

GUIDANCE FOR THE CREATION OF ARTIFICIAL SETTS

INTRODUCTION

The flow diagram of the badger Policy Guidance Note describes the circumstances under which it may be necessary to construct an artificial badger sett. Although such structures are not complicated, careful consideration needs to be given to aspects of sett location, design and construction. The information which follows provides appropriate guidance in these respects and, if adhered to, will improve the likelihood of a successful outcome. A suitably qualified ecological clerk of works should oversee the process from the start, i.e. from design to installation. A period of monitoring will be required in order to determine use of the artificial sett by badgers. The duration and frequency of monitoring will be site-specific, depending on when and if badgers colonise, and will be agreed between the ecological clerk of works, SNH and the client.

REASONS FOR CONSTRUCTING AN ARTIFICIAL BADGER SETT

There are two reasons for the construction of an artificial sett:

- To facilitate the relocation of badgers within their existing territory in those cases where a main or annexe sett is to be destroyed.
- To facilitate the release of badgers into new areas i.e. the translocation of badgers outside of their territory.

This guidance is concerned with the former circumstance i.e. those situations in which badgers are to be relocated within their existing territory as a consequence of main or annexe sett loss due to development.

Main and annexe setts are normally the most important setts within a badger territory. The removal of any badger sett is only possible under licence. In most situations such a licence will stipulate that replacement artificial setts must be provided. Where badgers are present in low density, or where the status or functionality of setts is difficult to establish, subsidiary or outlying setts may also assume a pivotal role in badger social organisation. Where this is suspected, the construction of artificial setts should also be considered an appropriate mitigation measure where such setts are to be lost to development.

SELECTION OF SITE

Many criteria must be considered with respect to the location of an artificial sett, particularly when the sett is to be provided as an alternative

to a natural sett that will be destroyed and where badgers will be excluded.

- **Social Group Territory**

Badgers are territorial; therefore, any alternative artificial sett must be located within the appropriate social group territory. If there is any uncertainty, the construction of the sett must be preceded by a territorial bait marking survey.

- **Proximity to Existing Setts.**

Badgers must be able to locate the replacement sett without any difficulty. A site must be selected as close to the existing sett(s) and/or area of badger activity as is practicable. However, the site must not be so close to the new development that disturbance could distract badgers from using it.

- **Size of Site.**

The size of the site required for artificial sett construction will depend upon the size of the natural sett which it replaces. Regardless of the artificial sett size, a minimum area of 30m radius should be demarcated from the outlying holes of the artificial sett to prevent damage and disturbance. An area 10m x 10m would accommodate a small artificial sett comprising two entrances with tunnels leading to at least two chambers. Small artificial setts, even though physically capable of accommodating the appropriate number of badgers excluded from larger setts, generally tend not to work. Therefore, it is important to construct a structure with adequate chambers and tunnels which replicates as much as possible the bulk of the natural sett it replaces. A mechanical digger is normally used to prepare the site and the amount of soil excavated during this procedure can necessitate a construction area considerably larger than the dimensions of the artificial sett itself.

- **Profile of the Sett.**

The exact shape of the sett can be varied to accommodate local topography. For example, sett footprints can be adapted to fit into long thin strips of ground or, within woodland, can be designed to integrate with existing trees. Sett design is flexible.

- **Gradient of the Site.**

It is important that there is sufficient drainage to avoid the artificial sett becoming flooded. Soil type plays a part in this. However, it is also important to ensure that tunnels slope away from the sett chambers such that water flows towards the sett entrances. It is also important to ensure a depth of at least one metre of soil above the chambers. There are two ways this can be achieved. The preferred way is to build the sett on or into a sloping site with the pipes emerging at the lowest point. If this is not possible, the whole sett can be covered with a mound of soil.

- **Timing of Sett Construction.**

The licensed destruction of an occupied sett will necessitate the exclusion of the resident badgers, again under license. In order to ensure that the excluded badgers have an alternative sett to go to, and that they are familiar with the artificial sett, timing is critical. The artificial sett should therefore be constructed at least 6 months prior to exclusion. An exclusion of a main or breeding sett will generally only be licensed to occur between the end of June and the end of November.

SETT DESIGN: GENERAL PRINCIPLES

- **Chamber Design**

The chambers should always be constructed at the end of branches off the main pipe run as badgers like the security of a defensible 'end' situation. Chambers are constructed using concrete slabs with either concrete or breeze blocks or alternatively wood and plastic. The basic design of the chamber reflects the shape and size of the materials used for construction. Thus, 3' x 2' concrete paving slabs can be used in association with 6" bed concrete. Alternatively, wood chambers typically measure 450mm to 750mm square. Completed chambers should always be filled generously with dry hay or straw.

