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~~EP/01/98~~

**DEVON AREA
INTERNAL REPORT**



**ENVIRONMENT
AGENCY**

**POPULATION EQUIVALENT
SERVED BY EXTON SOUTH
SEWAGE TREATMENT WORKS**

**NOVEMBER 1997
DEV/EP/01/98
(CATCHMENT 05A)**

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POPULATION EQUIVALENT SERVED BY EXTON SOUTH SEWAGE TREATMENT WORKS

1.0 INTRODUCTION

1.1 AIMS

In February 1997 a request was received from the Water Quality Office to determine the population equivalent served by Exton South Sewage Treatment Works.

1.2 BACKGROUND

Exton South Sewage Treatment Works was installed by developers in 1990 as an interim scheme to replace an existing crude outfall. It was proposed that in the longer term sewage would be pumped elsewhere for treatment.

The consent is descriptive and management of the works is undertaken by South West Water.

2.0 PROJECT TEAM

T. Cronin (Project Leader)

R. Pearson (Project Manager/Author)

3.0 SITE DESCRIPTION

3.1 Sewage Treatment Works

The works consists of a four-chambered septic tank discharging to a tidal reach of the Polly Brook at NGR SX982863 (Diagram 1, Photograph 1). The discharge pipe is regularly surcharged at high water resulting in partial flooding of the tanks with saline water, the whole site being subject to immersion at High Water Springs. Access covers to the tanks are screwed down to prevent lifting in such situations.

3.2 Connected Properties

Accurate sewerage maps of the area do not exist and SWW are themselves unsure of the situation. Past estimates of the population being served indicated that 61 properties were connected to the original crude outfall. A further 18 houses and 6 flats were sewered at the time that the septic tank was installed (Environment Agency File 'Exton Septic Tank' 05A EXT).



4.0 DIFFICULTIES WITH THE SITE

It had been hoped to install flow monitors on the influent or effluent pipes, but this was not possible for the following reasons:

(a) Influent

The influent is not screened and any deployment of equipment in the one practicable access manhole (Diagram 1, Photograph 2) would rapidly contaminate with rags.

(b) Effluent

Flow monitoring equipment cannot be installed at the outfall because the discharge pipe is partially or wholly underwater at all times. Whilst the fitting of monitors is feasible at the final effluent chamber within the works compound (there are considerable Health and Safety implications) there would be no reliable flow data during the period that the effluent pipe was surcharging, or during the release of such water from tanks in the STW. This may represent the corruption of several hours flow data per tide cycle, and even after the tanks appeared to have been emptied of the surcharge the flow rates could not be attributed with confidence to operation of the works.

5.0 METHOD

The STW catchment was identified both from existing maps (Maps 1 and 2) and from drawings made during site visits.

In view of the situation as described in 3.0 above, an estimate of the actual population served was made by calling on all the properties within the STW catchment.

Properties immediately to the north of Exton Lane (Diagram 2, Maps 1 and 2) were discounted on the grounds of topography. It is assumed that they are sewerred to Exton North outfall.

Properties of similar size and age were grouped so that where no occupancy figure for a property was available an average figure could be ascribed. Seven areas were so identified (Diagram 2).

6.0 RESULTS AND CALCULATIONS

Field work was carried out in February, June and July 1997.

The properties that are believed to be currently served by Exton South STW are indicated in Diagram 2 together with their occupancy figures.

