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National Vegetation Classification Survey

Turing House Free School

For

Campbell Reith

Project No.: ACAM233/001/002/003

August 2018

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Contents

1. Summary and Main Recommendations

1.1 Summary

1.1.1 Campbell Reith is involved in the development proposals for a new free school, Turing House Free School, in Whitton, London (grid reference: TQ132735), see Figure 1. The proposed development will includes new teaching facilities and the provision of a large areas of sports pitches.

1.1.2 The proposed development will be situated within the London Borough of Richmond and is located within a predominantly residential area. The site covers approximately 6.8ha. Planning permission is currently being sought for the site.

1.1.3 A Preliminary Ecological Appraisal was undertaken for the site in 2017 which identified the site as an area of Metropolitan Open Land; a non-statutory site designation. Nevertheless national and local planning policy considers Metropolitan Open Land important in a local context. As such a National Vegetation Classification survey was recommended to determine the ecological value. Additionally the Preliminary Ecological Appraisal identified the potential of the site to support badgers and bats, surveys for which are covered by separate reports. An Arboricultural Impacts Assessment and Arboricultural Method Statement has also being produced to determine the value of the trees on the site.

1.1.4 A National Vegetation Classification was undertaken in August 2017 with a total of 14 quadrats used to sample the grassland. Two stands were identified, see Figure 2. This was following adjustment to the stand boundaries after the analysis of the quadrat data using Tablefit and expert opinion, using National Vegetation Classification floristic tables and knowledge of the site. Stand one is an OV23d *Lolium perenne- Dactylis glomerata sub-community Arrhenatherum elatius – Medicago lupulina* grassland and stand two is MG7e *Lolio-Plantaginion community sub-community Lolium perenne – Plantago lanceolata* grassland.

1.1.5 Both habitats are typical of past grassland improvement and are typically widespread grasslands in the UK. However, in an urban context the loss of such a large area of moderately species rich grassland (although of widespread species and communities) would be considered important at the local level.

1.1.6 During the survey a small area of Japanese knotweed (*Fallopia japonica*) was also identified. This is a Schedule 9 plant species as listed in the Wildlife and Countryside Act 1981 (as amended) and it is an offence to plant or otherwise cause this species to grow in the wild.

1.1.7 The change of use of the site to areas for outdoor recreation and sport pitches is an acceptable use of Metropolitan Open Land under policy LP13 of the London Borough of Richmond upon Thames (2017). However, consideration should be given to the provision and species composition of the sports pitches and the surrounding use of the site in order to include provision for the maintenance of the Metropolitan Open Land designation. Recommendations are given below:

1.2 Main Recommendations

1.2.1 The following measures are recommended for the development to comply with relevant planning policy.

1.2.2 It is advised that the sports pitches are composed of coarse native grasses and not of artificial materials that would lead to the loss of much of the site's ecosystem service function. Additionally, to compensate for the reduction in species diversity within the sports pitches and loss of areas of OV23d and MG7e grassland, it is advised that the area around the peripheral margins of the site, a 20-25m grassland buffer is maintained and enhanced. Two options are suggested.

Option 1:

1.2.3 Cutting the grassland buffer to ground level in March of year one followed by chain harrowing to break up the sward, followed by broadcast seeding of a suitably high diversity 20+ wildflower seed mix into the buffer. This would aim to increase the overall species diversity of the grassland but maintain the OV23 and MG7 compositions within the buffer. The grassland can be maintained via flailing to 100-150mm in late summer and then again in late winter (March).