- **Tunnels.**

The tunnels are constructed from 12" (300mm) diameter pipes throughout - reduced at entrances to 9" (225mm) pipes. The 9" pipes at the entrances restrict the size of any dog that could enter into the sett, but allow badgers easy access. Pipes can be of clay or concrete, collared or not, and of any length that can be obtained. However it should be remembered that long pipes are difficult to handle and make curves more difficult to construct. Preferred pipes are clay at 1500mm long with collars. These are the lightest and easiest to handle, fit together well and

make the straightness of the trenches less critical. One, or possibly two, pipe branches with one branch left open to the surrounding soil allows the badgers to excavate and expand the sett if they wish. Plastic piping, 250mm – 300mm in diameter, can also be used and is easy to handle. If preferred, a mixture of all material types could be used.

- **Construction.**

A mechanical digger is usually used to excavate the sett. Chambers and pipe runs should be buried at a depth of at least 1250mm. Pipe trenches should be excavated using a 600mm wide digger bucket.

Normal Health and Safety guidelines apply, particularly with respect to working in trenches. Therefore, trench sides should be sloped back or stepped to comply with guidelines.

The time taken to construct an artificial sett is determined by how well the construction has been organised. Assuming that all materials and labour are readily available (including an excavator driver), the sett can be constructed, backfilled and landscaped within two to four days.

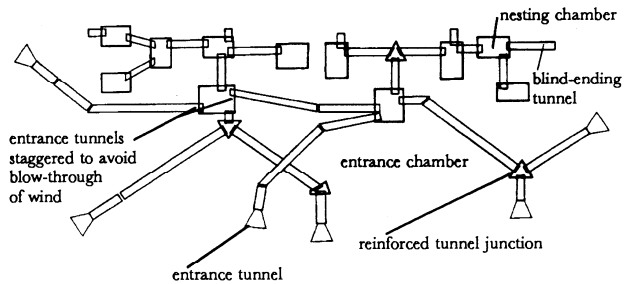
SPECIFIC SETT DESIGNS

Details of two types of design are considered below. Both are modular in construction and can be readily adapted to suit site and size requirements. The size of either design type should reflect the size and status of the sett which is to be replaced.

The Type 1 design probably more closely replicates the chamber conditions found within a natural sett. The Type 2 design benefits from an easier build, additional durability and security from persecution or interference. In all cases, badgers should have time to familiarize with replacement setts, which should be in position at least six months prior to any natural sett exclusion.

Type 1 Design

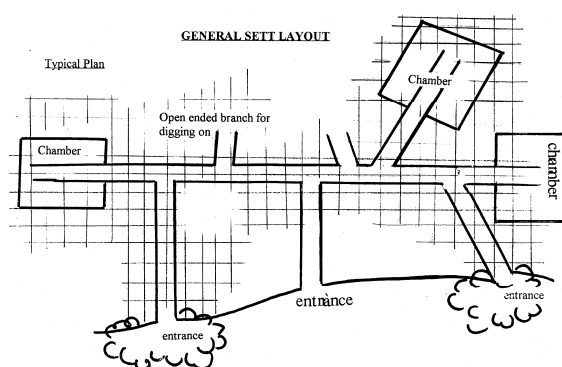
Comprising 450mm to 750mm square or similarly sized rectangular nest chambers constructed of wood and with a height of 300mm to 450mm. The chambers are connected by a 300mm to 400mm diameter plastic pipe tunnel system.



Above: plan of a medium size Type 1 Design artificial sett. Right: Type 1 Design artificial sett under construction, A97, Aberchirder, Scotland (Grampian Badger Surveys for Aberdeenshire Council 2000).

Type 2 Design

Comprising concrete block and paving slab nesting chambers with 225mm-300mm diameter clay or concrete piping tunnel system.



Above: plan of a small size Type 2 Design artificial sett. Right: Type 2 Design artificial sett at completion, Tarbot Hill, Aberdeen, Scotland Grampian Badaer Surveys for Shanks Waste Solutions 1998).

QUANTITIES, LABOUR & COSTS

Typical materials, equipment, labour and costs required to construct a Type 2 Design artificial sett with three chambers are listed below. Costs for a Type 1 Design are likely to be of a similar order. Specific costs will depend on site characteristics, materials used etc.

Materials

- Thirty eight 3' x 2' concrete paving slabs.
- One hundred 18" x 9" x 6" (bed) concrete blocks
- Eight 12" (300mm) diameter clayware pipes, c.1500mm long.
- Two 9" (225mm) diameter clayware pipes, 1500mm long.
- Two 12" (300mm) diameter clayware right angle junctions.
- Hay or straw sufficient to fill the chambers.
- Soil: may need to be imported for the purpose of covering and landscaping the completed artificial sett.

Pipes can be seconds, with or without collars. 1500mm long pipes are easiest to use; longer ones become very heavy to handle and shorter ones more expensive and difficult to use. Right angle junctions are easiest to use but if these are not available, 120 degree angles will suffice.

Machinery

A mechanical digger (JCB or a 360 degree excavator) is generally suitable for sett construction.

Shovels, picks and hand tools are required. A masonry cutting saw may be beneficial where pipes or block work need to be cut to size.

Labour & Time

Minimum: two men (excluding digger operator) for a minimum of two days will be required for the construction of one artificial sett. It will be essential to ensure that all materials are on site prior to starting if this timetable is to be met.

Cost

Budget for a minimum of c. £4,500 per 3-chambered sett, excluding labour.