

# Grange Lane Allotments

## Drainage and flood mitigation

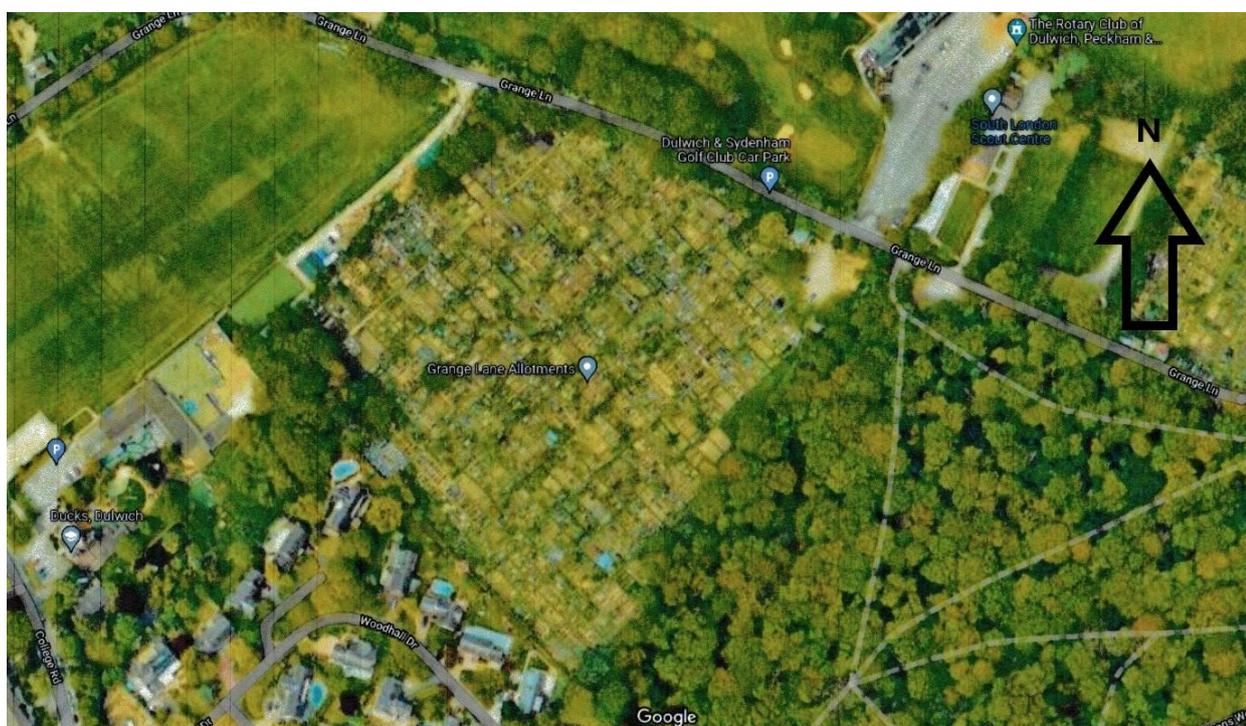
Advisory Note: Alex Hamilton and David Stacey

