



Operation and maintenance of public roads

– considerably more expensive than agreed

The Swedish National Audit Office has audited the Swedish Transport Administration's procurement of basic road maintenance. The Swedish Transport Administration is responsible for the operation and maintenance of 98,500 km of public roads. In 2017 these costs amounted to SEK 10.4 billion. This audit covers the part referred to as basic operating and maintenance contracts, with an annual volume of business of approximately SEK 3.5 billion. The contracts include management, inspection and routine maintenance. Winter-related measures account for an average of 60 per cent of the cost. Before starting the audit there were indications that the final cost is often higher than the contracted cost. The Swedish NAO thus identified a risk that the State would not receive as much maintenance as possible for the money. The audit is based on three questions: The third question is divided into three sub-questions.

1. Are the cost deviations substantial?
2. Are there systematic factors that influence the cost deviations?
3. Has the Transport Administration taken effective measures to minimise cost deviations?
 - a. Does the Transport Administration follow up the work that has been carried out during a contractual period effectively and efficiently?
 - b. Does the Transport Administration base its assessments of amounts on sufficient knowledge of roads' status and needs when assessing quantities for tender specifications?
 - c. Are maintenance contracts designed to promote good resource management?

Audit findings

The overall conclusion of the Swedish NAO is that cost overruns between procured and finalised contracts are large, just over 40 per cent, and that there are systematic differences that the Transport Administration should analyse more closely in order to minimise cost overruns. Better understanding of maintenance needs, so that additional orders can be reduced, would help the Transport Administration to work more effectively in reducing cost overruns, thereby getting more maintenance for the money

Are the cost deviations substantial?

The deviations between the procured price and the final cost are large for the basic contracts investigated. The Swedish NAO has reviewed contracts for basic road maintenance concluded in 2017 and 2018. This means that 47 out of a total of 109 maintenance areas are covered. The average contract increased by 41 per cent. The cost deviations are greater for *Other operation and maintenance* than for *Winter maintenance*. This contradicts the expected result, since the Transport Administration highlighted *Winter maintenance* as being the most difficult part to estimate in advance. The average cost deviation per contract was 33 per cent for *Winter maintenance* and as much as 57 per cent for *Other operation and maintenance*.

The cost deviations are greater for basic maintenance than for other types of contracts used by the Transport Administration. On behalf of the Government, the Transport Administration reports differences between costs in contracts signed and actual outcomes for public works contracts exceeding SEK 10 million. However, as different types of contracts are not separately analysed in this reporting, the government has not learned of the major cost increases and specific challenges that exist for basic maintenance. The cost deviations in the basic maintenance of roads have not been statistically analysed in the past in Sweden, which means that the audit provides completely new knowledge.

Large cost overruns are not always the same as the final cost being abnormally high. An unreasonably low tender may lead to what may be considered to be a normal final cost. Therefore, it is of interest to also try to find out which cost increases can be avoided by working more effectively.

Are there systematic factors that influence the cost deviations?

The Swedish NAO's analysis shows that there are systemic factors that influence the cost deviations, such as differences between different suppliers, how the Swedish Transport Administration organised the work and the length of the contracts. Systematic factors

affecting cost deviations have been estimated in different models for the two categories of *Other operation and maintenance* as well as *Winter maintenance*.

The analysis shows systematic differences in cost deviations between different suppliers. One of the major suppliers had significantly higher cost overruns compared with two others for *Other operation and maintenance*, i.e. the part where the costs increase the most. Systematic differences between suppliers indicate that there is too much scope for the contractor to act strategically. The extent of that scope depends, for example, on the ability of the Transport Administration to prepare accurate estimates of the amount of work to be carried out, called lists of quantities, in the tender specifications.

Some factors influencing the cost deviations have a clearer link to how the Transport Administration has organised work on the basic contracts. Differences between the Transport Administration's five maintenance districts remain even after controlling for the characteristics of the operating areas, traffic and weather conditions. This indicates that the Transport Administration has not advanced far enough in developing its activities to address inefficiencies. Differences due to how long the project manager has been responsible for the specific area are also examples of what the Transport Administration can influence, such as systematising the activity so that it becomes less dependent on individuals and vulnerable to knowledge loss.

Cost deviations grow in relation to the duration of the contracts. Already in contract year two the cost deviations are 40 per cent higher for *Other operation and maintenance*. In the case of *Winter maintenance* too, the cost deviations increase from year two. As the analytical model controls for weather outcomes, the percentage of roads with different winter standard classes, procurement year and region, this indicates that additional orders and increases in adjustable quantities arise later in contracts, independently of these external factors.

Some factors are linked to external conditions which cannot be influenced by the Transport Administration, but which it needs to take account of. Examples of these are the different nature of operational areas and the weather. To some extent, complex installations and bad weather will always lead to higher maintenance costs, but this can be managed more or less effectively. It is therefore important that the work to be carried out should be described as accurately as possible in the tender specifications.

Has the Transport Administration taken effective measures to minimise cost deviations?