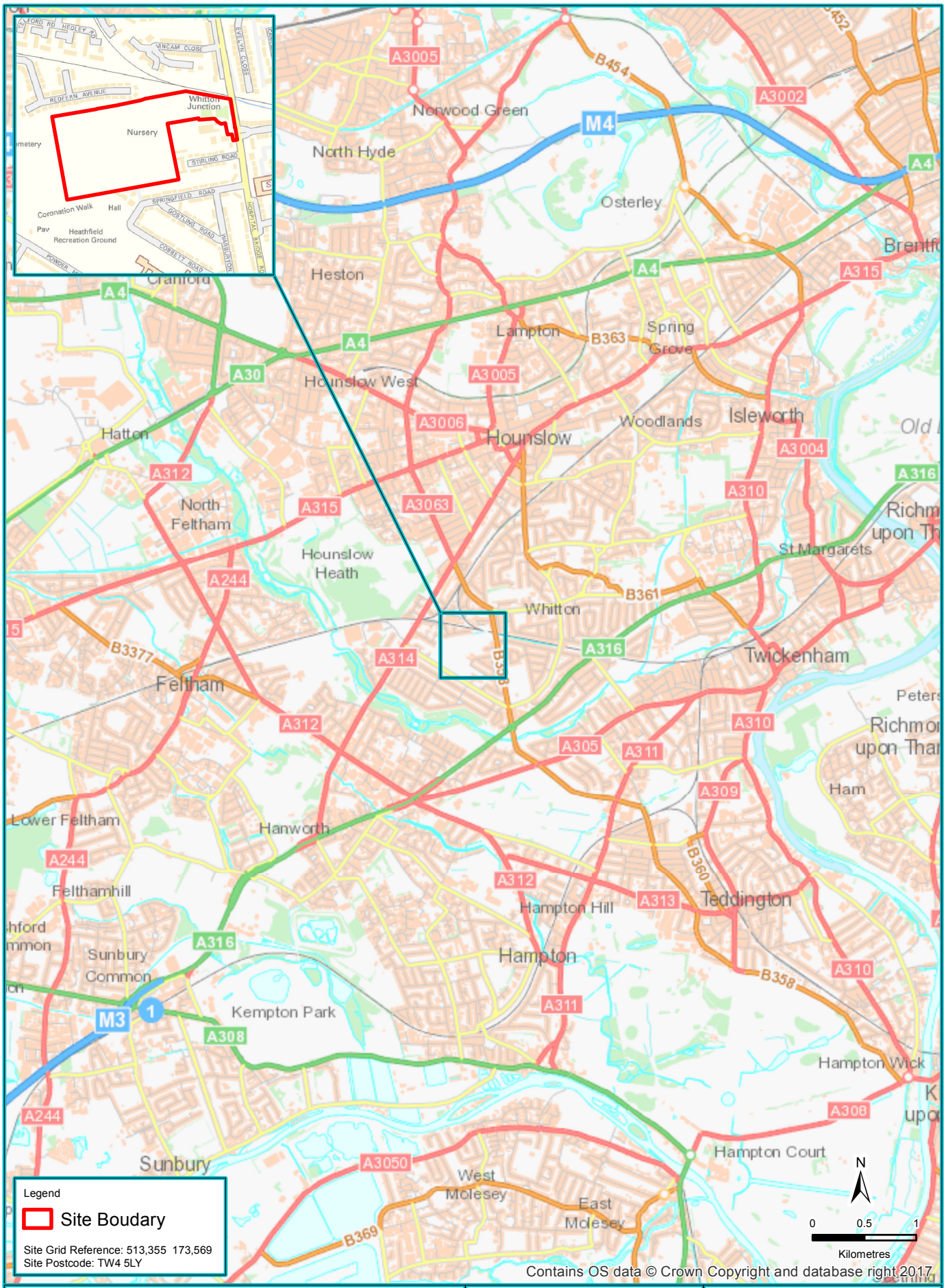
Option 2

1.2.4 Power harrowing two 3m strips within the grassland buffer in March of year one. The power harrowing will expose bare soil. The remainder of the grassland within the buffer can be mown to approximately 100mm and chain harrowed, following which a suitable high diversity 20+ wildflower seed mix should be sown into the power harrowed strips and buffer generally. The objectives would be to increase species diversity in the buffer and ultimately have a mosaic of grassland that includes OV23, MG7 and MG5 (*Cynosurus cristatus- Centaurea nigra*) NVC communities. Following the broadcast sowing the area should be left to germinate and no further management should be undertaken until mid-August in year one. In mid-August of year one, the buffer should be cut to 150mm using a power scythe, the material should be left for a few days before being collected up and piled in several areas within the buffer. Following collection of the material in year one the grassland buffer can be maintained via flailing to 100-150mm in late summer and then again in late winter (March).

1.2.5 It is advised that the area of Japanese knotweed that borders the residential development is eradicated from the site.

Ecological Enhancements

1.2.6 To further the environmental credentials of the development additional enhancements could be implemented. This includes; the provision of bird and bats boxes within the buffer, soil capped logs piles and soil scrapes for invertebrates. In addition a green roof could be implemented on one of the proposed buildings on site using a minimum of 10 plant species, suitable to withstand drought and low nutrient environments.



Client: Campbell Reith		Drawing Ref: ACAM233/24305/1	
Figure Number: 1		Scale at A4: 1:50,000	
Figure Title: Site Location		Drawn: HC	Checked: NS
		Date: 07/09/2017	Date: 07/09/2017

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Legend

- Target Note
- Photograph Location and Direction
- OV23 *Lolium perenne - Dactylis glomerata* community, sub community d
- MG7 *Lolio-plantagion* community, sub community e
- Non-grassland communities not surveyed
- Site Boundary

Site Grid Reference: 513,355 173,569
Site Postcode: TW4 5LY

Drawing Ref	ACAM233/24306/2
Scale at A3	1:1,500
Drawn: AS	Checked: NS
Date: 21/08/2018	Date: 21/08/2018
Client	Campbell Reith
Figure Number	2

Figure Title

NVC Communities Present on the Site

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Photograph 1:
Stand 1 OV23 *Lolium perenne- Dactylis glomerata* community, sub community d.

Photograph 2:
Stand 2 MG7 *Lolio-Plantaginion* community, sub-community e.