2 November 2022

### 1. Introduction

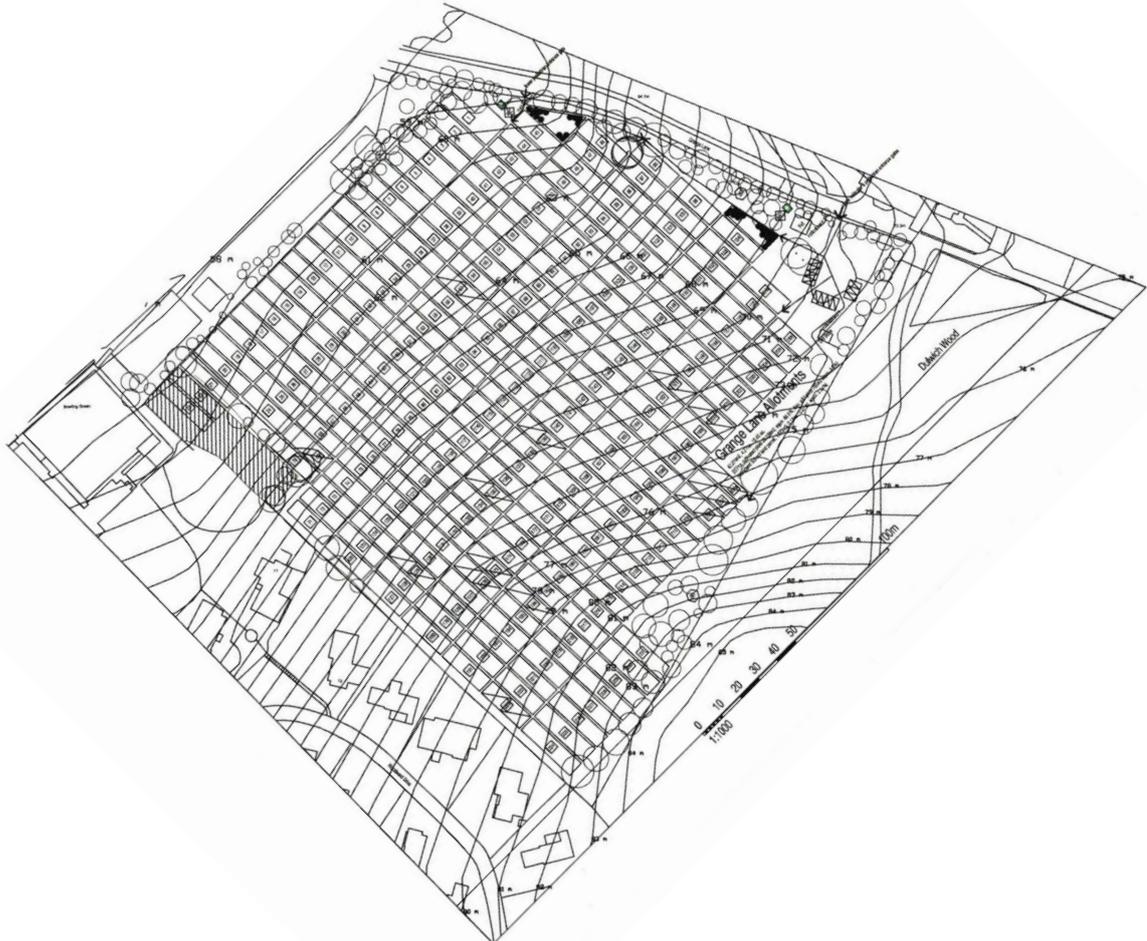
The Grange Lane Allotments Committee invited us to examine flooding and drainage of the allotments and to suggest ways of mitigating any problems that they have found arising from rainfall and from run-off onto and from the site. We visited the allotments on Tuesday 4<sup>th</sup> October (accompanied by Tyrrell Evans, Jill Panni, and Frank Kunna) spending about an hour familiarising ourselves with the main issues. On Tuesday 25<sup>th</sup> October we visited the site again for about two hours (accompanied by Jill Panni and Sarah Knight) to look in further detail at (i) the drainage from the woods, (ii) internal drainage of the allotments and (iii) runoff to the playing fields and other boundaries of the site.

An aerial view (from Google Maps) of the Grange Lane Allotments, which comprise some 210 plots, is given below. The area covered by the allotment site is approximately 4.5 ha. The site falls from about 84 masl at the border with Dulwich/Sydenham woods, which extend above the allotments, to 59 masl at the border with the playing fields, an average slope of about 12.5%. In general, the adjoining woodland and the site are underlain by a thick layer of London Clay. This clay is generally impermeable but the upper layer is weathered and can become fissured during dry summers. This upper layer of clay will support slow subsurface flow down the slope in both the woodland and the allotments site.



The site is bordered by Grange Lane to the north-east and by private housing along the south-west border. Minor development and some extensions to the housing are currently underway. A small area of woodland in the western corner of the site is currently part of the allotments site but it is understood that this is soon to be handed over to Dulwich Pre-prep school as a wild-life reserve.

A contoured plan of the site, provided by Frank Kunna, is given below.



The Grange Lane Allotments Committee members who showed us round the site commented on the following problems (see aerial plan below).

- During heavy rainfall, much of the runoff from the woods is carried away in the upper boundary ditch towards Grange Lane but this upper ditch is shallow at its upper end there are times when flow from the woods combined with site run-off in this area contributes to local flooding of plots in the east corner of the site.
- A flooding problem occurs in the south corner of the site where there used to be a drainage ditch running roughly south-east to north-west along the border with the private housing. This drainage ditch is now defunct and would be difficult to restore on the border.
- The main drainage from the site at the lower end of the allotments mainly exits through the north corner of the site and flows onto Grange Lane and to the road drains. The plot-holders

here accept any flooding problems that occur and, in some areas, have adapted their plots as wetland areas.

