Authority for vacuum systems for waste. Response to commission from the City Development Committee and the Traffic and Waste Management Committee, dated October 2008

Proposed decision

1. The City Development Committee and the Traffic and Waste Management Committee approve the offices' joint statement as a response to the commission.

2. The City Development Committee and the Traffic and Waste Management Committee approve the proposal concerning the city financing and owning future stationary vacuum systems for waste and recyclables.

3. The City Development Committee and the Traffic and Waste Management Committee will submit the matter to the City Council for approval.

4. The City Development Committee and the Traffic and Waste Management Committee will propose to the municipal council that they decide upon further investigation concerning where organisational responsibility should lie for the vacuum systems.

5. The City Development Committee and the Traffic and Waste Management Committee will submit the decision to the parties in the construction and property industry in the letter for their information.

Krister Schultz
Director of City Development Administration

Magdalena Bosson
Director of Traffic Administration

Appendix 1: Letter "Authority for underground waste transport systems with vacuum technology"
Background

Case/investigation
In October 2008, the Traffic Administration was commissioned on behalf of the Traffic and Waste Management Committee to work in cooperation with the City Development Administration and the City Planning Administration to examine the consequences of a municipal takeover of authority for underground waste transport systems with vacuum technology, and also to illustrate alternative options for handling the financing and operation of the same. The background to this was a letter which the Traffic Administration, City Development Administration and City Planning Administration received in June 2008 from 18 parties in the construction and property industry (Appendix 1). In this, the developers pointed out difficulties when underground waste transport systems with vacuum technology were managed by cooperative associations. They proposed, therefore, that authority for the systems should be held by the city instead of by property owners or cooperatives.

Representatives of the Traffic Administration, the City Development Administration and the City Planning Department have taken part in the investigation. The legal department at the City Executive Office has been engaged in order to illustrate the legal aspect, and information and views have been obtained from developers and other parties. The consequences of municipal authority have also been illustrated for existing housing areas.

Vacuum technology as a waste handling system
The Traffic Administration is working broadly with a gradual transition from manual to automatic collection systems for the city's waste, which is producing a better work environment, more rational collection and fewer transport movements. An underground waste transport system with vacuum technology is a form of automatic system in which waste is transported in pipelines from the refuse inlet point to the collection point. In the case of stationary vacuum system, the waste is extracted by vacuum to a central terminal, from which it is then picked up by a container truck. In the case of mobile vacuum system, waste is collected in tanks beneath the inlets, from which it is then extracted by vacuum to the vacuum truck when emptied. One advantage of the stationary vacuum systems, besides improved collection conditions, is the fact that the terminals can be sited on the outskirts of housing areas so that vacuum trucks do not need to use the streets in the district.

There are currently around 400 underground waste transport systems in Stockholm at present, of which some 160 have stationary terminals. There are around 90 000 households connected to these; that is, around 25 % of the total number of households in apartments. These systems are owned by property owners or cooperatives, while the city deals with picking up and treating the waste.
Stationary vacuum systems are considered to be part of the infrastructure when constructing new buildings in both Stockholm and other cities. With this approach, it is possible early on in planning to create conditions for sustainable, eco-friendly waste disposal. Underground waste transport systems also allow litter bins, for example, to be connected up, which will reduce problems with over-full waste recycle bins.

### Analysis and consequences

**Waste disposal in city development areas at present**

Most of the new buildings for housing purposes which are being constructed in major projects are currently being connected to stationary vacuum systems. Examples of projects where stationary vacuum systems are currently being planned: Norra Djurgårdsstaden, 5000 apartments; Annedal, 2500 apartments; and Norra Station, 3500 apartments. In these areas, the city has taken the initiative to set up vacuum systems for waste. Developers are being obliged to connect to the refuse suction system by means of city development contracts.

Planning of underground waste transport systems has to be started early on in projects, together with the city's project planning for streets and pipeline systems. However, the cooperative associations are formed a lot later, often once the underground waste transport system has begun to be extended. This means that the City Development Administration is forced to take on the role of client for the underground waste transport system in consultation with the developers. The city is then responsible for dimensioning, project planning, procurement and construction of the system.

