		AGENDA ITEM
		PSEG/32/14
Committee:	**Place Services and Economic Growth Scrutiny Committee**	
Date:	**27 November 2014**	
HIGHWAYS MAINTENANCE AND THE REPAIR OF POTHOLES: SEPTEMBER 2014 SITE VISIT		
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The September 2014 committee activity day comprised a site visit and seminar focussed upon highways maintenance and potholes. It was an informative day as Members were given the opportunity to witness specialist road repair work being undertaken on site, and to learn about a topic from first hand observation and discussion with experts.

An overview of the topic and record of the day's activities is set out in the scrutiny report attached at the appendix to this report. It is proposed that the report be published in the library of scrutiny reports published on the Council's website.

Re**quired by the Committee at this meeting:**

To endorse formally the publication of the attached scrutiny report.

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Appendix

Report of Place Services and Economic Growth Scrutiny Committee Site Visit on 25 September 2014 to consider Highways Maintenance and the repair of potholes

Introduction

At its meeting in June 2014 (Minute 5) the Committee agreed its current work programme, which included a proposal for a seminar on highways maintenance and repair of potholes. The aim of the seminar, as set out in a scoping document submitted at the same time, was to provide Members with a better understanding of how highway maintenance including the repair of potholes is managed and the choices made.

The following report provides a brief overview of the topic, together with a record of the Committee's site visit and seminar that took place on 25 September 2014.

Background

Highway maintenance is a complex subject area. Minor decisions or policies can have a major impact both in the short term and long term.

The total length of the road network in Essex is over 5000 miles and it is likely the most valuable asset the County has, with a value of around £7 billion.

It estimated that 90% of the Essex highway network was created before the 1960's and indeed some parts can be traced back to Roman times. During its evolution it would not have been envisaged that roads would have to accommodate the sheer volume of traffic that now exists on the network. Large parts of the network do not comply with modem design standards with the result that some roads are straining and have a high maintenance demand. This can range from strategic roads such as the A127 to some country lanes such as Pudding Lane in Epping Forest. The type of traffic that uses the network also has a big impact on its deterioration, with one HGV estimated to do as much damage as 10,000 cars.

Highways maintenance demands can become onerous and part of a vicious circle. Due to the demands to keep the network open and keep road/lane closures to a minimum the ability to undertake maintenance and bring it up to standard is reduced. Therefore the options are reduced for doing a long term repair and in some cases roads are reduced to a program of temporary repairs increasing the maintenance liability.

Generally speaking, it is preferable to maintain the asset and not let it deteriorate so that expensive disruptive repairs are required. Some of this work can be addressed by simple inexpensive techniques funded by revenue. However, such work is easily targeted in any funding cuts. The sort of areas referred to include drainage, weed spraying and surface dressing programs.

As with maintaining any other asset keeping on top of this work will reduce the risk and numbers of potholes, and subsequently help to contribute towards improved public satisfaction. However, it is emphasised that these maintenance programs will not

produce short term gains. Decisions taken years ago are only now being realised reinforcing the need to protect these programs.

- Highway Maintenance Inspections

In accordance with its statutory duties the Council carries out regular inspections of the highway network. The frequency of the inspections will depend on the type or purpose of the inspection and the importance of the road. There are two main types of inspection.

- Safety Inspections

Safety inspections are undertaken by in house inspectors and will pick up defects considered to be dangerous for the highway user. Strategic roads or main pedestrian footways will be inspected monthly. Lightly used rural roads and residential roads will be inspected annually. As far as possible an inspection will be carried out on foot by a dedicated highway inspector using a hand held data collection device. For high speed roads or for long lengths of rural roads these may be driven with the inspector accompanied by a driver. The method employed will depend on the risk assessment and what is deemed to be the safest method. This may be using a slow moving vehicle or van appropriately marked and up with lights, or a specialist truck with crash cushion, or other methods.

