MAIDSTONE JOINT TRANSPORTATION BOARD 29 JULY 2009

Subject:	**Highway Drainage**
Director/Head of Service:	Acting Director of Kent Highway Services
Decision Issues:	These matters are within the authority of the Kent County Council
Decision:	Non-key
CCC Ward/KCC Division:	**All**
Summary:	*To provide Members with an overview to highway drainage within the County & to advise on the improved current position.*
For Information:	**This report is for Members' information.**
Classification:	THIS REPORT IS OPEN TO THE PUBLIC

Introduction

1. To provide Members with an overview of highway drainage within the county and to advise on the improved current position since the transformation of Kent Highways.

Background

2. The importance of highway drainage has been known since Roman times and a key feature of road construction is the drainage system. Kent County Council as the Highway Authority has a legal obligation under Section 41 of the Highways Act 1980 to maintain highways to set standards and this includes the maintenance of highway drainage systems. The objective is to drain water off the highway, under the highway or prevent discharge onto the highway to avoid flooding.

What is a highway drainage system?

3. The metal grids which can be found in the road to take water off the highway are referred to as gullies. Gullies collect surface water from the highway which then collects in gully pots and these drain away via pipework to either the main sewer network, soakaways, ditches, watercourses, ponds, lagoons and rivers etc. Surface water will also flow through roadside drainage channels, catchpits, manhole chambers and culverts to discharge points.

The Asset and its Condition

4. Kent County Council's drainage system is made up of approximately 256,000 gullies which serve its 8,440 kilometres of road network. The inventory information in relation to the carriageway and footway gullies is relatively good and their locations plotted onto a GIS layer. The information held on the inventory for gullies does not indicate such details as to whether they are brick, concrete or cast iron or their size and direction of the outlet pipes. Information relating to other drainage assets is poor. There are many thousand kilometres of pipework and although the exact number of soakaways is not known as many are buried in farmers' fields it is thought to be in the region of 10,000. Similarly, there are no known figures for the number of manhole chambers, culverts, catchpits, ditches, watercourses, ponds, lagoons etc. The council has very little information to confirm the position, size, depth, gradient or

ownership of these drainage systems. Inventory data collection is an ongoing task. The condition of the visible regularly visited sections of the drainage system i.e. gullies is generally known and in reasonable order, whereas the condition of the remainder of the network, which is largely underground, is less known. There is now a dedicated CCTV team recording such information. The drainage asset continues to grow with the adoption of new roads/footways or carriageway improvements.

Risk from Inadequate Highway Drainage

5. The problems caused by a lack of appropriate maintenance or defective drainage systems are:-

- Aquaplaning
- Skidding on ice
- Swerving to avoid standing water
- Flooding and damage to adjacent property and land
- Erosion and damage to the road structure requiring costly repairs
- Delays and disruption to the movement of people and goods
- Nuisance splashing of pedestrians

Prior to Transformation

6. In the years prior to the Transformation of Kent Highways and when Highway Maintenance Units were operating from District Councils under the Agency Agreement, operational engineers were responsible for all aspects of highway maintenance and as a consequence highway drainage only featured as a small percentage of the workload. Drainage and flooding incidents only accounted for approximately 10% of issues raised by residents. Accordingly the drainage budget reflected this figure. Generally two districts shared a gully emptying machine and additional machines if required were hired in on an ad-hoc basis. Flooding was always attended to but blocked gullies that did not caused a problem and required more work than just a clean may have been ignored in place of other more important highway issues. Similarly drainage repairs were only carried out where flooding was a potential hazard or causing damage to properties or land.

Current Cleansing Regime

7. In accordance with the KCC Maintenance Plan, Kent Highways endeavours to clean gully pots on a planned basis with known hot spots being cleaned on a more frequent basis. All works to gullies receiving attention are recorded on worksheets and entered onto a database. During the past year there has been 16 gully emptying machines fully dedicated to either scheduled cyclic cleaning or reactive cleaning. Despite this number, in practice, at various locations, targets are not met due to a mixture of:-

- resource shortfalls
- parked cars
- backlog of blocked gullies
- blocked connections from the gully
- heavily trafficked roads
- narrow roads
- building works or utility companies services works
- flooding sites requiring reactive cleaning

Other factors which affect the service and take longer to carry out the routine cyclic cleaning include gullies being used for fly tipping containing car batteries, vehicle sump oil, garden refuse, hardened concrete and hypodermic needles. Leaf fall in the autumn causes significant problems by blocking gully gratings.