In this way, the city already takes on a central role in the construction of major stationary vacuum systems, as a client and executor, and bears the risk and cost of investment before the system is handed over to the cooperative.

The main problems with the major systems which have been expanded over the past few years are administrative and technical in nature. Several of these systems are very large. There are currently up to 30 properties, covering around 3500 apartments, participating in existing systems in Hammarby Sjöstad. For future areas, such as Norra Djurgårdsstaden, plans are being laid for systems for around 5000 apartments. Another problem with this large communal system is that main pipelines which link the various properties to the refuse suction terminal have to be laid to a great extent in a public place: the street. The cooperative association that is then formed to manage the underground waste transport system is responsible for operation and maintenance of the system. Although day-to-day management can be assigned contractually to someone else, responsibility rests with the Board of the cooperative association to negotiate with the manager and for the owners of the
participating properties to take responsibility in the case of investment decisions for reinvestments. Authority resting with the individual properties also has the disadvantage that co-owners are often parties of differing natures, with differing interests. They also have different expertise and experience of technical property management.

**Waste disposal in existing buildings**

The inner city of Stockholm, with its older buildings, there are a lot of refuse collection sites which are problematic as regards manual collection, mainly as regards the work environment. Around 70% of waste is collected in recycle sacks. Collection is often hindered by stairs, for example. When bins are used, in around 70% of cases these are located more than 10 metres from the refuse truck's stop location.

Around ten collection points at Södermalm have recently been made subject to a safety stop, which means that the main safety representative for the refuse collection operatives has deemed it impossible to collect waste for work environment reasons until measures have been put in place. To ensure waste collection temporarily, the property owner has to place the sacks on the street outside the property prior to collection, or else are containers placed out on the street at set times. These are not long-term solutions as they are unwanted additions to the city environment and they prevent access to the areas. A further ten collection stops can be expected to be imposed on areas to the south as early as February. The Traffic Administration is of the view that this number will continue to increase, and estimates that there are a further 5,000 properties or more in the Stone City which risk being made subject to collection stops. In some instances, it may be possible to convert existing waste collecting rooms or set up new ones, but in many cases this is not feasible; instead, other solutions are required such as stationary or mobile vacuum system.

Many property owners are constructing or planning to construct mobile vacuum system. In 2009 (January – November), 13 property owners applied to the licence unit at the Traffic Administration to build pipes and docking points on streets. Eleven of these have been approved and ground laying contracts have been entered into. Mobile vacuum systems resolve the work environment problem but not the accessibility problem in the inner city. Waste collecting trucks often have problems stopping in appropriate places, while at the same time they themselves often cause an obstruction for other traffic. Mobile systems are also associated with noise problems.

The fact that stationary systems are not being installed at present in existing buildings is probably due to the high investment costs associated with these. Given the current ownership model, property owners affected are required to work
together and invest jointly in a system, and to take responsibility for its ownership and the costs associated with it.

A pipeline system has to be constructed with a stationary vacuum system in the inner city. Pipes for water, drainage, district heating, city gas and cables for electricity, telephones, data communications, etc. are already laid beneath streets and pavements. In some cases, space can be so restricted that it is not possible to accommodate more pipes. In such instances, other solutions may be necessary. For instance, the property can be connected to a mobile refuse suction system or a bottom-emptying container can be sited there.

**Municipal authority for underground waste transport systems**

**Advantages**

The city is already responsible for most of the project planning and implementation of refuse suction systems within city development areas. Extended responsibility in the form of ownership and management will give stability and a long-term perspective for operations.

Municipal authority will give the city control of which system is to be used, based on the requirements and opportunities in the respective areas. The city can then more effectively plan for and ensure a good, environmental waste disposal which is sustainable in the long term. To ensure that the vacuum systems are used, the municipality can designate in its local regulations for waste management a collection system for a specific geographical area.

