

Appendix 9.7
BOTANICAL SURVEY

FORT HALSTEAD, KENT
BOTANICAL SURVEY

A Report to: CBRE Ltd

Report No: RT-MME-127947-07 Rev A

Date Final Issued: November 2018
Date Rev A Issued: September 2019



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REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development".

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The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 24 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified ecologist to assess any changes in the habitats present on site, and to inform a review of the conclusions and recommendations made.

NON-TECHNICAL SUMMARY

Middlemarch Environmental Ltd was commissioned by CBRE Ltd to undertake an updated Botanical Survey of woodland and grassland at Fort Halstead in Kent. This survey is required to inform a hybrid planning application associated with the proposed redevelopment of the site, which will involve the demolition of the majority of existing industrial buildings and the construction of a new employment-led mixed-use village.

The site is surrounded by Ancient and Semi-Natural and Ancient Replanted woodland. During desk study work, 81 parcels of ancient woodland were identified within 2 km of the site, 17 of which form part of the survey area. Following previous botanical assessment by Waterman, CG2a *Festuca ovina* – *Avenula pratensis* grassland; *Cirsium acaule* – *Asperula cynanchica* sub-community to CG3 *Bromus erectus* grassland was identified in the south of the site. This unimproved calcareous grassland supported a high diversity of species and had high potential to support notable vascular plants associated with chalk grassland in Kent, though no such species were observed during the surveys. Parts of the grassland had been recently grazed by livestock, leading to presence of coarser species typically associated with nitrogen-rich neutral grassland, and both the grassland and woodland areas showed signs of deterioration through encroaching scrub. Overall the woodland and grassland on site were considered to be of district value, with potential for improvement through implementation of appropriate management.

Botanical assessment work was undertaken throughout 2018, with targeted surveys carried out on 31st May, 1st June and 17th July 2018. During the suite of surveys carried out by Middlemarch Environmental Ltd during 2018, the site appeared generally in a similar condition as identified during the previous surveys. No protected plant species were observed during the suite of survey work. Numerous indicator species for calcareous grassland and ancient woodland were observed, contributing to the overall diversity and value of the habitats on site.

A small amount of rhododendron was recorded growing within the Old Fort area, which is located in the centre of the site. In addition, an unidentified cotoneaster species was recorded within the area of mixed plantation woodland located to the north of Armstrong Close and west of Fort Road. As this cotoneaster could not be identified to species level, the possibility of it being an invasive species could not be ruled out. Japanese knotweed was also recorded during the survey; off site, approximately 300 m from the boundary adjacent to London Road.

Following the results of the Botanical Survey, the following recommendations have been made:

R1 Broad-leaved, semi-natural ancient woodland

The proposed works could potentially impact several Ancient Woodland and Non-Statutory Sites if appropriate preventative measures are not implemented. Therefore, a Construction Ecological Management Plan (CEcMP) should be compiled for the site. The aim of the CEcMP is to minimise the potential impact of the construction phase of the development on the existing ecology of the site and off-site receptors, and ensure works proceed in accordance with current wildlife legislation. This document should be agreed with the Local Planning Authority ecologist prior to any works commencing.

R2 Unimproved and semi-improved calcareous grassland

'Lowland calcareous grassland' is a Habitat of Principal Importance for Nature Conservation in England and 'Chalk grassland' is a priority habitat on the Local BAP. The unimproved calcareous grassland on site is of intrinsic ecological value due to its species richness, calcareous features, and potential to support a range of protected/notable species. As such, the development proposals should be designed in such a way as to allow for the retention of the semi-improved and unimproved calcareous grassland on site. The CEcMP recommended in **R1** should also detail protective measures for habitats that are being retained, including the calcareous grassland.

R3 Grassland and woodland management

A Landscape Ecological Management Plan should be compiled for the site. This should detail appropriate management of the grassland and woodland areas in order to manage encroaching scrub and maintain / improve the quality of the habitats on site. This approach should focus on developing the existing seedbank by introducing scrub management and annual hay cuts of grassland areas, and by avoiding the use of fertilisers and additional seed mixes, to encourage the native, local species currently present to thrive.