Aside from carrying out regular inspections the inspectors will also respond to reports about defects from members of the public, police or other sources. These reports will be channelled to the inspectors via Contact Essex, online via CONFIRM, and the customer teams, and are recorded for ad hoc inspection to take place.

- Service Inspection and Condition Surveys

Service inspections are specialist surveys or enhanced inspection that require specialist knowledge or need to be carried out in more detail. These include New Roads and Street Works Act (NRSWA) inspections to regulate the activities of utility companies; Inspections of safety barriers, trees, etc. The frequency will depend on the item being inspected: Assets such as Safety fencing and trees are inspected as part of a rolling programme.

Condition surveys are undertaken by specialist contractors and are used to establish the current state of the road network. These surveys must be undertaken to national methodologies and for some areas of the network form part of the Government's Single Data List and so must be reported to the DfT. The present methodology requires that A B and C roads (predominately our County Roads network) must be undertaken using machine surveys called SCANNER.

- Defects

Problems with the highway material or structure that meet the "investigatory levels" detailed in the Essex Highways Maintenance Strategy (April 2008) are known as defects. The repair times relating to carriageway defects were revised in the summer of 2013, and the current repair and inspection standards can be found using the following

link:
http://cmis.essexcc.gov.uk/essexcmis5/Decisions/tabid/78/ctl/ViewCMIS_DecisionDetails/mid/422/Id/5353/Default.aspx

Due to the size of the network it would be impossible to record and repair all defects that are present. Only defects that meet a criteria or investigatory level will be recorded and assessed priority repair status. This process is set out within the Highway Strategy (pages 48 to 65, http://www.essexhighways.org/Uploads/Files/essex_highway_maintenance_strategy_april_08.pdf).

Defects that are deemed to require an urgent or prompt attention are classified as -

> Category 1 defects and would be made safe either within 2 hours or 24 hours from the time the defect was identified.
>
> Category 2 defects are those that following an assessment are deemed not to represent an immediate hazard or have a low safety risk. These defects are more likely to have serviceability or sustainability implication which if left unchecked could develop into Category 1 defect.

All defects are recorded on the counties Asset Management system called CONFIRM. Each defect has a unique number recording its description, GPS location as well as photos of the defect. This information can then be used to assist the engineers to programme and instruct repairs, defend third party (red) claims, measure outputs and carry out analysis.

- Potholes

By far the most common defect on the highway is the pothole. There is information on the Council's website via link http://www.essexhighways.org/Transport-and-Roads/Roads-and-Pavements/Potholes.aspx

Technically a pothole is defined as the breakup of the highway surface and can be the result of one or combination of three causes.

- Structural weakness – This usually occurs on the edge or haunches of the carriageway pavement structure where it is unsupported by a kerb edge. It is a common problem on rural roads where the edges have been overrun by traffic. It can also occur in the wheel tracks of carriageways, which have not been strengthened to take heavier traffic.

- Impact damage or chemical attack – This is the result of damage caused by third parties from heavy loads impaction onto the carriageway surface or severe point loads. It can also include areas of carriageway where oil or diesel has be spilled, breaking down the asphalt binder.

Water ingress: An asphalt surface is an impervious material. Over time the binder will oxidise taking on the grey colour compared to the black of fresh surfacing. As it oxidises micro cracks form enabling water to get within the surfacing structure. Traffic

loads cause the surfacing to flex putting the entrapped water under pressure. Eventually the pressure will propagate the micro cracks leading to the breakup of the surfacing.

Water is the most destructive element to the highway surface. It will find the weak point in any surfacing whether it will be a micro crack, poor construct joints or reinstatements or cracks that have opened up due to structural faults.

The speed that a pothole will develop is very dependent on a variety of factors. The weather is the biggest influence or catalyst. Flooding, wet weather and freezing temperatures will accelerate the process hence the winter and spring months are known pothole season but they can form at any time. Other influences would be type of traffic or the present of iron works within the structure.