Current Repair Regime

8. In addition to the cleansing of surface water drains there is a programme of works to repair defects highlighted in the drainage systems. These types of works generally involve the excavation of the highway and generally cause disruption to traffic flows. Examples of such repairs or maintenance are:-

- Resetting of gully gratings and frames and other ironwork (manholes) dropped 50mm or more below road level
- Replacing broken gully gratings and frames or other broken ironwork (manholes)
- Replacing stolen gratings
- Replacing cast iron gully pots which have no jetting facility
- Replacing brick gully pots where the brickwork is collapsing
- Replacing gully pots which have been filled with concrete
- Replacing gully pots which are not trapped and emanate smells
- Investigating blockages and repairing collapsed pipework
- Repairing pipework broken by utility companies installing services and recharging costs
- Clearing/excavating and reshaping ditches
- Cleaning soakaways and/or deep boring
- Reshaping of carriageways or footways
- Clearing or cutting of grips

In the first year of formation the drainage team has repaired 861 defects (not including ironwork repairs) across the county. In addition to the above there are major works involving detailed engineering designs to resolve flooding issues.

Criteria for Establishing Priority for Works

9. A list of schemes has been drawn up with the objective of lessening the risk of flooding or damage caused by excessive surface water in order of importance as set out below:-

Level 1
- Sites of known fatalities
- Flooding on high speed roads
- Major flooding to properties (3 or more)

Level 2
- Flooding to properties (1 or 2)
- Flooding to A and B Class roads causing obstruction or potential danger to traffic
- Flooding to unclassified roads causing complete obstruction

Level 3
- Flooding to garages and outhouses
- Flooding to unclassified roads causing minor obstruction
- Damage to buildings caused by water splashing

Level 4
- Flooding of the highway causing splashing to pedestrians

Level 5
- Works to alleviate nuisance (flooding to gardens etc.)

Why Roads will still Flood

10. Problems of flooding will occur despite drainage systems being cleaned and well maintained. Such problems may be caused or exacerbated by a number of factors including:-

- Rainfall of high intensity which is occurring more often and is possibly the consequence of climate change. Large quantities of water arriving on the road, greater than the drainage capacity to take it away.
- Exceptional rainfall washing mud and other debris from nearby fields and quickly blocking gullies which were otherwise clean.
- Long periods of relatively heavy rainfall. This causes land which is normally permeable to become saturated and then acts as if it were impermeable, meaning that any additional rainfall will result in rapidly increasing run-off and overloading of drainage systems and watercourses.
- Soakaways (which are large drainage pits and allow surface water to permeate into the surrounding sub-soil), become ineffective when ground conditions are saturated and/or mud is washed off surrounding fields, silting up the soakaway.
- Highway drainage systems of inadequate capacity, for instance if there are too few road gullies or if drainage pipes, ditches, culverts etc. are too small to take peak flows of surface water run-off.
- The foul sewer network being overloaded, often resulting in water discharging from gullies and manhole covers. This mainly occurs in built-up areas.
- Changes in land drainage patterns. Removal of hedges and woodlands or new springs appearing. Farmers ploughing fields down the fall line instead of across the fall line, allowing water to run off more easily.
- An increasingly common problem is the run-off from front gardens which have been paved for vehicle parking.
- Severe flash floods causing flooding to rivers streams and ditches, preventing highways systems discharging.

The causes of flooding are generally complicated and there are typically a range of contributory factors to any single flooding event

What the Future Holds

11. All the gully emptying machines and the drainage maintenance vehicles are fitted with 'Masternaught' a global positioning system (GPS) for tracking purposes to help manage the inventory and improve efficiency. It is possible in the future to use this innovative technology to record the location and condition of all highway drainage systems and feed the data into the authority's geographical information system (GIS). The benefit of such technology on gully emptying is that the amount of detritus and sediment in gully pots can be ascertained and those gullies in hot spots that silt up quickly can be cleaned on a more regular basis. Similarly, gullies in other locations and lightly trafficked areas may only need a clean once every few years and this information will help produce a more efficient cleaning programme with subsequent cost savings. Another development in the future is the recycling of gully waste. The effects of the Landfill Directive together with the annual increase in Landfill Tax have been to significantly increase the cost of disposal of gully waste (currently at approx. £50 per tonne). It is now possible to process and treat gully waste and to render their constituents safe and suitable for reuse, with the result that less than 5% of drainage waste will go to landfill and so reduce operating costs.

Budget

	2009/10
Gully Cleaning and Jetting	£2,700,000
Drainage Repair Works	£3,100,000

Conclusion

12. This report is for information only and has no budget implications. It aims to highlight the improved level of service since the transformation of Kent Highways and the introduction of a dedicated drainage team. Many long outstanding drainage issues are now receiving attention as engineers work through the backlog of problems. Electronic inventory data collection continues and new exciting technology will help in producing an efficient and cost effective service.

Contact Officers

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