R4 Schedule 9 Plants

A Method Statement must be developed for the proposed works to ensure that they do not result in the spread of any invasive non-native species. This method statement should reflect established best management practices for the treatment of the species.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

Middlemarch Environmental Ltd was commissioned by CBRE Ltd to undertake an updated botanical survey of grassland and woodland at Fort Halstead in Kent. This assessment is required to inform a hybrid planning application associated with the proposed redevelopment of the site, which will involve the demolition of the majority of existing industrial buildings and the construction of a new employment-led mixed-use village. It is understood that the new village will comprise business areas (Use Classes B1a/b/c with energetic testing operations), development of up to 750 residential dwellings, a village centre (Use Classes A1/A3/A4/A5/B1a/D1/D2), a one form entry primary school, use of the Fort Area and bunkers as an Historic Interpretation Centre (Use Class D1), together with amenity space, landscape and ecological enhancements both on the site and on the adjacent land within the Applicants ownership.

A suite of baseline surveys have been completed by Waterman Group between 2006 and 2013, the results of which are provided in an Ecological Appraisal (Report EED12715-102.R.2.3.7.LM) and Protected Species and Habitat Survey (Report EED12715-102.R.3.3.6.LM), and summarised in the ecology chapter of an EIA associated with a previous application, for which outline planning consent was granted.

Due to the amount of time that has elapsed since the previous surveys were completed, updated ecological surveys were required for the current planning application.

In addition, Middlemarch Environmental Ltd has been commissioned to undertake the following assessments:

- Preliminary Ecological Appraisal (Report RT-MME-127947-01);
- Preliminary Bat Roost Assessment (Report RT-MME-127947-02);
- Nocturnal Emergence and Dawn Re-entry Bat Surveys (Report RT-MME-127947-03);
- Bat Activity Surveys (Report RT-MME-127947-04);
- Badger Survey (Report RT-MME-127947-05);
- Breeding Bird Survey (Report RT-MME-127947-06);
- Terrestrial Invertebrate Survey (Report RT-MME-127947-08);
- Reptile Survey (Report RT-MME-127947-09);
- Dormouse Survey (Report RT-MME-127947-10);
- Winter Bird Survey (Report RT-MME-127947-11);
- Pre-development Arboricultural Survey (Report RT-MME-128206-01); and,
- Arboricultural Impact Assessment (Report RT-MME-128206-02).

The site is surrounded by Ancient and Semi-Natural and Ancient Replanted woodland. During desk study work, eighty-one parcels of ancient woodland were identified within 2 km of the site, seventeen of which form part of the survey area. Following previous botanical assessment by Waterman, CG2a *Festuca ovina* – *Avenula pratensis* grassland; *Cirsium acaule* – *Asperula cynanchica* sub-community to CG3 *Bromus erectus* grassland was identified in the south of the site. This unimproved calcareous grassland supported a high diversity of species and had high potential to support notable vascular plants associated with chalk grassland in Kent, though no such species were observed during the surveys.

Parts of the grassland had been recently grazed by livestock, leading to presence of coarser species typically associated with nitrogen-rich neutral grassland, and both the grassland and woodland areas showed signs of deterioration through encroaching scrub.

Overall the woodland and grassland on site were considered to be of district value, with potential for improvement through implementation of appropriate management.

1.2 SITE DESCRIPTION AND CONTEXT

The site is located off Star Hill Road in Halstead, Kent, centred at National Grid Reference TQ 4970 5922. It is an irregular shaped parcel of land that measures 131.89 ha in size.

At the time of the survey, the site comprised a defence research facility which contained a number of buildings with associated areas of hardstanding, surrounded by parcels of semi-natural and plantation woodland. Areas of neutral grassland, calcareous grassland and amenity grassland were also present, as well as patches of scrub and tall ruderal vegetation.