Client: Campbell Reith		Drawing Ref: ACAM233/24307/1	thomson ecology
Figure Number: 3		Scale at A4: Not applicable	
Figure Title: Photographs of the Site		Drawn: HC	Checked: NS
		Date: 07/09/2017	Date: 07/09/2017

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2. Introduction

2.1 Development Background

2.1.1 Campbell Reith is involved in the development proposals of a new free school, Turing House Free School, in Whitton, London (grid reference: TQ132735), see Figure 1. The proposed development will include a three storey teaching block, two storey sports block, hard and soft informal social areas, and athletics and sports pitches. These proposals are hereafter referred to collectively as “the development”.

2.1.2 The proposed development will be situated within the London Borough of Richmond and is located within a predominantly residential area. The site covers approximately 6.8ha and is bounded to the north by residential gardens located off Redfern Avenue, to the north east by a railway line, to the east by Hospital Bridge Road and existing residential properties, to the south by residential properties and Heathfield Recreation Ground and to the west by Borough Cemetery. The area affected by the development is hereafter referred to as “the site”.

2.1.3 Planning permission for the proposed development is currently being sought.

2.2 Ecology Background

2.2.1 Thomson Ecology Ltd. was commissioned in January 2017 by Campbell Reith to undertake an arboricultural survey of up to 100 trees within and adjacent to the site, and to produce an Arboricultural Impact Assessment (AIA) and Arboricultural Method Statement (AMS) to discuss the likely impact of the development proposals on the trees on the site (Thomson Ecology, 2017a, 2017b). The majority of trees on the site will be retained. Through completion of the AMS a total of three trees and three groups of trees of C to B rating require removal as part of this development. Additionally, as part of good arboricultural management the Category U trees will be felled to remove any potential health and safety risk they pose to public or property. The removal of such trees should not have a significant detrimental effect on the arboricultural value of the site.

2.2.2 Campbell Reith was commissioned in June 2017 by Turner and Townsend Project Management Ltd. to undertake a Preliminary Ecological Appraisal (PEA), which included a desk study and an extended Phase 1 habitat survey of the site (Campbell Reith, 2017). The PEA established that the site is designated as a Metropolitan Area of Open Land (MOL). A botanical survey was therefore recommended to establish the level of ecological value of the site.

2.2.3 The PEA also identified trees which could have the potential to support roosting bats and a potential badger sett. Therefore Preliminary Ground Level Roost Assessments (PGLRA) of trees and a badger walkover survey were recommended.

2.2.4 Thomson Ecology was commissioned to carry out the PGLRA and badger walkover survey in August 2017 (Thomson Ecology, 2017c). The surveys identified one tree with low potential and three trees with moderate potential to support roosting bats. One potential outlier badger sett was identified and two potential fox earths or rabbit burrows were recorded.

2.3 The Brief and Objectives

2.3.1 Campbell Reith commissioned Thomson Ecology on 15th August 2017 to undertake a botanical survey of the site. The brief was to:

- Undertake a National Vegetation Classification (NVC) survey of the semi-improved grassland areas on site. The survey will follow the NVC survey methodology (Rodwell, 2006). Within each quadrat, all species of higher plant will be identified and for each species, the percentage cover of the quadrat will be estimated. At the same time, a walkover survey will be undertaken to record additional plant species and map the occurrence of any notable species. Following the field survey and for the purposes of NVC classification, the frequency of each species will be calculated and the figure for percent cover for each species in each quadrat will be converted to a DOMIN value. Finally, the NVC community type will be determined, as far as possible, by comparing the results from the field survey with the published accounts and floristic tables of vegetation communities given in British Plant Communities (Rodwell, et al, 1992 et seq) or using MATCH or TABLEFIT software.
- Provide a report giving the methods and results of the survey, a discussion of any relevant legislation and planning policy and our recommendations.

2.4 Surveyors

2.4.1 The survey was carried out by Ecological Consultant Justin Groves BSc (hons) GradCIEEM on 24th August 2017.

3. Methodology

3.1 General Approach

3.1.1 The Survey Area encompassed all land within the 6.5ha site. The method used in this survey is based on the standard Phase II NVC survey technique for short herbaceous vegetation which enables comparison of the vegetation found in the survey area to the types published in British Plant Communities volumes by Rodwell. The grassland survey was conducted on 24th August 2017.

3.2 Field Survey

3.2.1 An initial walkover survey was undertaken to determine the variation in the vegetation over the whole survey area including any areas that were determined suitable for the survey objectives. Similar looking areas of vegetation, known as homogenous stands, were marked on a map. The walkover survey indicated that there were two homogenous stands of vegetation present within the survey area hereafter referred to as Stand 1 and Stand 2. These are shown on Figure 2.