More information on the causes or development of potholes can be found on the APDET report "Potholes and repair Techniques for Local Roads" http://www.ukroadsliaisongroup.org/en/utilities/document-summary.cfm?docid=73BC2560-AB35-480C-90703C6A36E7C811

- Pothole repairs

Once a pothole has formed in the running surface it is essential to repair the damage area before it

a) Spreads further in plan and becomes source of danger or inconvenience for highway users, and

b) Prevent water getting into the lower levels of the pavement construction and damaging the structural stability of the highway.

There are a variety of pothole repair materials or techniques available on the market. Most are just a cold lay material or similar that fills the void that has been created. Their advantage is the speed or ease of use thus making them ideal for emergency works such as dealing with Category 1 potholes or defects. None of them can be regarded as permanent repair, but they do make the defect safe and slow down further deterioration until a full permanent repair can be programmed. Some pothole repairs are permanent – where the pothole is cut out back to sound surface and a patch is applied rather than filling just the actual pothole.

- **Committee Seminar and Site Visit - September 2014**

On the scheduled committee activity day, 25 September 2014, there was a seminar/ site visit organised for the Place Services and Economic Growth Scrutiny Committee to obtain firsthand experience about the techniques used to fill potholes, and management of the highway asset.

Committee members Councillors C Guglielmi, I Henderson, D Kendall, C Pond, S Robinson, and S Walsh, together with Councillors B Aspinell and K Bobbin took part in the activity. Councillor R Bass, Cabinet Member for Highways and Transportation, (on

behalf of his Cabinet colleague Cllr Johnson) also joined the Committee on site to witness how repair techniques are applied.

On the day the Committee was supported by a number of officers including David Forkin, Head of Maintenance and Operations, Essex County Council; Barbara Nash, Head of Stakeholder Engagement, Essex Highways.

Also Paul Goosey, who is the Chairman of the Road Surface Treatment Association as well as a Divisional Director of Eurovia Specialist Treatments (a company working in partnership with Ringway Jacobs) was present throughout the day to provide an industry perspective on relevant issues.

The presence of engineers and highways maintenance operatives was particularly important in making the visit and seminar a success. It was an opportunity for them to explain to councillors the techniques being demonstrated on site and the way that the highway asset is maintained from a practical perspective reference to the different locations visited. Throughout the day councillors were able to ask questions of the experts present, and to draw upon the experience of the skilled workmen on site.

Analysis

The day began with the Committee travelling to the Highways Depot at Springfield. Each member was equipped with high visibility health and safety clothing as they would

be visiting sites where repair work was actually being performed. As a matter of course safety is paramount where ever maintenance is being undertaken on the highway. There are potential hazards associated with the fact that operatives may be handling hot asphalt and heavy machinery, as well as managing passing traffic. All operatives have to wear the proper safety clothing otherwise they cannot work on site.

There is a considerable range of surface patching treatments available, the use of which is determined by a number of variables such as road type, location and volume and speed of traffic. During the visit three locations were visited, and the application of four techniques witnessed. A summary of each location is set out below, together with a brief explanation of the various techniques seen on the day.

Spray Injection Patching Process Trial

Arrangements were made especially to co-incide with the Committee's planned visit so that Members could see a new technique to the United Kingdom being trialled. A spray injection patching vehicle and team had been brought over from Paris to demonstrate how some suitable types of pothole could quickly and efficiently be repaired. The location was Walnut Tree Way, Colchester, which is an estate road.