- There are one or two informal drainage channels from the bottom of the site, dug by plot-holders, which discharge towards the playing fields. The land levels on the border of and in the playing-fields are subject to change as material is dumped in this area. Dulwich College are thought to have provided a drain along the border but the extent and effectiveness of this is not clear. There is a case for formalising these channels.
- Apart from these issues, the internal drainage of the site is of importance and advice is required on how to deal with this, particularly with regard to the impact of rainfall and seepage on the grass paths between the plots.



Our comments and suggestions below cover the following issues: (i) water entering the site from the woods; (ii) internal drainage affecting individual plots and the condition of the grass paths; (iii) water reaching the lower part of the site. We deal first with the issues identified from our visits to the site and then with suggested mitigation measures.

## 2. Issues identified

### *General*

- Between October and March, one should expect average monthly rainfall to be higher than in other months of the year. Whatever drainage measures are put in place, standing water in some individual plots and softening of the grass paths over parts of the site are to be expected at this time of year. During late autumn and the winter period, rainfall is greater and evaporation is substantially lower than in the late Spring and Summer months. The purpose of introducing drainage measures is to mitigate the problems arising from the waterlogging of individual plots and the damage to grass paths.
- The site receives both direct rainfall and surface run-off and sub-surface flow from the woods. There are reports that artesian pressure generated in the higher land above the site

gives rise, at times, to a spring in one plot in the middle of the site. The natural drainage of the site is principally in a north-west direction towards the playing fields,

### ***Run-off entering the site from the woods***

- Some run-off from the woods is intercepted by the ditch which runs roughly south-west to north-east just below the border of the site and the woods. The discharge of this ditch is via a culvert (roughly 300 mm diameter) under Grange Lane. This ditch is maintained by the Allotments Committee and is said to work well but it only takes the run-off which comes from a little more than half of the south-east boundary with the woods. It needs some attention and deepening at its upper end.
- There is less run-off from the woods across the other section of the boundary but this is reported to cause flooding of some plots in the southern corner of the site. A boundary ditch, which previously ran along the border of the allotments with the private housing estate and which might have alleviated this problem, is now defunct but it would be difficult to re-instate. Other means of mitigating this problem should be considered.

### ***Internal drainage***

- During the autumn, winter and early spring, standing water on some plots and problems with saturation of the grass paths are reported to occur across the site.
- Some plot-holders have already improved their plots by digging channels around their plots and introducing pipes which allow standing water on their plots to be passed on to the plot below and eventually to the bottom of the site and away. This is to be encouraged.
- There are familiar problems which affect the grass paths between the plots which result from them being primarily composed of clay. (i) Unless protected by the digging and maintenance of plot 'ditches' and installation of drainage pipes, the clay paths will suffer under the impact of prolonged and heavy rainfall and subsurface seepage; (ii) As the clay absorbs moisture it becomes weaker and softer. As the clay becomes softer it is easier for it to be rutted and churned up by footprints and barrow wheels, which in turn create puddles on the path leading to further softening of the clay.
- Solutions to the path problems must concentrate on first minimizing the entry of water into the clay, second on maximizing drainage of rainfall falling on the paths and/or ponding up in the adjacent plot and, third, on introducing measures that can strengthen the surface of the paths. This may prove important at some well used paths and at path junctions, where there is heavy traffic.

### ***Water reaching the lower part of the site***

- Run-off from the site drains naturally to the north-west and to the site boundary with the playing fields. A short diagonal local drain has been dug to direct drainage from the north-east wing of the site to the bottom of the site and the northern corner where it drains away to Grange Lane. We understand that there can be periodic accumulations of water in this corner of the site but the plot-holders in this area are not concerned and, in some areas, have adapted their plots to be managed as wetland. Our visit was not made during a wet period.

It would be worth examining the route that drainage water takes at times of high run-off to see if there are any problems and improvements could be made.

- The land levels on the border and particularly in the playing fields have been subject to change as material is dumped by contractors working for Dulwich Estate in this area. A drainage pipe is reported to have been installed by Dulwich Estate along the border of the playing fields but the extent and the impact of this is not clear. There are one or two informal drainage channels from the bottom of the site, dug by plot-holders, which cross the boundary and discharge towards the Dulwich playing fields. These should be investigated further and the Allotments Committee may wish to designate and improve three or four of these as preferred discharge points from the site.

### **3. Suggestions and Recommendations**

#### ***Managing Run-off entering the site from the woods***

- The ditch which intercepts run-off from the woods and which runs roughly south-west to north-east just below the border of the site and the woods and which discharges to Grange Lane is broadly effective and serves more than half of the boundary run-off. However, the impact of the upper part of the ditch could be improved by deepening it at its upper end. A minimum depth of 500 mmm is recommended
- Run-off from the woods across the other section of the boundary is reported to cause periodic flooding of some plots. There appears to be no reasonable way of re-establishing the now defunct drain which ran along the south-west boundary. The problem could be mitigated by designating two or three longitudinal plot ditch boundary lines (running south-east to north-west) as primary drainage channels with pipes (75mm-100mm diameter) provided under the lateral grass paths to ensure drainage to the lower end of the site.