All properties served by the STW are residential except for the *Puffing Billy* public house. In this case the population equivalent was calculated from effluent flow rates given in the Consents

Manual as follows:

Effluent per capita volume for residential properties 180 litres/person/day

Effluent per capita volume for public houses 15 litres/person/day

The ratio is therefore $15/180 = 0.083$

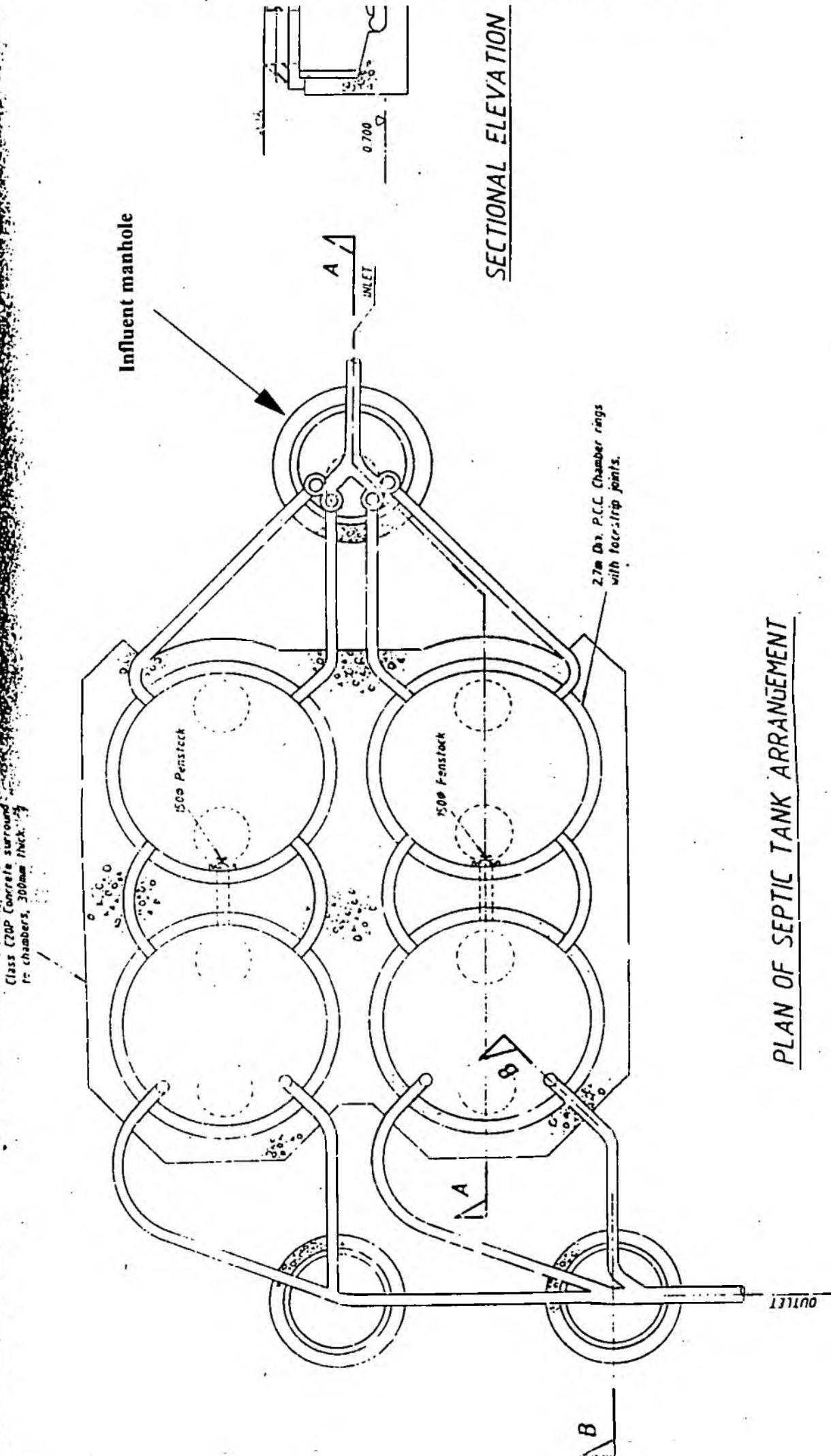
The average number of patrons was estimated (by the publican) as 30/day.