Compared with other parties, the city has a better overview of overall construction operations. Therefore, the city is able to plan and extend vacuum systems in a strategic manner.

At present, the city coordinates other pipeline owners who are carrying out works in streets. Having fewer parties involved means that costs can be kept down, while at the same time disruptions to traffic and access are kept to a minimum.

Municipal authority also provides the opportunity to adapt the system, for example so that different types of business, future buildings and public waste bins can be connected. The city also has more opportunities to progress the development of technology, such as for sorting different fractions and measuring waste individually.

**Disadvantages**

Municipal authority means that the city will be responsible for ownership and financing of new constructions, for which other parties are responsible at present. Over the expansion stage which the city is currently experiencing, increased investment charges may be difficult to finance.
Over the administration stage, servicing and repair work will need to take place on the installations. If the city is the authority for the systems, responsibility for these works will also be incumbent upon the city.

**Finance**

Construction of underground waste transport systems with vacuum technology involves major investment costs. In new areas, the city - in the event of municipal authority - would make the investment and then gradually recover the cost from the property owners connected, possibly divided over a one-off amount at the time of connection and then an annual charge, which also includes operation and maintenance. Handling of the waste (removal from the terminal and treatment) will be charged according to standard waste charges. This means that the total cost to property owners should be about the same as if the system were owned by them. For the city, this means a major initial cost for every system, but over time this will not involve any added expense in practice.

On the other hand, according to current legislation there are no options for charging property owners connection charges in existing buildings. In these areas, the city's investment cost needs to be recovered in another way instead. In the event of installation of stationary vacuum systems in existing housing areas, the current manual collection systems will no longer be applied for households.

Most of the properties in the inner city currently have no waste collecting rooms which meet the requirements for a good work environment. For comparison of costs for a property with underground waste transport system and one with manual collection with waste in bins, the requirements for a good work environment must be met in the case of manual handling. In many instances, this requires use of premises next to the street and conversion of these premises in order to meet the requirements for waste collecting room design. In a comparison as shown in the example below, the cost of a property with 24 apartments will be around SEK 50 000 per annum for manual handling and around SEK 20 000 per annum if connected to stationary vacuum system.

Estimated costs (SEK) for a property in the inner city:

<table>
<thead>
<tr>
<th></th>
<th>Manual system</th>
<th>Stationary refuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charge, household waste</td>
<td>10 800</td>
<td>7 200</td>
</tr>
<tr>
<td>Operation and depreciation of system</td>
<td>0</td>
<td>14 400</td>
</tr>
<tr>
<td>Depreciation, conversion of refuse room</td>
<td>15 000</td>
<td>0</td>
</tr>
<tr>
<td>Interest, conversion</td>
<td>4 500</td>
<td>0</td>
</tr>
<tr>
<td>Rental income lost</td>
<td>22 500</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>52 800</td>
<td>21 600</td>
</tr>
</tbody>
</table>
Conversion cost for a 15 sq m waste collecting room is estimated to be SEK 300,000, depreciation period 20 years, interest rate 3.0%. Rental income is estimated to be SEK 1,500 per sq m and year.

**Consequences for the market**

There are a number of companies that design and install underground waste transport systems. Many of them operate mainly in other countries but are interested in the Swedish market. In the event of municipal authority, the refuse suction systems newly installed - in both new and existing buildings - would all be procured individually in accordance with the Public Procurement Act, and in that way the market would be opened up to more parties. The systems can be divided up into several elements (terminal, main network, district network) which are each procured individually in order to increase the opportunities for smaller parties to submit tenders. In the long run, an increase in competition may also result in improved pricing, which will benefit the property owners connected. Operation and maintenance of the systems will also be procured in accordance with the Public Procurement Act in the event of municipal authority, which would accordingly benefit the market and - in the long run - property owners as well.

**Environment**

Waste disposal by means of vacuum technology is considered to be a good method from an environmental standpoint as it results in less transportation and the waste is handled more cleanly and more tidily. It has major advantage from a work environment standpoint as well, both for property maintenance operatives and collection operatives.