3.2.2 Within each of the homogenous stands identified initially by the walkover, a minimum of five locations were chosen to sample the vegetation. Prior to data analysis and adjustment of the stand boundaries shown in Figure 2, six quadrats were undertaken in Stand 1 and eight quadrats in Stand 2, giving a total of 14 sample locations. Following analysis of the data it was apparent Stand 1 covered much of the site and included 12 of the quadrats overall and Stand 2 a small area including the remaining two quadrats. Such quadrat locations across the site were taken from homogenous areas representative of the general vegetation types and structure within the site boundary. To aid analysis the quadrats were spread uniformly across the site which would allow stand boundaries to be adjusted accordingly following analysis. The samples were taken using 2m x 2m quadrats.

3.2.3 Within each quadrat, all species of higher plants in the ground layer were identified (no bryophytes were present in the quadrats) and, for each species, the percentage cover of the species within the quadrat was estimated and recorded.

3.2.4 The figure for percent cover for each species in each quadrat was then converted to a DOMIN value. DOMIN values are shown in Table 1.

Table 1: DOMIN values

Cover %	DOMIN
91-100	10
76-90	9
51-75	8
34-50	7

Cover %	DOMIN
26-33	6
11-25	5
4-10	4
<4 with many individuals	3
<4 with several individuals	2
<4 with few individuals	1

3.3 Data Collation and Analysis

3.3.1 The data from each quadrat was then assessed using both Tablefit computer software (Hill 1989) and by the surveyor using the NVC British Plant Communities (Rodwell 1992, 2000) in order to determine which community of the NVC best matched each stand of vegetation. The computer programme Tablefit provides a measure of goodness-of-fit between the observed data and the NVC floristic tables as published by Rodwell (1992, 2000). The goodness-of-fit score, which ranges from 0 to 100, is indicative only, and other information available, for instance the known distribution of each community, should be taken into account when matching a sample with an NVC community. This is particularly relevant when the score of the best matching community is low. Table 2 shows the goodness-of-fit ratings.

Table 1. Goodness of fit ratings.

Goodness of fit	Rating
80-100	Very good
70-79	Good
60-69	Fair
50-59	Poor
0-49	Very poor

3.3.2 A table of the species diversity and the DOMIN scale observed for the species in each quadrat is given in Table 3, Appendix 1 and a table showing the most appropriate NVC community per quadrat and per stand is given in Table 4, Appendix 2.

3.3.3 Finally, the NVC community type was determined, as far as possible, by comparing the results from the field survey with the published accounts and floristic tables of vegetation communities given in British Plant Communities volumes.

4. Results

4.1 Background

4.1.1 Prior to data analysis the stands were identified based upon the management, species diversity observed prior to detailed quadrats being undertaken, soil moisture content and site profiles. Broadly the northern half of the site appeared to be mown to a greater height, with greater nutrient enrichment/ soil moisture content. The south appeared drier with a shorter mown sward.

4.1.2 Management via the use of a tractor mounted flail appears to have occurred once or twice annually. This was apparent from patches of uncut vegetation. Approximately a month prior to the survey, flail mowing had occurred. Sward height prior to mowing was in the region of 20-40 cm and there was the occasional hawthorn or bramble patch in the northwest corner of the site. Past management of the site as apparent from aerial imagery suggests the site was used as grazing for livestock or ponies. Based upon the species generally observed very little perennial rye-grass (*Lolium perenne)* is present and it is not felt the site has been reseeded, but grazing has clearly occurred altering species diversity along with potential fertiliser input.

4.1.3 Management has clearly reduced significantly in recent years, however the species diversity in the grassland is moderate due to the reduction in management, only slight improvement and occasional cutting reducing coarse grasses outcompeting herbaceous vegetation.

4.1.4 A bare area at the centre of the site as shown on Figure 2 “Non-grassland communities not surveyed” was not surveyed as this was not grassland as per the brief and comprised a mixture of communities all disturbed as a result of usage as storage and planting by the adjacent plant nursery.

4.1.5 Following the input of data into Tablefit and analysis by the surveyor using the NVC British Plant Community volumes, the boundaries of the stands were adjusted based upon the results of the 14 quadrats. These stands are shown by Figure 2. A representative photograph of Stand 1 and Stand 2 is shown on Figure 3. The species recorded within each quadrat and their abundance according to the DOMIN scale are shown in Appendix1, **Error! Reference source not found.**4, The NVC community with the best overall fit (based on the Tablefit goodness-of-fit and on expert opinion) for each quadrat is shown in Appendix 2, Table 5.

4.1.6 Of the 14 quadrats, 12 were identified as OV23d *Lolium perenne- Dactylis glomerata sub-community Arrhenatherum elatius - Medicago lupulina* grassland (Stand 1, Figure 2) with varying degrees of fit from very good to poor as indicated by Tablefit. Additionally, based upon the analysis of the NVC community floristic tables, OV23d grassland was the most appropriate community.

4.1.7 The remaining two quadrats were identified as MG7e *Lolio-Plantaginion sub-community Lolium perenne - Plantago lanceolata* grassland (Stand 2, Figure 2), the fit for the community was fair as indicated by Tablefit. Furthermore, based upon the analysis of the NVC community floristic tables, MG7e grassland was the most appropriate grassland within the stand.