This represents a population equivalent of $30 \times 0.083 = 2.49 + 2$ residents = 4.49 persons

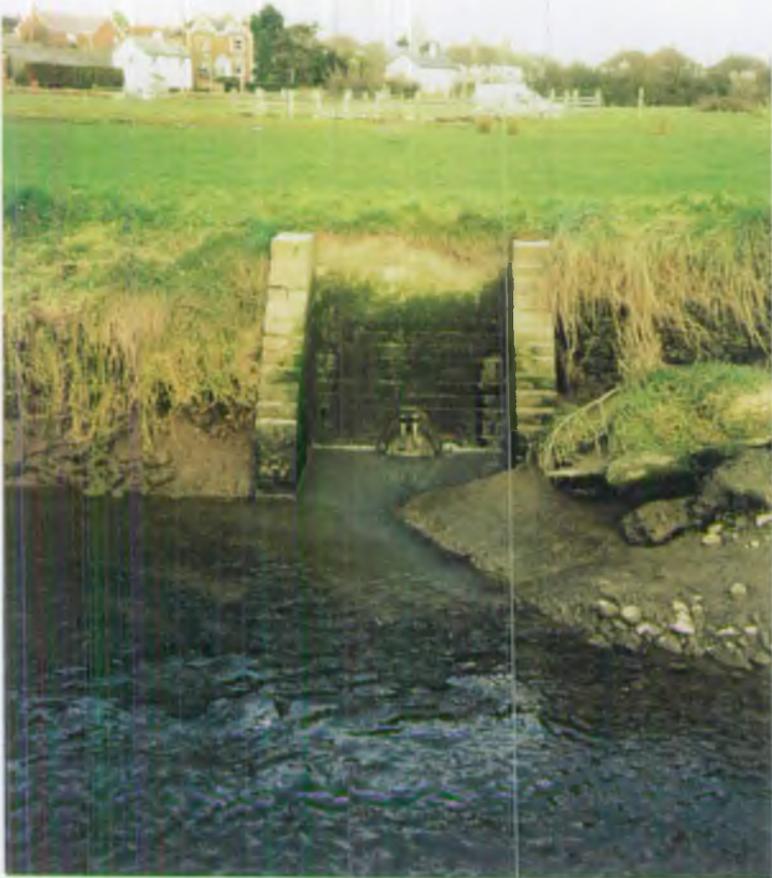
Therefore, the estimated total population equivalent served by Exton South STW is 261 (Table 1.).

