

Extended working hours - a technique to reduce congestion

When to extend working hours

QWIRC7 covers the principal concepts that need to be considered for local residents and the travelling public when assessing what working hours can be extended when undertaking road or street works: the need for even greater working hours because of emergency repairs are not included because safety will then be the paramount consideration. Extended working hours can be employed for some or all of the work operations when those operations will not necessarily inconvenience local residents or the travelling public; the extent and duration will always depend on the local situation.

The Mayor of London and Transport for London (TfL) have introduced a targeted Lane Rental scheme that allows TfL to charge companies a daily fee for undertaking roadworks on London's busiest roads at the busiest times. The Lane Rental scheme will help incentivise more efficient working practices and reduce disruption from roadworks, which it is estimated costs the Capital's economy around £750 million a year. Around £300 million of this is on the Transport for London Road Network (TLRN) or on Red Routes.

To help to minimise the amount of time that works disrupt traffic, either by ensuring works are carried out as speedily as possible, or by ensuring that more works are carried out outside of peak traffic hours, there is need to encourage the highway construction industry to deliver a real step change in the way that roadworks are planned and carried out.

This is the seventh of a series of 'Quick Win Innovation to Reduce Congestion' (QWIRC) Notes, produced on behalf of TfL and the DfT, and aimed at providing roadworks contractors, utility companies, highway authorities and equipment suppliers with information on how to employ innovative technologies and methods to reduce the impact of road works on traffic congestion.

Extended working hours

Currently, work on the roads tends to be undertaken during the day outside the "rush hours" (at least for road works) in urban areas in order to minimise the disruption to residents and the travelling public. Such limits do extend the time that the works, including any road restrictions, have to last. However, this is an untargeted approach because the situations for both groups can vary significantly depending on the local situation. Furthermore, the times when the local residents will be least disturbed by road works will not necessarily coincide with the times when the travelling public want to travel. Finally, different operations for both road and street works will inconvenience the residents and the travelling public to different extents.



Therefore, it would be useful if those undertaking and regulating road or street works should look at the particular situation for each site and decide on what can be done to extend the working hours without significantly increasing the inconvenience to either local residents or the travelling public. After all, allowing an extension to the time when work can be done should reduce the overall duration of the works and, hence, their inconvenience.

Acceptable conditions

Noise

Noise is the main concern for local residents: once inside their houses, they do not want to be disturbed by excessive noise, particularly at night. However, there are several factors in the extent that any noise will disturb people: the loudness at source, the distance from the source and the extent of any shielding being the primary ones together with the permanence and the frequency of the sound.

BS 5228-1:2009 is a code of practice for noise on construction sites. The target for properties will be either no significant increase in the existing background level for areas where the noise is already a problem or an accepted maximum level. The World Health Organisation regard 55 dB(A) Leq as the maximum day time level before community annoyance sets in (the base level for residential areas) and 35 dB(A) as the maximum desirable noise level for sleep. Whilst these values can be used as the basic, Hospitals and other facilities may require lower limits whilst industrial areas could tolerate higher levels.



Lighting

Working outside daylight hours will generally require artificial lighting to allow the work to be undertaken safely and effectively. This additional lighting can also cause annoyance to residents if not carefully targeted. In particular, flashing lights are a common irritation to residents when working overnight, both at night and during the day. Furthermore, using generators to provide the power for that lighting can also add to the noise that will need to be considered when assessing whether the noise will be excessive.

Vibration

Several operations, including generators for lighting, can produce vibrations that are transmitted through the ground. The effect that such vibration will have on residents will depend on the ground conditions and building type as well as proximity. These vibrations can be a nuisance in their own right and will need to be considered in an overall assessment. BS 5228-2:2009 is a code of practice for vibration on construction sites.

Vehicle movements

Any works require some vehicle movements to transport materials, equipment and personnel to and from the site, but these are not usually significant compared to the total traffic. The main issue with traffic around road and street works is the reduction of lanes available to carry it. If the lanes required for the work are made available for trafficking when no work is being undertaken (see QWIRC3 and QWIRC6), extended working hours should not affect the disturbance caused at that time; however, the disturbance should be for a shorter time period.