4.1.8 A description of the two NVC communities within the appropriate stand is shown in Table 3.

Table 3. A description of NVC communities recorded within the survey area.

Stand 1 - OV23 - *Lolium perenne* - *Dactylis glomerata* community	
OV23d	*Lolium perenne - Dactylis glomerata sub-community Arrhenatherum elatius – Medicago lupulina.* Dominants included those typically occurring *i.e.* perennial rye-grass, Cock's-foot (*Dactylis glomerata*) and ribwort plantain (*Plantago lanceolata*) with the additions of Yorkshire-fog (*Holcus lanatus*) and common bent (*Agrostis capillaris*). This sub-community covered much of the site This community correlates well with a current management regime; a reduced mowing regime whereby the sward has started to become dominated by courser grasses and taller forbs. OV23d is typical of succession following more lax grassland management. There is a tendency for the grassland to vary with patches of MG7e whereby ribwort plantain is a constant species (see MG7e below) not typical of OV23d. However this may be a result of the timing of mowing as in general the grassland is coarse and taller (when unmown). There is also the occasional dense small stand dominated by false oat-grass (*Arrhenatherum elatius*). The community is widespread.
Stand 2 - MG7 – Lolio - Plantaginion community	
MG7e	*Lolio-Plantaginion community sub-community Lolium perenne – Plantago lanceolata grassland* Dominant here included common bent, ribwort plantain, yarrow (*Achillea millefolium*), Yorkshire fog and white clover (*Trifolium repens*). The MG7e stand is found in an area of what appears to be shallower soils, greater drainage and shorter mowing regime. No perennial rye-grass is present within this area, however this is often the case as the sward ages and the species is replaced by Yorkshire-fog, common bent and ribwort plantain becomes dominant.

4.1.9 Of the two sub communities identified none are scare at a national level and are typical of improved grasslands within the UK along with verge type habitats. Both OV23d and MG7e are widespread throughout the UK. However in an urban context the loss of such a large area of moderately species rich grassland (although of widespread species and communities) would be considered important at the local level.

4.2 Notable species

4.2.1 A notable find of the survey was the presence of Japanese knotweed (*Fallopia japonica)* incidentally on the northern boundary; approximately centrally along its length see indicative location by target note (TN1) on Figure 2. Japanese knotweed is an invasive species native to China, Japan and Korea introduced to the UK in the 1850s and has since rapidly spread across

England. It reproduces from very small fragments of root in all soils and forms dense stands with deep penetrating roots.

5. Legal and Planning Policy Considerations

5.1.1 The site is designated as Metropolitan Open Land (MOL). MOL is an area of strategic open land within the urban area that contributes to the structure of London. MOL is predominantly open land or water which is of significance to London as a whole, or to a part of London.

5.1.2 The London Plan (The Mayor of London, 2016) identifies that MOL has an important role to play as part of London's multifunctional Green Infrastructure. Policy 7.17 of the London Plan states "*The strongest protection should be given to London's Metropolitan Open Land and inappropriate development refused, except in very special circumstances, giving the same level of protection as in the Green Belt*".

5.1.3 Policy LP13 of the London Borough of Richmond upon Thames Local Plan (publication version for consultation January 2017 – February 2017) states "*The borough's Green Belt and Metropolitan Open Land will be protected and retained in predominately open use. Inappropriate development will be refused unless 'very special circumstances' can be demonstrated that clearly outweigh the harm to the Green Belt or Metropolitan Open Land. Appropriate uses within Green Belt or Metropolitan Open Land include public and private open spaces and playing fields, open recreation and sport…. Development will be supported if it is appropriate and helps secure the objectives of improving the Green Belt or Metropolitan Open Land.*"

5.1.4 The sections of the National Planning Policy Framework (NPPF) 2018 that apply to Greenbelt apply equally to MOL. Section 13 paragraph 141 of the NPPF states "*local planning authorities should plan positively to enhance their beneficial use, such as looking for opportunities to provide access; to provide opportunities for outdoor sport and recreation; to retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land.*"

5.1.5 The development proposals include a large area which will be in use as an area for outdoor recreation and sport pitches. Under policy LP13 of the London Borough of Richmond upon Thames Local Plan (2017) and Section 9 paragraph 81 of the NPPF this is an appropriate use of MOL. However consideration should be given to the provision and species composition of the sports pitches and the surrounding use of the site in order to maintain the NVC grassland types. Appropriate recommendation to ensure compliance with planning policy is given in Section 6.

5.1.6 Japanese knotweed was found during the site walkover, this species is listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and as such, it is an offence to plant or otherwise cause this species to grow in the wild. Recommendations are given in Section 6

6. Recommendations

6.1 Protected species

6.1.1 No vascular plant species were recorded during the survey that are protected under Schedule 8 of the Wildlife and Countryside Act 1981, listed as Species of Principal Importance for the conservation of biological diversity in England under Section 41 of the Natural Environment and Rural Communities Act 2006, or listed under the vascular plant Red List for England (Cheffings *et al.* 2005).

