Postcode Matrix Design.

To avoid peaks in the fleet requirement across the week, the work load for each day must be made very similar. An approximation can be done on a spreadsheet before any transport modelling is carried out. This shortens the modelling element considerably reducing it to a fine tuning exercise only.

For simplicity it will be assumed that all customers or postcodes have a weekly frequency of one. For multi-frequency matrices, the following process needs to be repeated for second or more deliveries for only the part of the client base or delivery area that has multi frequency.

To maximise the fleet optimisation, the drop density needs to be maximised, and to do this the fleet needs to be focused in one area per day (assuming frequency of one). Assuming a five day week, the country needs to be carved into five areas of equivalent workload. This workload can be pre-calculated on a spreadsheet with the aid of some dummy route runs.

The study must be carried out using at least four average weeks' worth of historical data. It is unlikely that any single week will allow a flat vehicle profile for the long term. The target is to get the average profile flat over four or more weeks, depending on the business in question.

The stages necessary to redesign a postcode to day matrix are:

1. Spreadsheet pre-work
2. Dummy route building to extract stem ratio KPIs
3. Spreadsheet pre-work continued: postcode to day pre-allocation on spreadsheet
4. Routing of model based on spreadsheet pre-allocation.
5. Final nudging of a few postcodes from one day to another to finalise.
6. Repetition for clients or areas with frequency of two or more.

Spreadsheet pre-work

For simplicity Scotland will be excluded. A depot in Stafford will also be assumed. Refer to the complementary map that illustrates the final allocation.

The object of the spreadsheet pre-work is to develop a postcode matrix that will be close to the final matrix with a minimum of routing.

Each day has to have a similar workload for the fleet profile to be flat across the week and without peaks. The daily workload consists in essence of:

1. The sum of all fixed delivery times for the day (minutes per drop)
2. The sum of all variable delivery times for the day (minutes per pallet / cage / etc.)
3. The total driving time for the day.

The first two points above are easy to calculate on a spreadsheet, but what about the third? For this, some dummy route building will have to be carried out to calculate the Stem Ratio.

Dummy Route Building to Extract KPIs

There are two approaches to calculate the driving time element of the overall workload:

1. Routing of each postcode area individually to get an exact driving time for each area. This may be deemed too laborious because there are 105 areas to route, but on the plus side, it will calculate the complete workload for each postcode area removing some of the spreadsheet work described further on.
2. Dividing the country into five or six chunks (depending on the days covered by the matrix) and routing the five or six chunks to calculate their "Stem Ratio". The stem ratio is the aggregate routed driving time divided by the aggregate stem times from depot to each customer.

What routing software will produce without routing is the stem time from the depot to each customer. If the second of the two approaches above is chosen, the sum of the stem times for each section of the country can be multiplied by its stem ratio to get that section's approximate aggregate driving time providing the missing element of the aggregate workload.

Spreadsheet pre-work continued: postcode to day pre-allocation on spreadsheet

For each postcode area within the delivery territory the total working time for the week(s) there will now be:

1. The sum of all fixed times
2. The sum of all variable times
3. The approximation of aggregate driving time

This will add up to 100% workload for the delivery area. The next step is to select which adjacent postcode areas will be visited on which days so that each day's calculated workload is close to 20% for five days or 16.67% for six.

Refer to this sample Postcode matrix design spreadsheet download.

Routing of model based on spreadsheet pre-allocation.

The spreadsheet based pre-selection should be close to the final postcode to weekday matrix. This pre-selection needs to be tested with routing for final adjustment.

Final nudging of appropriate postcodes from one day to another to finalise.

If the average vehicle profile is not flat enough over the four or more weeks, then adjacent postcode areas or sectors need to be nudged from one day to another and the routing redone until the desired result is achieved.

The map illustrates the outcome of one exercise involving frequency of one and a depot in Stafford.

Repetition for postcodes with frequency of two or more.

For multi frequency matrices, the same process needs to be repeated as many times as the number of deliveries per week.

Note that when working on the frequency of one model, for those postcode areas or customers with frequencies of 2, 3 or more, only ½, 1/3 or less of the week's data must be included for the first pass.