This type of process is ideal for urban locations as the chippings are deposited at low pressure, which prevents loose chippings being sprayed indiscriminately around the area of working. The extension arm at the rear of the vehicle where the material is sprayed from is very operator friendly, as it is extremely light and easy to move both sideways and up and down. All mixes of material are completely computer controlled, giving consistent results every time. Once an area of repair has been determined, it will be taped off to ensure that all edges are straight making it look very neat and tidy. Any dust or dirt is removed from the area using compressed air or with a fine water spray. The cleaned surface is then evenly sprayed with a fine tack coat to enhance the bonding of the material to the base area. The damaged area is now filled with a mixture of polymer modified bitumen emulsion and aggregate, with the operator being able to adjust the %age mix of binder on the keypad attached to the extension arm. With this particular machine two sizes of aggregate are able to be stored and used, so if the hole is fairly deep then it will be filled using 6mm aggregate, and then topped off using 4 down to 2mm. Once completed, a fine spray of clean 4/2mm is sprinkled on the repair to reduce the chance of vehicle tyres adhering to the surface. The repaired area is now rolled using a ride on roller, and when completely rolled the tape is then removed from the patch accordingly.

Conventional Patching

Conventional patching may be necessary where the pothole repair is deeper, and is more labour intensive requiring a patch to be prepared including digging out the area to be filled, emulsion to be applied prior to the laying of new asphalt by hand. The location was James Carter Road, Colchester, which is an estate road.

Two skilled operatives were working at the site, and through observation and questioning Members were able to fully appreciate the skill and experience that were necessary not only to complete the repair but to interpret local conditions and manage the flow of passing traffic.

Mixture of Jet Patching and Thermal Treatment

Following two urban situations, the Committee travelled to Hardy's Green near Birch to see some more patching techniques in a rural setting. A crew was in the area performing a planned series of repairs that had been identified by inspectors using different coloured markings to highlight their varying priorities.

The number of operatives in the crews doing the thermal treatment and jet patching in the rural location will be between two and four operatives depending on the operational requirements and traffic management control measures required. Sometimes road closures are required.

The Committee ascertained that while the public perception tends to veer towards the view that it would be more practical to address all visual defects in the road surface when a crew is on site, it is not possible in practice or necessarily efficient to do so. If too many additional works are added to a schedule of work when on site, then the overall schedule of works would fall more and more behind with a direct impact upon the repair of high priority defects where road safety considerations are greater. Furthermore not all visual defects may be cause for concern in terms of overall asset management and maintenance due to their position in the road, or they may be more cosmetic than structural defects.

Spray Injection or Jet Patching

Jet patching is performed by a skilled crew using a specially designed vehicle to apply the treatment. It is described by the Road Surface Treatments Association (RSTA) as –

> 'A rapid patching technique suitable for use on rural and urban roads using cold emulsion asphalt which is placed in to the void depression in the road surface under high pressure. The void is first blasted with compressed air to clean the surface and remove any debris, then the surface of the void is sprayed and coated with bitumen emulsion. Finally the asphalt is blasted into the void, self compacting from the bottom up so requiring no additional compaction.' (Quote taken from RTSA website http://www.rsta-uk.org/spray-injection-patching.htm)

Thermal Treatment

Thermal treatment is described by the RTSA as -

> ‘The principal of this technique is to re-heat the damaged area on the surface course using targeted infra-red then re-work the warm mobile asphalt material with a small addition of emulsion binder and aggregate as necessary, followed by compaction to make good the patch.’
> (Quote taken from RTSA website http://www.rsta-uk.org/thermal-road-repairs.htm)

Seminar

Upon returning to the Highways Depot at Springfield the Committee was given a tour of the facility by David Forkin, Head of Maintenance and Operations. Consequently Members were able to learn about the winter service facilities and other machinery and plant on the site. It also provided an appreciation of the working relationship between the maintenance undertaken on the highway network with the provision and availability of materials and equipment, recycling facilities etc at a depot, as well as the underlying management of the maintenance programme.

Following the practical insight that the Committee was able to benefit from in the morning, the afternoon session was designed along the lines of a seminar drawing together factual information on the management of highways maintenance in Essex. While two presentations formed the basis for discussion of the subject and it provided a real opportunity for Members to challenge the information provided particularly as they now had a better understanding of the practicalities of the way that carriageway defects may be addressed.

