

APPENDIX B

Reactive Maintenance of Carriageways

This mainly involves the repair of potholes and small sections of resurfacing but also encompasses the resetting and replacement of ironwork in the carriageway and the renewal of road markings.

1. Conventional Pothole Repairs

Potholes can be repaired with a number of different types of bituminous mixtures. Traditionally, this would ideally have been hot material similar to the original material that was laid. This had durability benefits due to the material being hot it would effectively join with the older material and create a waterproof joint. The disadvantage was that the material needed to be kept hot all day which was costly and with current environmental issues created a large CO2 footprint.

The alternative traditional material was “cutback” which was a mixture of an open graded macadam and a volatile oil which kept the material workable for a number of days. This was used in Emergency situations only and if left in place would result in rutting and moving of the material if subjected to heavy traffic.

For pothole repairs we now use, traditional hot material, cold “deferred set” material and hydrophilic material.

The traditional hot material is used for the non-emergency pothole repairs where the repair can be planned in advance. This will usually be a sand bitumen asphalt mixture but rather than be kept hot all day it will be brought to site straight from the batching plant utilising just in time management practices.

The cold set material is used in the emergency situation and can be used in either wet or dry conditions. However, there are durability impacts if the material is laid in wet conditions. It can almost be classed as a permanent repair depending on the time and effort in the placing of the material and the weather conditions at the time.

An alternative is the hydrophilic material which is used in the emergency situation only due to it being more expensive than the others. However, it can be used in any weather condition and doesn't affect the travelling public as it self-compacts under the weight of passing vehicles. It doesn't actually contain any bitumen as it uses a vegetable based binder which reacts with moisture and water to set hard. This gives us positive environmental benefits.

2. Jetpatching

This process was developed in New Zealand in 1985 and lends itself to the rural rather than urban environment. The first step involves blasting high velocity air to prepare the pothole and remove any stones and detritus. The second step blasts bitumen emulsion into the pothole before finally blasting a mix of stone and bitumen to fill and self-compact the pothole. Clearly in a rural environment it is unlikely that any stones blasted from the pothole will strike someone or damage property but in the urban environment that is not the case. Similarly, the blast of bitumen can carry on the wind and in an urban environment cover nearby property, vehicles and people. Consequently, we don't use this process in Halton.

3. Hot in-situ patching

This method uses localised heat to the pothole which heats the surrounding material. Once soft, the material is raked and a special rejuvenator solvent is then poured over the pothole and surrounding area. New hot material is added from a small hot box on the wagon and raked again with the existing material. This is then rolled and compacted and the patch complete. It has the benefits of a traditional hot patch in that there are waterproof joints with the existing material but can be expensive due to the cost of the special rejuvenator. A problem with this type of system is the potential to overheat the existing surfacing and cook the aged bitumen which makes it more brittle than before. The two main products in the market have been trialled in Halton one of which produces excellent results but overall costs need to come down to make it viable for us to use on a regular basis.

4. Patching

The carriageway patching works carried out by the Reactive team utilise the same materials as those described in Appendix A for programmed carriageway maintenance. However, whereas the programmed works schemes can cost from circa £10k upwards, the Reactive team deal with the smaller but still significant patching works below this amount.