6.2 Mitigation

6.2.1 In order to comply with national and local planning policy with regards to the MOL designation that applies to the site, it is advised that the development includes provisions that maintain the MOL designation.

6.2.2 It is advised that the sports pitches are composed of coarse native grasses and not of artificial materials that would lead to the loss of much of the sites ecosystem service function. Additionally, through using native grasses it would show a commitment to maintaining the MOL even though there has been a change of use to "*playing fields, open recreation and sport*" which would entail more intensive management and a reduction in species diversity. It would also ensure the continued maintenance of an extensive area of green space within the local area.

6.2.3 To compensate for the reduction in species diversity within the sports pitches at the centre of the site and loss of areas of OV23d and MG7e grassland, it is advised that around the peripheral margins of the site, a 20-25m grassland buffer is maintained and enhanced for biodiversity. This is feasible based upon the most recent site plans "*1284-SK9-PG 060117 Site Option 1 revC*" as provided to Thomson Ecology on 7th September 2017. This enhancement of a buffer would show a further commitment to the maintenance of the MOL designation and be in support of the London Borough of Richmond upon Thames Local Plan, that states that an MOL can be used for "*biodiversity including …… open community uses*".

6.2.4 Two options for the enhancement of the grassland buffer are given below:

Option 1:

1. Cutting the grassland buffer to ground level in March of year one followed by chain harrowing to break up the sward to reduce the competition by grasses and allow herbaceous seeds to germinate.
2. Broadcast sow a suitable high diversity 20+ wildflower seed mix into the buffer following chain harrowing. This would aim to increase the overall species diversity of the grassland but maintain the OV23 and MG7 compositions within the buffer. The seed mix should be suitable for loam & alluvial or heavy clay soils. Soil samples taken to understand the geology of the site for building purposes prior to development would assist the developer in choosing the correct seed mixture for the buffer. The grassland should then be left to develop over the summer months.

3. In late summer of year one the grassland can be maintained via flailing to 100-150mm and then again in late winter (March) of each subsequent year. This should maintained the buffered as a mix of OV23 and MG7 grassland and result in increased plant species diversity.

Option 2

1. Power harrowing two 3m strips within the grassland buffer in March of year one. The power harrowing will expose bare soil in an attempt to add diversity the grassland buff to imitate a dry meadow. The remainder of the grassland within the buffer can be mown to approximately 100mm and chain harrowed to reduce the competition by grasses and allow herbaceous seeds to germinate.
2. Broadcast sow a suitable high diversity 20+ wildflower seed mix into the power harrowed strips and buffer generally. The objectives would be to increase species diversity in the buffer and ultimately have a mosaic of grassland that includes OV23, MG7 and MG5 (*Cynosurus cristatus- Centaurea nigra*) NVC communities. The seed mix should be suitable for loam & alluvial or heavy clay soils. Soil samples taken to understand the geology of the site for building purposes prior to development would assist the developer in choosing the correct seed mixture for the buffer.
3. Following the broadcast sowing the area should be left to germinate and no further management should be undertaken until mid-August in year one.
4. In mid-August of year one, the buffer should be cut to 150mm using a power scythe, the material should be left for a few days before being collected up and piled in several areas within the buffer to reduce the nutrients within the buffer strip and allow seeds to be released to ground level.
5. Following collection of material to reduce nutrients in year one, the grassland buffer can be maintained via flailing to 100-150mm in late summer and then again in late winter (March) of each year. This should maintain the buffer as a dry meadow and result in increased plant species diversity.

6.2.5 Overall this would have multiple benefits including an increase in the species diversity present on the site, maintaining the site as a whole as grassland, maintaining a large green buffer, improve the aesthetics of the site, increase potential reptile habitat should they be present, provide good quality foraging habitat for badgers and improve the foraging habitats for bats in a dark corridor surrounding the site.

6.3 Notable species

6.3.1 Japanese knotweed is listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). As such, it is an offence to plant or otherwise cause this species to grow in the wild.

6.3.2 It is advised that the area of Japanese knotweed that borders residential development is eradicated from the site. This will prevent the accidental spread of this species during the development of the site.

6.4 Opportunities for Enhancement

6.4.1 In line with LP13 of the London Borough of Richmond upon Thames Local Plan and the NPPF 2018 ecological enhancements could be incorporated into the development proposals in order to enhance the biodiversity value of the MOL.

6.4.2 Possible opportunities for enhancement within the grassland buffer that could be implemented include:

- The erection of bird and bat boxes on posts on the edges of the buffer;
- Large 4m x 4m scrapes that provide bare ground for invertebrates; and
- Installation of soil capped brick and log piles that would improve the grassland for reptiles should they be present.