The site was bordered by the A224 Polhill to the north-east and Star Hill Road to the south-west. A mixture of arable and pastoral fields, pockets of woodland and farm buildings surround the site. The wider landscape was dominated by a rural setting, consisting of agricultural land interspersed with pockets of woodland and small settlements.

1.3 DOCUMENTATION PROVIDED

The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project. Documentation made available by the client is listed in Table 1.1.

Document Name / Drawing Number	Author
Fort Halstead – Design and Access Statement: 00556I	John Thompson and Partners
Site Location Plan: 00556I_S01 Rev D5	John Thompson and Partners
Land Use and Green Infrastructure Plan: 00556I_PP01 Rev D10	John Thompson and Partners
Building Heights Plan: 00556I_PP02 Rev D10	John Thompson and Partners
Access and Movement: 00556I_PP03 Rev D9	John Thompson and Partners
Demolition Plan: 00556I_PP04 Rev D8	John Thompson and Partners
Ecological Appraisal: EED12715-102.R.2.3.7.LM	Waterman Group
Protected Species and Habitats Survey: EED12715-102.R.3.3.6.LM	Waterman Group
Environmental Statement - Ecology and Nature Conservation	Waterman Group
Decision Notice (planning application number SE/15/00628/OUT)	Sevenoaks District Council

Table 1.1: Documentation Provided by Client

2. METHODOLOGY

2.1 DESK STUDY

As part of the Preliminary Ecological Appraisal (Report RT-MME-127947-01) an ecological desk study was undertaken within a 2 km radius of the site. The consultee for the desk study was Kent and Medway Biological Records Centre.

Middlemarch Environmental Ltd then assimilated and reviewed the desk study data provided by this organisation. Relevant plant data are discussed in Chapter 3. In compliance with the terms and conditions relating to its commercial use, the full desk study data are not provided within this report.

2.2 FIELD SURVEY

The site was subject to a targeted walkover survey to verify and build upon the comprehensive data collected by Waterman Group. The survey focussed on key woodland and grassland areas. Where present, any protected, notable or invasive non-native species were recorded.

The data collected was compared to the communities published within the baseline National Vegetation Classification (NVC) Survey (Rodwell, 1991 et seq.). The NVC survey is a standard technique for a detailed classification of British habitats into floristic communities and sub-communities. The data was then used to compare the condition of the habitats surveyed with the results of the previous assessment and determine whether the habitats have altered in condition.

3. DESK STUDY

The data search was carried out in July 2018 by Kent and Medway Biological Records Centre. Records of plant species within a 2 km radius of the survey area provided by the consultee are summarised in Table 3.1. It should be noted that the absence of records should not be taken as confirmation that a species is absent from the search area.

Species	No. of Records	Most Recent Record	Proximity of Nearest Record to Study Area	Species of Principal Importance?	Legislation / Conservation Status
Butcher's broom <i>Ruscus aculeatus</i>	9	2017	1,460 m north	-	ECH 5
Rough marsh-mallow <i>Malva setigera</i>	2	1989	1,980 m north-west	-	WCA 8
Snowdrop <i>Galanthus nivalis</i>	16	2016	Potentially within 2 km*	-	ECH 5
Oak polypore <i>Piptoporus quercinus</i>	8	2016	Potentially within 2 km**	✓	WCA 8
Green hound's-tongue <i>Cynoglossum germanicum</i>	1	2016	Potentially within 2 km*	✓	WCA 8
Lizard orchid <i>Himantoglossum hircinum</i>	5	2015	Potentially within 2 km**	-	WCA 8
Pennyroyal <i>Mentha pulegium</i>	2	2012	Potentially within 2 km*	✓	WCA 8
Jersey cudweed <i>Gnaphalium luteoalbum</i>	1	2012	Potentially within 2 km*	-	WCA 8
Bearded tooth <i>Hericium erinaceus</i>	11	2008	Potentially within 2 km**	✓	WCA 8
Early gentian <i>Gentianella anglica</i>	7	2003	Potentially within 2 km**	✓	ECH 2, ECH 4, WCA 8
Bog moss <i>Sphagnum</i> sp.	3	2003	Potentially within 2 km**	-	ECH 5
Deptford pink <i>Dianthus armeria</i>	2	2001	Potentially within 2 km**	✓	WCA 8
Large white-moss <i>Leucobryum glaucum</i>	1	2001	Potentially within 2 km**	-	ECH 5
Blunt-leaved bog-moss <i>Sphagnum palustre</i>	2	1999	Potentially within 2 km**	-	ECH 5
Feathery bog-moss <i>Sphagnum cuspidatum</i>	1	1991	Potentially within 2 km**	-	ECH 4
Fringed bog-moss <i>Sphagnum fimbriatum</i>	1	1991	Potentially within 2 km**	-	ECH 4
Magellanic bog-moss <i>Sphagnum magellanicum</i>	1	1991	Potentially within 2 km**	-	ECH 5
Papillose bog-moss <i>Sphagnum papillosum</i>	1	1991	Potentially within 2 km**	-	ECH 5
Red bog-moss <i>Sphagnum capillifolium</i>	1	1991	Potentially within 2 km**	-	ECH 5
Flat-topped bog-moss <i>Sphagnum recurvum</i>	1	1991	Potentially within 2 km**	-	ECH 5