Underground waste transport systems can handle a number of different fractions. Different entry points can be used to allow residents and companies to deposit their sorted food waste, for example, at one and the same collection point as their waste collection sacks with no extra transportation being required in the area.

When planning underground waste transport systems with vacuum technology in both new and existing areas, the option of handling fractions other than just residual waste should also be examined. By also transporting packaging fractions, with subsequent sorting in the stationary system, the degree of collection of packaging should increase and the number of recycling stations in the inner city can be reduced in the longer term.

**Accessibility**

With underground waste transport system, it is possible to have an inlet point near to the homes, at points where opportunities to pick up waste using standard waste collecting trucks would otherwise be limited. Municipal authority would probably result in the implementation of more installations. It is suggested that inlet points
be positioned outside the properties, on municipal land. There must be opportunities for property owners to extend the service by themselves financing the laying of pipelines and installation of additional inlet points inside the properties.

**Solutions in other municipalities**

The most common owner solution in the municipalities of Sweden is that the systems - as in Stockholm - are owned and run by cooperative associations or housing companies. However, there are other models as well. One example is in Halmstad, where the municipal energy and environmental company has taken over as the developer and owner of a permanent under-ground waste transport system in an initial project, Nissa-strand, with 1 500 apartments. The developers are funding the entire public system for the municipal company at the start of construction, and then they will be paying regular operation and maintenance costs over and above their waste charges. Financially, it is not thought that this undertaking will encumber the municipality.

In Sundbyberg, a similar project is in progress in Ursvik, although this system is being built by the developers and will be handed over to the municipality on completion. The municipality will then hold authority and charge the costs. In both instances, refuse collection will be charged at applicable rates, separately from the operating costs for the system.

Stationary vacuum systems for residual waste are found mainly in bigger cities. In Gothenburg, there were 22 systems connected to 17 000 apartments, and in Malmö there were five systems for a total of 4 500 apartments in 2009.

In Europe, examples can be found in cities such as Barcelona, when the municipality has installed a stationary vacuum system in the heart of the old city. In Bergen in Norway, too, the municipality has decided to install stationary vacuum system, partly to reduce the risk of fire, in the inner parts of the city where older wooden houses have been built. In Copenhagen, there are underground waste transport systems inlet points at street level which also act as waste collecting bins.

**Proposals of the Administrations**

The Administrations propose that a decision be made to continue working with the issue, focusing on the following:

In new buildings and existing buildings in the inner city, the city will take responsibility for planning and constructing vacuum systems for waste on the basis of the needs and conditions of the respective areas. Ownership and management will rest with the city. The costs for investment and operation of these systems will be covered by the connected properties separately, and the cost of collection and processing the waste will be covered via the waste charge.
It is necessary to examine where responsibility for the systems should lie in terms of organisation. The Administrations view a number of administrations, such as the City Development Administration, the Real Estate Management Administration and the Traffic Administration, as well as pipelaying companies such as Stockholm Vatten and Stokab as potential alternatives. Where this responsibility lies also determines whether tax funds or the waste fee will be used to finance the initiative. Responsibility for ongoing operation and management of the underground waste transport systems installed on behalf of the city does not necessarily have to rest with the same organisation as the one that is responsible for planning and/or establishment.

Construction of the underground waste transport systems will be procured by the city in free competition, and in both new and existing buildings the operation and maintenance of the systems will be offered out to contract.

The structure of the interface for ownership in a system also needs to be examined. One suggestion is that the property owners could own the parts with lie within their property boundaries. When systems are installed in existing buildings, the city can offer inlet points at street level, while the property owners in order to provide a better level of service for residents, could fund the laying of pipes and installation of inlet points in their own properties.

Developers and property owners should have the opportunity to install and own underground waste transport systems themselves. Property owners should also have the opportunity to buy out and take over responsibility for any system owned by the city at cost price.

No changes will be made to the ownership of the underground waste transport systems that are currently operational.

Expertise needs to be built up within the city in order to plan, procure and manage the operation and maintenance of these systems.

End