[Note: Throughout this note the word ‘longitudinal’ refers to features running down the slope of the allotments in a south-east to north-west direction. The word ‘lateral’ refers to features running across site in south-west to north-east direction.]

#### ***Internal drainage***

During wet weather, the surfaces of paths are subject to deterioration by becoming soft and vulnerable. However, damage can be mitigated by

- Ensuring the level of any standing water or adjoining saturated ground is well below the level of the path. This is best done by digging ‘ditches’ (approximately 200 mm deep) on all sides (i.e. all four sides) of a plot.
- Where water levels still remain high at the lower end of a plot a pipe (75mm-100 mm diameter) should be provided to allow drainage under the lateral path to a plot lower down the site (and subsequently to plots below and to the lower end of the site). In order to maintain the condition of the lateral paths, it is important to maintain the ‘ditches’ on the upslope side of the lateral paths, where the paths tend to intercept seepage and surface water flow.

- It would be beneficial to aim for a slightly convex surface on longitudinal grass paths or a slight cross-fall in the downhill direction on lateral paths.

The following measures for path maintenance are suggested with the work done by individual plot-holders or through the site maintenance team.

- Raise low areas on paths, using material from the plot, wood chip, sand or materials which would not interfere with mowing and would aid surface drainage. This is important at the junctions of paths which suffer both from maximum traffic and poor drainage.
- Encourage plot-holders to maintain (or in some areas raise) or re-establish the level of paths.
- Encourage plot-holders to dig and clean boundary ditches on their plots.
- Introduce pipes under the lateral paths where there are persistent problems.
- Where traffic (e.g. wheelbarrows) on paths is causing ruts and low spots, encourage plot-holders to minimize the deterioration of paths. In extreme cases introduce a rotation of path use by placing small temporary signs or barriers to reduce traffic on affected areas.
- Where there is a path which suffers from very heavy traffic (e.g one leading from a source of supply of compost), it may be worthwhile paving this path.

### ***Managing water reaching the lower part of the site***

- Run-off from the site drains naturally to the site boundary with the playing fields. It would be worth examining the route that drainage water takes at the north of the site at times of high run-off to see how it escapes from the site to Grange Lane and see if there are any problems and improvements that could be made.
- There are one or two informal drainage channels from the bottom of the site, dug by plot-holders, which cross the boundary and discharge towards the playing fields. These should be investigated further. The Allotments Committee may wish to identify, designate and improve three or four of these as preferred discharge points from the site.

### ***Messages to allotment holders***

The Committee and volunteers cannot be expected to carry out all the ‘local’ work and it is up to individual plot-holders to carry out most of the work at or inside the area of their plot and on the adjacent paths. This includes:

- Establishing and maintaining effective 200mm deep ‘ditches’ on all four sides of their plot.
- Maintaining the paths adjacent to their plot.
- Advising the Committee of any severe drainage problems and obtaining advice on installing drainage pipes connecting their plot to an adjacent plot downstream. (A general principle exists here that any plot-holder has the right to discharge drainage water from their plot to the plot downhill).

## 4. Conclusions

In response to the Grange Lane Allotments request for advice on flood mitigation and drainage of the Allotments, our summary conclusions are:

### *Upper boundary of site*

- Improve and deepen the upper end of the drainage ditch which discharges to Grange Lane just below the woods.
- Designate two or three plot boundary border lines (running south-east to north-west), at the south-west side of the site, as primary drainage channels with pipes (75mm-100mm diameter) provided under the lateral grass paths to ensure drainage to the lower end of the site.

### *Internal drainage*

- Advise plot-holders of the need for them to (i) make and maintain their own plot 'ditches' (20mm deep), (ii) maintain adjacent paths and (iii) discuss local drainage problems with the Committee before installing drainage pipes themselves so the work can be coordinated and made relevant to the whole site.
- Introduce pipes under the lateral paths to carry drainage water downhill where there are persistent problems with drainage.
- Measures on path maintenance should be undertaken which reduce low spots and keep path levels as even as possible. Appropriate material from a plot, wood-chip or sand could be used to improve the profile of the path. Buried artificial fabric or mats could be considered at path junctions;
- In extreme cases, where traffic (e.g. wheelbarrows) on paths is causing ruts and low spots, encourage plot-holders to minimize the deterioration of paths. Introduce a rotation of path-use by placing small temporary signs or barriers to reduce traffic on affected areas;