6.4.3 It may also be possible to implement a green roof on the one of the proposed buildings on the site using a minimum of 10 plant species suitable to withstand drought and low nutrient environments. Should an alkaline substrate be used, a chalk grassland seed mix would be appropriate. This will improve the environmental credentials of the development.

7. Conclusion

7.1.1 Following an NVC survey of the site to determine the value of the MOL designation, two stands of vegetation were identified. Stand one; OV23d *Lolium perenne- Dactylis glomerata sub-community Arrhenatherum elatius – Medicago lupulina* and stand two; MG7e *Lolio-Plantaginion community sub-community Lolium perenne – Plantago lanceolata* grassland. MOL is only considered as important as part of planning policy.

7.1.2 These two grassland types are typical of past grassland improvement and are widespread throughout the UK. The grasslands here have a moderate diversity of common and widespread species. In the context of London the loss of a large area of grassland would be seen as important in a local context.

7.1.3 Should the recommendations be followed in Section 6 to maintain the MOL designation the development would be compliant with the NPPF (2012), London Plan (2016) and the London Borough of Richmond upon Thames Local Plan (2017). This includes provision to maintain grass sports pitches and two options of the management of the buffer of grassland surrounding these sports pitches to increase species diversity whilst maintaining the OV23d and MG7e grassland still present.

8. References

8.1.1 Campbell Reith (2017) *Preliminary Ecological Appraisal, Turing House, Whitton.* Report ref: AHah-11677-14-150617-TuringHousePEA.doc.

8.1.2 Cheffings, C.M., Farrell, L., Dines, Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C. (Chris), Rumsey, F.J. & Taylor, I. (2005) The vascular plant red list for England. Botanical Society of the British Isles, Shirehampton, UK.

8.1.3 Hill, M.O. (1989) Computerized matching of releves and association tables, with an application to the British National Vegetation Classification. *Vegetatio*, 83, 187-194.

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8.1.5 Rodwell, J.S. (ed). (1992) British plant communities. Volume 3: grasslands and montane communities. Cambridge University Press, Cambridge, UK.

8.1.6 Rodwell, J.S. (ed). (2000) British plant communities. Volume 5: maritime communities and vegetation of open habitats. Cambridge University Press, Cambridge, UK.

8.1.7 Thomson Ecology (2017a) Arboricultural Impact Assessment, Thomson Ecology, Guildford Report ref: ACAM229/001/001

8.1.8 Thomson Ecology (2017b) Arboricultural Method Statement, Thomson Ecology, Guildford Report ref: ACAM229/002/001

8.1.9 Thomson Ecology (2017c) Preliminary Ground Level Bat Roost Assessment and Badger Surveys, Thomson Ecology, Guildford report ref: ACAM233/001/001