The audit shows that, in addition to improving the collection of information, the Transport Administration also needs to introduce new methods of analysis and planning so that the

new information can be used to serve a useful purpose in the procurement process. This involves both the preparatory work for new contracts in each individual operational area and the way the results of the work at an overall level need to be analysed in order to draw lessons to improve future tender specifications.

The Transport Administration's routine monitoring to verify that the contractor performs the work ordered under the contract has been improved in recent years. The Swedish NAO considers that the basic tools are now in place. A significant change was made in 2016 when the GPD analysis tool was introduced. The tool collects exception reports from various sources so that both the commissioner and the supplier have a good overview of the work that needs to be done, when it is to be completed and what has been completed and can be signed off. The Transport Administration has also taken steps to ensure a minimum level of physical checks of the condition of roads to be carried out on an equal basis across the country.

However, the audit shows that longer term monitoring, with the aim of developing activities and bringing back lessons from previous contracts to future procurement, has shortcomings. The main means available to the Transport Administration to reduce the risk of cost increases is to specify as accurately as possible at the time of procurement, what is to be included in the contract. If this is done successfully, not as many additional orders will be necessary - orders which risk being more expensive than the work already included in the contract. This also leaves less room for speculative pricing.

The Transport Administration has templates and guidelines at national level which govern the process of producing tender specifications, but the difficult part occurs when the content is to be adapted to the roads in a specific area. The challenge is to get as much as possible of the future maintenance work into the contracts right from the start, by using historical experience and knowledge of the respective area. However, the Transport Administration's approach is not based on the availability of such evidence, so the basic problem of a high degree of dependence on individuals and lack of a systematic approach is not remedied by the five national coordinators who are to assist the project leaders with analysis and support.

Project managers are currently dependent on the information they themselves or their predecessors in the best case have documented concerning work done under previous contracts. This is not searchable in any database. Only in 2018 did the Swedish Transport Administration start to require project managers to report on purchased quantities in the contracts using a measuring subsystem that collects data on a monthly basis. This means that information from the measurement subsystem for the entire previous contract will only be available for contracts launched in 2022-2024. The installation data system also has

shortcomings, and the documentation of additional works is not carried out in a uniform manner.

Furthermore, the use of additional works has not been identified and analysed in sufficient detail at national level to identify whether there are patterns for when excess production or overcharge problems arise. Such information could provide a better understanding and knowledge that project managers can benefit from in analysing their own area ahead of a procurement process.

The Swedish NAO considers that the basic contracts are sensitive to unbalanced bidding. Suppliers can set prices based on speculation that the need for certain types of works will increase or decrease compared to the tender specifications and the Transport Administration has little scope to limit this through restrictive rules in the tendering phase. In 2018 the Supreme Administrative Court ruled that it is not permitted to impose mandatory requirements whereby an hourly rate below the floor price will not be adopted. Following the decision of the Supreme Administrative Court, the Transport Administration considers that it is only able to use ceiling prices and to reject tenders where prices are set at zero or lower for individual accounts, and to make use of certain overall rules on how remuneration may be allocated. This means that various tenderers' prices for the same account can vary substantially, which is a sign of speculation.

There are two main problems that can arise due to prices based on speculation on changes in the volume of work. One means that the contractor's incentive to implement different types of measure is influenced by whether they are high or low priced. If one type of measure is abnormally low priced, more active steering and follow-up may be required to ensure that the work is actually carried out in accordance with the order. This is made more difficult when weighing up factors where the need is not obvious. Although the Transport Administration has improved its monitoring of suppliers' work, this risk persists as long as pricing creates such incentives.

The second problem concerns the fact that the Transport Administration cannot know which tenders will ultimately offer the lowest cost because of the large differences between the tender prices and the final costs. The Transport Administration's ability to counter unbalanced pricing is limited due to the design of the procurement legislation and the inability of the agency to prevent price speculation affecting the final cost. This also results in an uncertain market for suppliers. The audit indicates strongly that the State could obtain significantly more maintenance for the funds spent. However, the current follow-up and documentation do not allow the analyses that could more accurately estimate the actual scale and impact of unbalanced bidding. The Swedish NAO therefore considers it important that the Transport Administration carry out such analyses before the Government and the

agency take a final position on what further steps should be taken to ensure more maintenance for the money.

Recommendations

In view of this, the Swedish NAO makes the following recommendations:

To the Government:

- Instruct the Transport Administration to analyse the scope and consequences of unbalanced bidding in basic road maintenance contracts. The audit shows that the cost deviations are particularly large in the basic contracts and the more comprehensive analysis requested by the government is not sufficient to decide on specific measures to improve the basic contracts.

To the Swedish Transport Administration:

- Develop a new process to systematically quality-assure the estimated work needs in the tender specifications so that the newly introduced measurement subsystem is actually used to improve the tender specifications and ultimately contribute to more efficient procurement.
- Ensure that additional orders are documented in a uniform manner and make a national survey of how they are used. The prices of additional orders should be compared with calls in the ordinary accounts in order, for example, to be able to assess the nature of the additional orders involving the greatest cost increases.