### *Lower part of site*

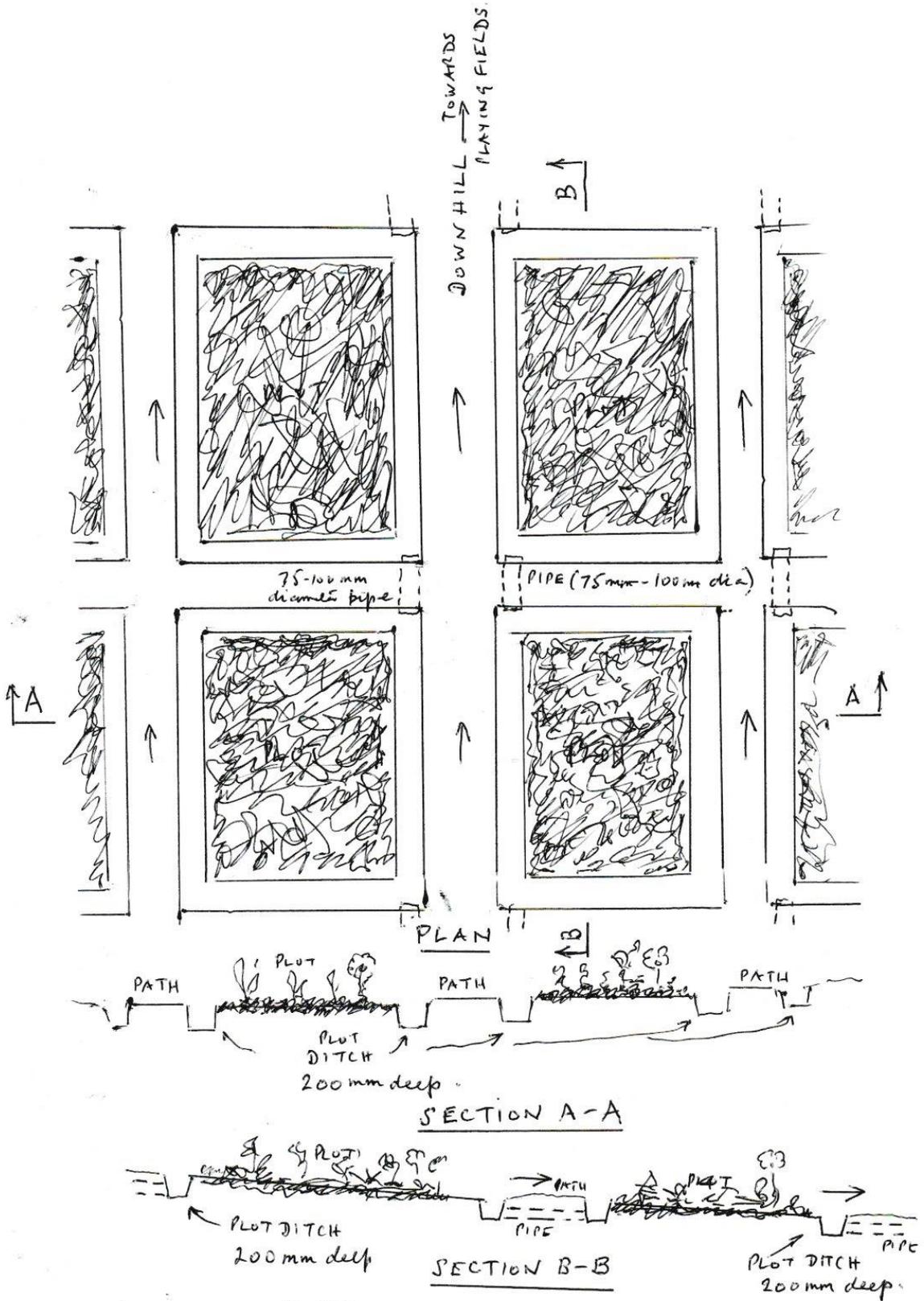
- Examine the route that drainage water takes at the bottom of the site at times of high runoff to see how it escapes from the site. Check problems and identify improvements that could be made.
- Investigate the informal drainage channels at the bottom of the site, dug by plot-holders, which cross the boundary and discharge towards the playing fields. Identify, designate and improve three or four of these as preferred discharge points from the site.

The sketch in the Appendix below gives a plan and sections of plot ditch and pipe suggestions.

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2 November 2022

Appendix



ALLOTMENT PLOTS  
(NOT TO SCALE)