8.1.10 The Mayor of London (2016) The London Plan, London

Appendix 1

Table 4. Stand and Quadrat data adjusted following NVC community analysis

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
Stand (S) 1 Quadrat (Q) 1	*Plantago lanceolata*	6	ground layer
	Trifolium repens	6	ground layer
	Achillea millefolium	5	ground layer
	Lolium perenne	4	ground layer
	Dactylis glomerata	4	ground layer
	Agrostis capillaris	4	ground layer
	Holcus lanatus	4	ground layer
	Trifolium pratense	2	ground layer
S1Q2	Holcus lanatus	7	ground layer
	Lolium perenne	5	ground layer
	Dactylis glomerata	5	ground layer
	Agrostis capillaris	5	ground layer
	Trifolium repens	4	ground layer
	Trifolium pratense	4	ground layer
	Achillea millefolium	2	ground layer
	Plantago lanceolata	1	ground layer
	Senecio jacobaea	1	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
S1Q3	Agrostis capillaris	7	ground layer
	Trifolium repens	6	ground layer
	Plantago lanceolata	4	ground layer
	Dactylis glomerata	4	ground layer
	Holcus lanatus	4	ground layer
	Hypochaeris radicata	4	ground layer
	Lolium perenne	2	ground layer
	Centaurea nigra	2	ground layer
	Trifolium pratense	1	ground layer
	Senecio jacobaea	1	ground layer
	Arrhenatherum elatius	1	ground layer
	Lotus corniculatus	1	ground layer
	Vicia sativa subsp. segetalis	1	ground layer
S1 Q4	Agrostis capillaris	7	ground layer
	Plantago lanceolata	5	ground layer
	Trifolium repens	5	ground layer
	Dactylis glomerata	4	ground layer
	Holcus lanatus	4	ground layer
	Achillea millefolium	2	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Trifolium pratense	2	ground layer
	Hypochaeris radicata	2	ground layer
	Taraxacum officinale	2	ground layer
	Senecio jacobaea	1	ground layer
	Arrhenatherum elatius	1	ground layer
	Ranunculus repens	1	ground layer
S1 Q5	Trifolium repens	6	ground layer
	Arrhenatherum elatius	6	ground layer
	Plantago lanceolata	5	ground layer
	Agrostis capillaris	5	ground layer
	Dactylis glomerata	4	ground layer
	Taraxacum officinale	4	ground layer
	Hypericum perforatum	2	ground layer
	Ranunculus acris	2	ground layer
	Holcus lanatus	2	ground layer
	Senecio jacobaea	1	ground layer
	Vicia sativa subsp. segetalis	1	ground layer
S1 Q6	Agrostis capillaris	7	ground layer
	Plantago lanceolata	5	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Dactylis glomerata	4	ground layer
	Holcus lanatus	4	ground layer
	Taraxacum officinale	4	ground layer
	Lolium perenne	4	ground layer
S1 Q7	Agrostis capillaris	7	ground layer
	Holcus lanatus	7	ground layer
	Plantago lanceolata	4	ground layer
	Arrhenatherum elatius	4	ground layer
	Lolium perenne	4	ground layer
	Vicia sativa subsp. segetalis	2	ground layer
	Dactylis glomerata	1	ground layer
	Ranunculus acris	1	ground layer
	Senecio jacobaea	1	ground layer
	Taraxacum officinale	1	ground layer
	Cirsium arvense	1	ground layer
	Cerastium fontanum	1	ground layer
S1 Q8	Agrostis capillaris	7	ground layer
	Holcus lanatus	6	ground layer
	Plantago lanceolata	4	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Ranunculus acris	4	ground layer
	Festuca rubra	4	ground layer
	Achillea millefolium	4	ground layer
	Vicia sativa subsp. segetalis	3	ground layer
	Dactylis glomerata	2	ground layer
	Trifolium pratense	2	ground layer
	Hypochaeris radicata	1	ground layer
S1 Q9	Plantago lanceolata	6	ground layer
	Agrostis capillaris	6	ground layer
	Trifolium repens	5	ground layer
	Holcus lanatus	5	ground layer
	Arrhenatherum elatius	4	ground layer
	Vicia sativa subsp. segetalis	3	ground layer
	Dactylis glomerata	1	ground layer
	Ranunculus acris	1	ground layer
	Trifolium pratense	1	ground layer
S1 Q10	Plantago lanceolata	7	ground layer
	Agrostis capillaris	5	ground layer
	Dactylis glomerata	4	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Trifolium repens	4	ground layer
	Taraxacum officinale	4	ground layer
	Achillea millefolium	4	ground layer
	Ranunculus repens	4	ground layer
	Holcus lanatus	2	ground layer
	Vicia sativa subsp. segetalis	1	ground layer
	Hypochaeris radicata	1	ground layer
S1 Q11	Trifolium repens	7	ground layer
	Lolium perenne	6	ground layer
	Plantago lanceolata	4	ground layer
	Dactylis glomerata	4	ground layer
	Taraxacum officinale	4	ground layer
	Achillea millefolium	4	ground layer
	Trifolium pratense	1	ground layer
S1 Q12	Trifolium repens	7	ground layer
	Plantago lanceolata	5	ground layer
	Agrostis capillaris	5	ground layer
	Lolium perenne	4	ground layer
	Achillea millefolium	4	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Dactylis glomerata	1	ground layer
	Trifolium pratense	1	ground layer
	Lotus corniculatus	1	ground layer
S2 Q1	Agrostis capillaris	7	ground layer
	Plantago lanceolata	5	ground layer
	Achillea millefolium	5	ground layer
	Trifolium repens	4	ground layer
	Dactylis glomerata	4	ground layer
	Holcus lanatus	4	ground layer
	Taraxacum officinale	4	ground layer
	Senecio jacobaea	1	ground layer
	Hypochaeris radicata	1	ground layer
	Cerastium fontanum	1	ground layer
S2 Q2	Agrostis capillaris	7	ground layer
	Plantago lanceolata	5	ground layer
	Holcus lanatus	5	ground layer
	Dactylis glomerata	4	ground layer
	Hypochaeris radicata	4	ground layer
	Taraxacum officinale	2	ground layer

Stand and Quadrat number	Scientific Name	Abundance (DOMIN) scale	Field Layer
	Trifolium repens	1	ground layer
	Trifolium pratense	1	ground layer
	Ranunculus acris	1	ground layer
	Ranunculus repens	1	ground layer

Appendix 2

Table 5. NVC community based on Tablefit goodness-of-fit and expert opinion using floristic tables

	Stand and Quadrat Number													
	S1Q1	S1Q2	S1Q3	S1Q4	S1Q5	S1Q6	S1Q7	S1Q8	S1Q9	S1Q10	S1Q11	S1Q12	S2Q1	S2Q2
Analysed NVC community	OV23	OV23	OV23d	OV23d	OV23d	OV23d	OV23d	OV23d	OV23d	OV23d	OV23d	OV23d	MG7e	MG7e
Goodness of Fit (Tablefit)	80	86	61	64	55	65	60	42	43	59	68	52	64	61
Rating	Very good	Very good	Fair	Fair	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Poor	Fair	Fair