The task can become quite complex and laborious because not all areas may be subject to the same frequency service. You may wish to consider me for assistance. You will benefit from my expertise, my speed and more time for you and your team to focus on or day to day business.

Kenneth Paine

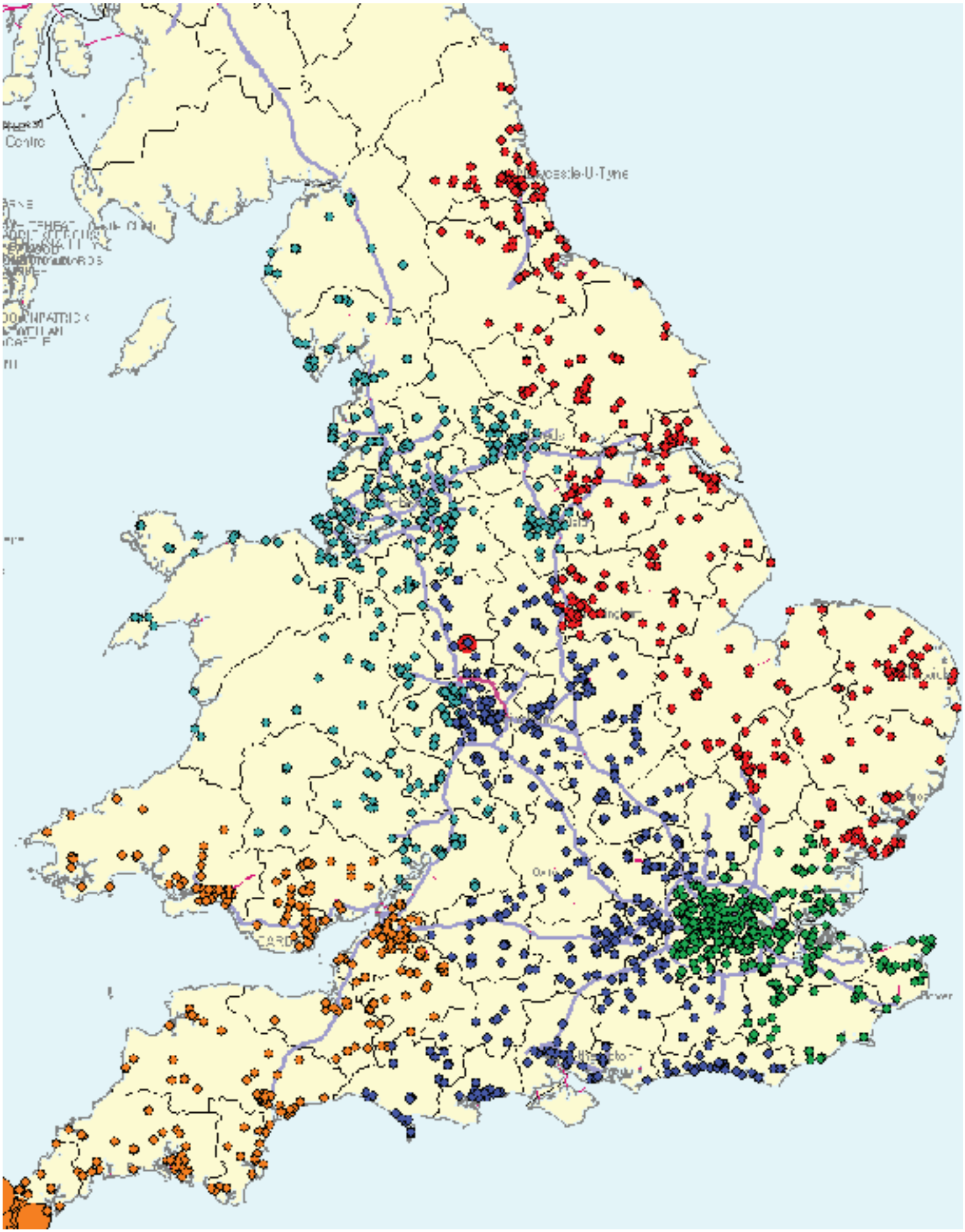
Point Eight One Ltd

01242 577102

07984 175883

kenneth.paine@point-eight-one.co.uk

Do you disagree or have any suggestions? I would like to hear your views.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