Paul Goosey, Chairman of RTSA, addressed the Committee as an expert guest speaker. He provided an overview of the Association, which contributes to the development of standards, guidance and sharing if best practice as well as promoting road surface treatments throughout the UK and Europe. As a Divisional Director of a company engaged in the provision of specialist highways treatments, he explained the relationship between his industry, highway authorities and other pertinent organisations.

Building upon the insight Members had achieved that morning, he proceeded to focus upon the different types of surface dressing and specialist patching together with the associated advantages and disadvantages.

With particular reference to specialist patching Paul Goosey highlighted the following benefits:

- Quick permanent solution for rural and urban locations
- Mobile and fast installation
- Minimal disruption to residents

- Can be trafficked in minutes
- No loose aggregate

Aside from the patching treatments he confirmed that 'Surface Dressing' is a long established proven highway maintenance technique. In simple terms it involves the even spray application of an emulsion bituminous binder through a purpose built tanker onto the existing road surface followed immediately by the even application of aggregate chippings to 'dress' the binder.

The benefits of surface dressing are:

- The most cost effective solution to road maintenance
- Fast Installation
- Allows controlled traffic to travel on the new surface immediately
- Seals the road from ingress of water and prevents potholes
- Provides a skid resistance surface
- Will provide a service life of up to 10 to 15 years

While the disadvantages are:

- Initial public perception / Loose material
- Weather constraint

The benefits of surface dressing costs compared to conventional resurfacing (plane and resurface) were illustrated by the fact that in Essex over the past year 260 miles of surface dressing have been applied, whereas only 20 miles of conventional dressing would have been completed for the same amount of money.

http://www.rsta-uk.org/surface-dressing.htm

- Micro surfacing/ Gripfibre

The innovative aspect of micro surfacing is the inclusion in the formula of synthetic fibres that have undergone special surface treatment. They make it possible to apply gap-graded mix designs without risk of segregation and thus ensure lasting surface texture.

It is usually applied in a single layer of about 10mm thickness over properly shaped substrate, and is more suited to urban areas. Gripfibre® extends the service life of structurally sound pavements. It is produced and laid by a single self propelled machine that transports and stores the constituent materials, proportions them, mixes them and spreads them over large widths on the roadway. The equipment used by Eurovia is fitted with extending, variable-width spreaders. Some machines use frontend loading and continuous feed of both aggregate and liquid components and thus achieve very high application rates.

http://www.eurovia.com/media/128665/gripfibre_a4_gb_bd.pdf

Benefits

1. Excellent solution for rural and urban locations
2. Fast Installation
3. Can be trafficked after 20 minutes
4. Minimal Loose material after 24 hours
5. Seals the road from ingress of water and prevents potholes
6. Reshapes the road and provides a skid resistance surface
7. Will provide a Service Life of up to 10 to 15 years

- Disadvantage
  - Initial Public Perception / Very Black!!!
  - Weather Constraint
  - Ironwork must be raised after the surface has been laid

In response to Members' questions as to his impression of the Essex Highways Authority performance, Mr Goosey indicated that from his experience the county has some of the better quality roads in the country, and a good balance of management and work. The management systems in place including the RAG (Red Amber Green) provide an opportunity for early intervention and the planning of works.

Concern was expressed that local roads were not as good as PR1 and PR2 routes, which was thought to be due to the large number of concrete roads. The engineers present confirmed that concrete based roads are more difficult to treat, and therefore the aim is to try to keep them to an acceptable standard otherwise there are large costs associated with their reconstruction.

While Members found it useful to have been afforded a better understanding of the technicalities of highway maintenance and the criteria adopted, as politicians they were fully aware of the difficulties of trying to change public perception as well as address high expectations.

Following on from consideration of the techniques that may be used to repair and maintain the highway, David Forkin, Head of Maintenance and Operations gave a presentation on the way that the Highways Asset is managed in practice by Essex Highways.