Methodology

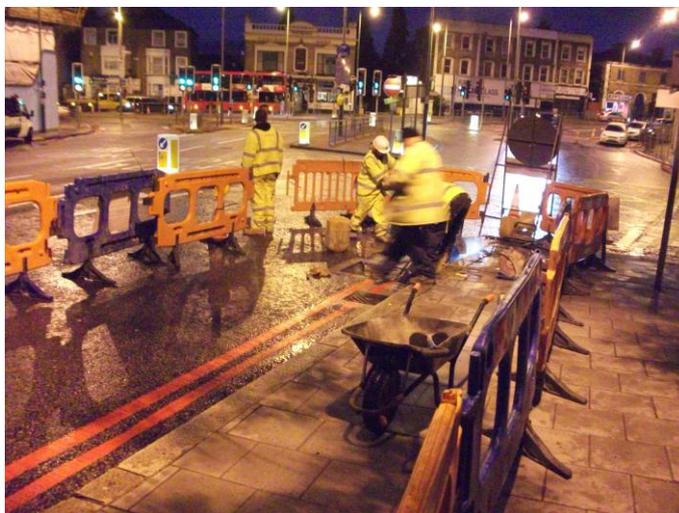
Break down of jobs

In assessing when work can be undertaken, the particular works required can be broken down into a series of separate operations. The operations can include some or all of the following:

- Setting up traffic management
- Breaking out the bound layer(s)
- Excavating the unbound layers
- Shoring the excavation
- Repairing / installing / replacing the utility (street works)
- Removing the shoring
- Replacing and compacting the unbound material
- Replacing and compacting the bound layers
- Moving the traffic management (if work to be undertaken in sections)
- Applying road markings
- Removing traffic management

The order is not fixed with some operations not necessarily being sequential, some operations may be repeated, some operations may be unnecessary and other operations may also be required on a particular site.

Each of these operations will create a certain amount of noise, vibration and other disturbance depending on its nature, the equipment available for the job and the conditions at the site. The effect that it has needs to be assessed at the nearest and/or most exposed property to the work to see if that operation can be undertaken during hours outside normal hours. However, it may require measurement of that operation at that location to confirm the level.



Disturbance reducing techniques

The noise can be reduced by the use of new equipment, both because old equipment can have become noisier with wear and because manufacturers are developing quieter models.

Muffling of the equipment can reduce the disturbance caused by an operation. However, it is assumed that such muffling will be taken into account when assessing the noise and/or vibration impact of a particular operation.

Noise barriers and screens can also be used to reduce the impact of noise and lighting, respectively. However, there needs to be sufficient room to install such temporary barriers or screens, which will not always be there. Also, the barriers will reflect the noise in a different direction, potentially making a different building the most exposed to noise. In particular, experience has shown that sound barriers can focus noise from ground level to flats above. Nevertheless, the use of noise barriers and/or screens can be considered if they reduce the maximum impact of the work to an acceptable level to all residents.

Time-constrained activities

Not all operations can be assessed on their own. As an example, if shoring is required for safety and will be too noisy to be undertaken outside normal hours, the excavation of the unbound material cannot be undertaken during extended working hours however quiet it is unless it is at the end of the extended hours so that shoring can start immediately afterwards. Therefore, having identified which operations can be undertaken when, the sequence of operations needs to be planned in order to minimise the overall disturbance caused by the works.

Planning



The use of judicious consideration for planning some (or even all) works to be done over extended working hours should reduce the time over which some road and street works will last, and hence cause congestion and noise for a shorter time, without causing excessive disturbance to local residents during that period. Such planning should be undertaken for all works that are scheduled to last more than a single working day.

Generally the planning will be undertaken by the contractor, who will then need to gain agreement of the highway authority that the planned work programme outside normal working is acceptable. On occasions, however, the planning will be done by the highway authority if it considers that such working is necessary to reduce the overall impact of the work on residents. In such a case, the contractor will need to check that the proposal is practical.

In some locations with all-day traffic restricted routes, there is the reverse situation where the night shift is limited to 19:00 to 23:00 even with suppression, giving an effective working window of 4 h. Such a limited window can considerably extend the time required to complete the work. The enforcement is invariably by a separate department within the Local Authority to the highways department responsible for NRSWA/TMA control and there can be conflicting interests between these two sections which makes common-interest agreement difficult. Better co-ordination is needed in these cases as well.

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