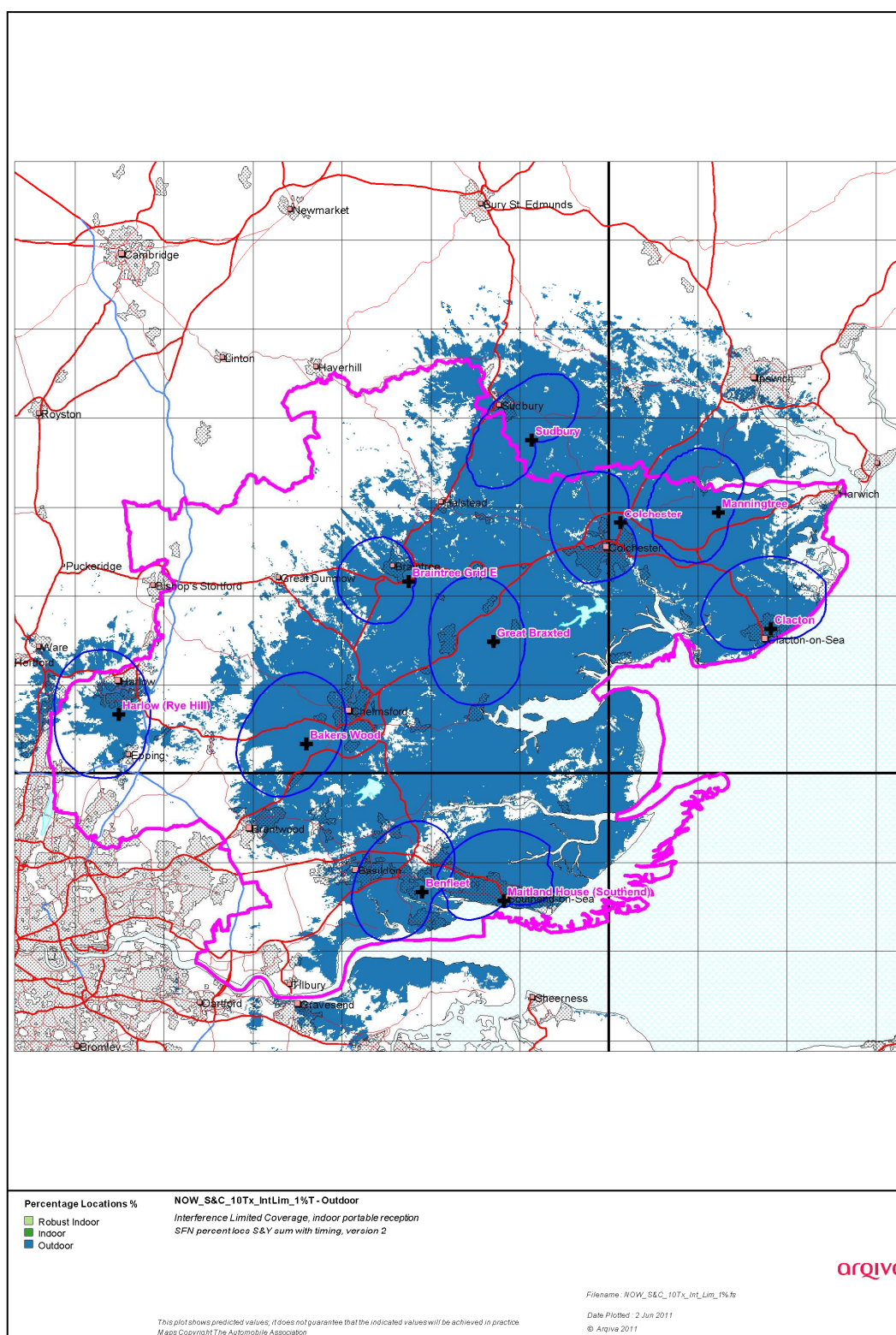


Figure 2-8. Modified Network 2 – Outdoor Only, 1% Time Interference



## 2.2 Population Coverage tables within Editorial Area

Table 2-1 Population - Proportional Indoor Coverage: Total 741,662 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 (%)
Current (6Tx)	Existing	-	426,742	-	-	57.54
Current (6Tx)	Existing	-	423,790	-	-	57.14
Great Braxted	New	69,651 (9.22%)	494,027	70,237	9.47	66.61
Clacton	New	48,945 (6.48%)	530,417	36,390	4.91	71.52
Manningtree	New-Existing Infrastructure	30,087 (3.98%)	555,320	24,903	3.36	74.88
Braintree Grid E	New	21,210 (2.81%)	564,744	9,424	1.27	76.15

Case 1

Light yellow

Existing Network

Case 2

-

Purple

Modified Network 1

Case 3

-

Blue

Modified Network 2

Case 4

-

Blue + Green

Modified Network 3 – n/a -same as Case 3

*Table 2-2. Road Coverage 99% Locations and 99% Time Interference Protection**Total Roads 824.0 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 (%)
Current (6Tx)	Existing	327.7	-	-	39.77
Current (6Tx)	Existing	323.8	-	-	39.3
Great Braxted	New	403.9	80.1	9.7	49.0
Clacton	New	412.1	8.2	1.0	50.0
Manningtree	New-Existing Infrastructure	464.6	60.7	6.4	56.4
Braintree Grid E	New	481.0	16.4	2.0	58.4

Case 1		Light yellow	Existing Network
Case 2	-	Purple	Modified Network 1
Case 3	-	Blue	Modified Network 2
Case 4	-	Blue + Green	Modified Network 3 – n/a - same as Case 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>
1	426,742 (57.5%)	327.7 (39.7%)
2	423,790 (57.1%)	323.8 (39.3%)
3	564,744 (76.15%)	481.0 (58.4%)
4	564,744 (76.15%)	481.0 (58.4%)