Robin Pearson
Investigations Officer
29/11/97

DIAGRAM 1. South West Water Plan of Exton South STW



PLAN OF SEPTIC TANK ARRANGEMENT

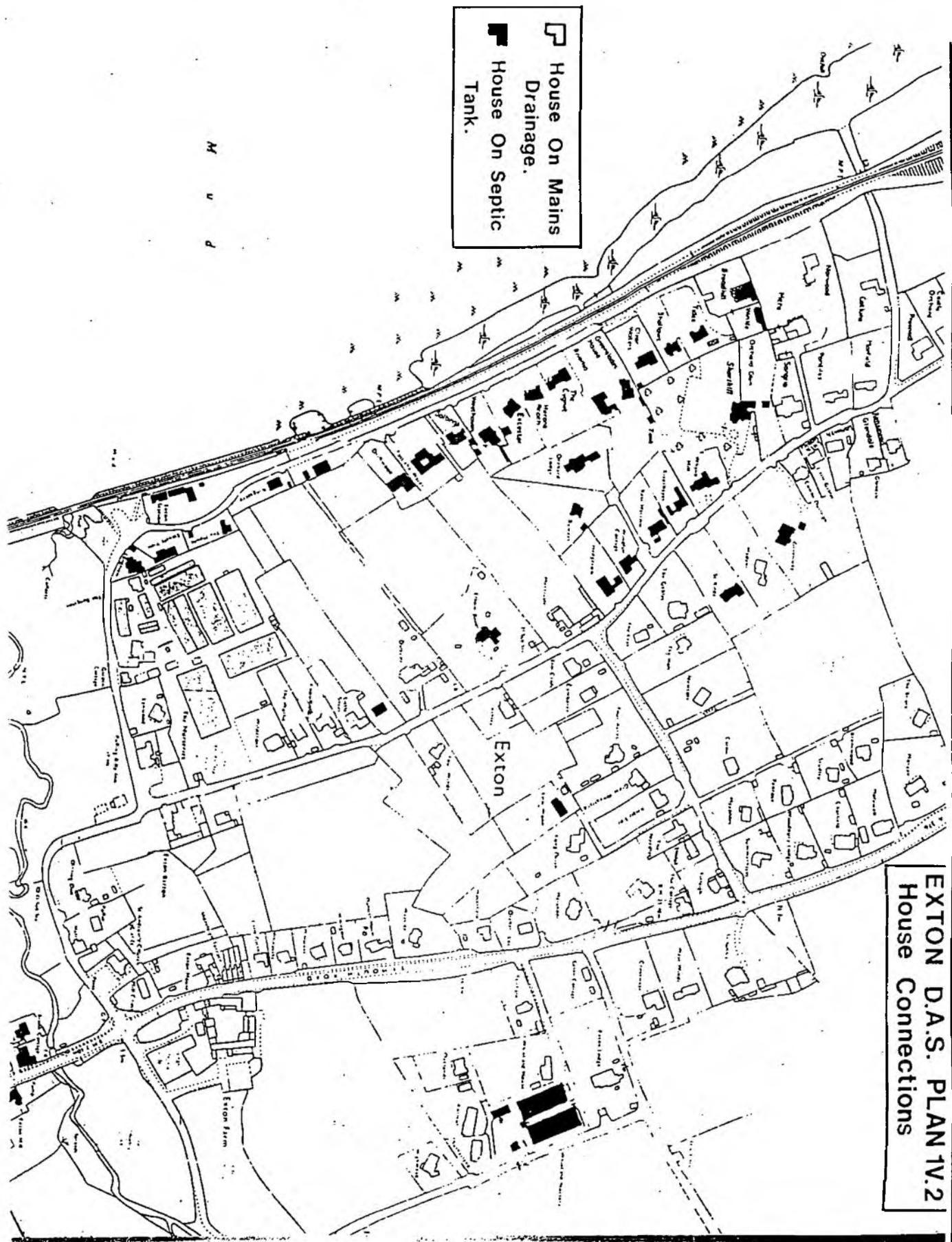


Photograph 1. Outfall to Polly Brook



Photograph 2. Influent Chamber

MAP 1. Properties connected to Exton South crude outfall (prior to 1990)



House On Mains Drainage.
House On Septic Tank.

EXTON D.A.S. PLAN IV.2
House Connections

MAP 2. Exton South sewerage (prior to 1990)



EX-107 SEWERAGE

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DIAGRAM 2. Occupancy Figures for Properties Served by Exton South Sewage Treatment Works