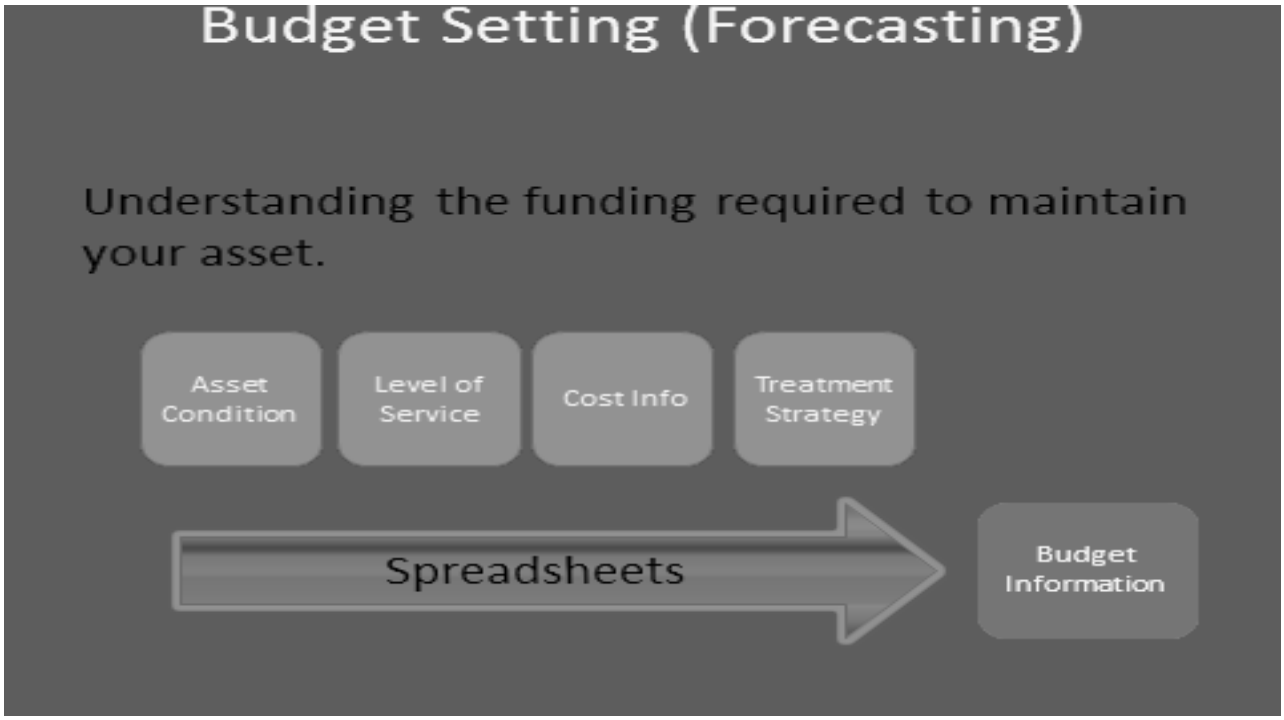
The main Asset System is called 'Confirm'. It is used to manage carriageways, footways, structures, tress, public rights of way, and ITS (ie traffic signals and similar equipment on the network); and holds information for safety inspections works ordering, customer enquiries, gazetteer management, street works management.

Condition surveys are conducted regularly on a variety of highway asset including roads, footways, vehicle restraints, ad hoc tree surveys, and ad hoc grip tester.

Highway Policies are set out in an Asset Management Plan (TAMP), Maintenance Policy, Highway Practice Notes, and Skid Policy, which are available via the Council's

website. Also Materials Guidance and a Vehicle Restraints Policy are under development. Skid policy is under development, of the above, only the Maintenance Strategy is on the website.

Asset valuation is undertaken on an annual basis in line with national reporting requirements, and involves asset owners providing up to date information. GRC is Gross Replacement Cost (cost to replace assets if building for the first time), DRC is Depreciated Replacement cost (what the asset is worth in its current condition).