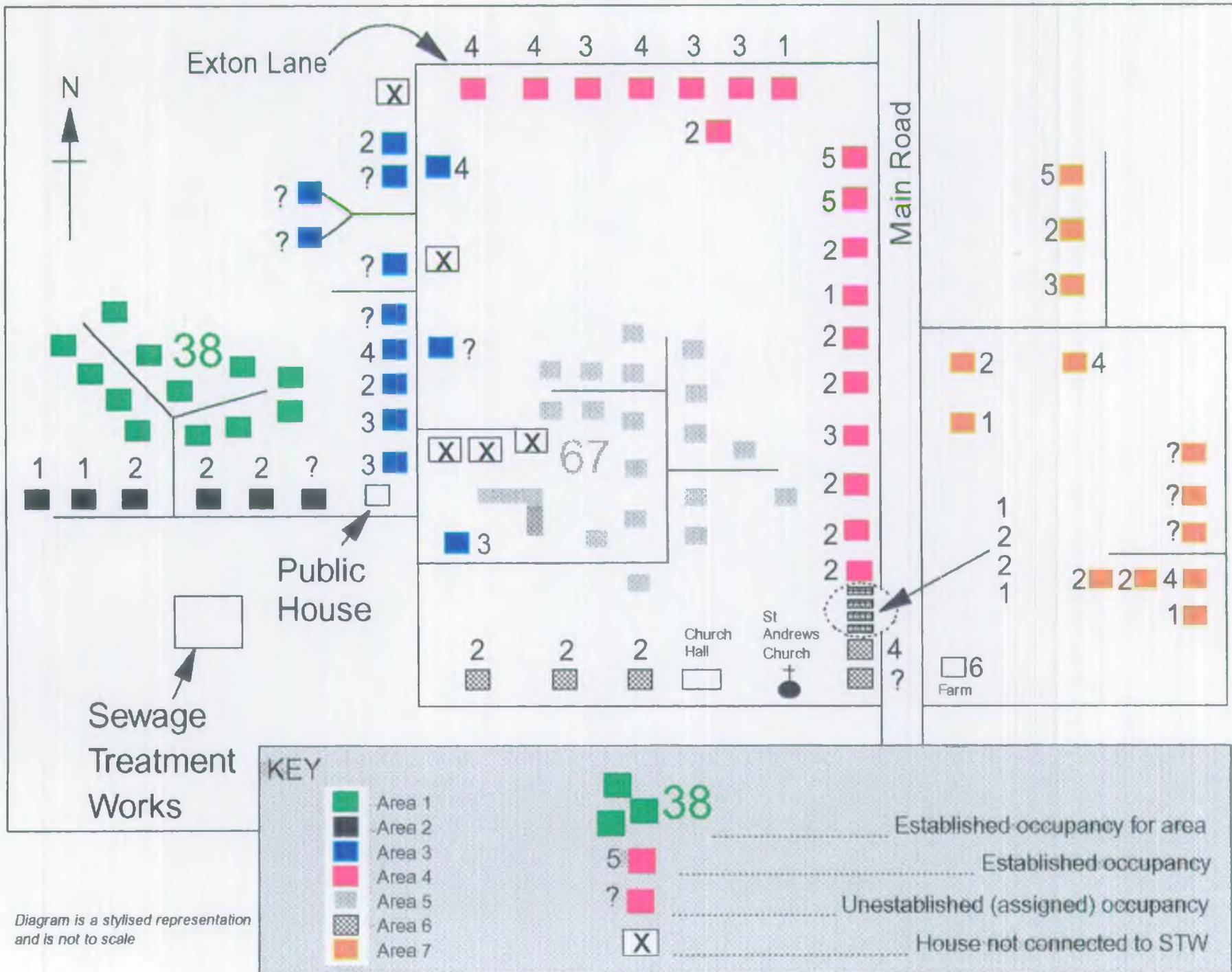


Diagram is a stylised representation and is not to scale

Table 1. Population Equivalent for Exton South STW

	1	2	3	4	5	
	Established occupancy	Average occupancy	Number properties with unestablished occupancy	Column 2 x Column 3	Total (column 1 + column 4)	
Area 1 	38	3.17	0	0	38	New housing development
Area 2 	8	1.6	1	1.6	9.6	
Area 3 	19	3	5	15	34	
Area 4 	50	2.78	0	0	50	
Area 5 	67	*?	0	0	67	New housing development
Area 6 	10	2.5	1	2.5	12.5	
Area 7 	26	2.6	3	7.8	33.8	
Public House	2	**2.49	n/a	n/a	4.49	
Terrace	6	1.5	0	0	6	
Farm	6	n/a	n/a	n/a	6	
Total					261.4	

* involves a number of unidentified farm mews conversions
 ** see text for derivation this value