The Council is in the process of amending its current Maintenance Strategy agreed in 2008, part of which includes the consolidation of existing road hierarchies and clear direction for maintenance standards for carriageways. The new carriageway hierarchy is as follows:

County Routes
PR1 = All A roads and some B Roads
PR2 = Remaining B roads and some c roads
Local Roads
Remaining C roads and all unclassified roads

All PR1 routes will be inspected monthly, PR2 routes will be inspected quarterly, and local roads will be inspected annually. In some instances, footways may be inspected at a different frequency to the adjoining carriageway.

New priority response times have been introduced that only relate to carriageway surface and carriageway structural defects (CWSF and CWST Confirm Defect Types). All other defect types will be responded to in accordance with the existing Maintenance Strategy 2008. Full details of the response times are published on the Council's website, together with an explanation of the paint colours used to indicate the

scheduling of repairs on the surface of the carriageway. Every defect is recorded on Confirm and a job report is maintained.

It is intended that the implementation of the new Strategy will help to manage public expectation partly because there will be a different look and feel for similar roads. It consolidates existing hierarchies, and provides a clear direction for maintenance standards for carriageways.

In financial terms the following funding is allocated

General Maintenance Allocation
- £8.1 million – countywide focus, £3.4 million for carriageways

PR1/PR2 Defect Repair Plan
- £2.5 million carriageway defects

Local Rural Carriageway Defect Repairs
- £3 million

Local Urban Roads Repairs
- £4.5 million – worst urban sites in Essex including carriageway, footway, kerbing and surface covers defects

Conclusions

The approach taken to the Committee's latest consideration of highways maintenance and pothole repairs was innovative in that it placed Councillors in a situation where they not only had an opportunity to challenge what was taking place in a real life setting rather than confines of a meeting room, but in turn their personal preconceptions were challenged. While it was agreed that it would be useful to see photographs of the condition of the potholes that they saw repaired during the visit after they have been in place for a year to assess their success or otherwise, the experience of seeing the techniques demonstrated had highlighted that there is not one technique alone that fits all circumstances and it is a more complex topic than may be popularly assumed.

While Councillors may have had an opportunity to familiarise with repair techniques, and how inspections are conducted including the role of criteria and used of coloured lining on the road surface to identify action proposed, it was accepted that the incidence of potholes would continue to be at the forefront of public concern. It will continue to be extremely difficult to foster greater understanding of the professional approach to the implementation of the strategies used manage the whole highway network, and the actual repairs carried out. Individuals will naturally tend to focus upon those particular potholes that they have personal or local concerns about, and therefore it was important to ensure steps continue to be taken to explain to the public how and why highways maintenance decisions may be taken.

Another feature of the day had been that Councillors had been in a better position to appreciate the skills required of highway operatives, and the difficulties that they may face in carrying out repairs and managing traffic on site. Actually watching potholes

being repaired had been a reminder too that the work does take time to carry out before completed and open to traffic, and had to be considered in the context of the overall scale and ever changing number of potholes across the large highway network across Essex.

In conclusion the Committee agreed that the activity day had proven very successful in equipping those councillors who had taken part with a better understanding of highways maintenance and pothole repairs, and the importance of passing on more informed explanations of the County Council's managed approach to maintaining the network with reference to the links to published information on reporting highway faults, work proposed and undertaken.

Further information may be obtained via the following links:

General information about pothole repairs and the reporting of highway defects
http://www.essexhighways.org/transport-and-roads/roads-and-pavements/potholes.aspx

Information about the programme for repairs 2014/2015
http://www.essexhighways.org/Transport-and-Roads/Roads-and-Pavements/Repair-programme-2014-15.aspx

Homepage of the Road Surface Treatment Association
http://www.rsta-uk.org/index.htm
Specific information about carriageway surface treatments
http://www.rsta-uk.org/surface-products-treatments.htm