Key:

*: Grid reference provided was four figures only.

** : Grid reference provided was two figures only.

ECH 2: Annex II of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation.

ECH 4: Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest in need of strict protection.

ECH 5: Annex V of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures.

WCA 8: Schedule 8 of Wildlife and Countryside Act 1981 (as amended). Protected plants and fungi.

Species of Principal Importance: Species of Principal Importance for Nature Conservation in England.

Table 3.1: Plant Species Records Within 2 km of Survey Area

In addition, the desk study revealed records of twelve species of plants and fungi that are listed as Species of Principal Importance, including basil-thyme *Clinopodium acinos* which is located potentially on site (the six-figure grid reference overlaps the site boundary).

4. SURVEY RESULTS

4.1 INTRODUCTION

Botanical assessment work was undertaken throughout 2018 by Jamie Fletcher (Ecological Consultant), Richard Wheat (Ecological Consultant) and Helen Pearce (Ecological Consultant), with targeted surveys carried out on 31st May, 1st June and 17th July 2018.

Table 4.1 details the weather conditions at the time of the survey.

Parameter	Conditions		
	31/05/2018	01/06/2018	17/07/2018
Temperature (°C)	14	19	23
Cloud Cover (%)	100	80	100
Precipitation	Nil	Nil	Nil
Wind Speed (Beaufort)	F1	F2	F1

Table 4.1: Weather Conditions During the Preliminary Bat Roost Assessment

4.2 CONSTRAINTS

During the updated survey work, no major constraints were identified at the time of survey.

4.3 GRASSLAND DESCRIPTION

Grassland areas were present across the site, forming open areas to the west and south, steeply sloping banks on and around the bunkers of the Fort and managed amenity verges delineating many of the buildings and roads.

Amenity grassland

The verges predominantly comprised short-mown amenity grassland containing a range of common grassland species including perennial rye-grass *Lolium perenne*, red fescue *Festuca rubra*, ribwort plantain *Plantago lanceolata*, common daisy *Bellis perennis* and creeping buttercup *Ranunculus repens*. In parts the grassland appeared significantly more diverse than typically associated with mown amenity grassland, with species including pyramidal orchid *Anacamptis pyramidalis* and violet helleborine *Epipactis purpurata* also observed.

Semi-improved calcareous grassland

The Fort contained semi-improved calcareous grassland growing on steeply sloping banks atop, and surrounding, a number of underground bunkers. Much of the grassland in this area was managed and had recently been mown to < 5 cm in height; however, the steeper banks had been left, with the taller grasses growing to c. 40 cm. Species included heath false-brome *Brachypodium pinnatum*, wild basil *Clinopodium vulgare*, sheep's fescue *Festuca ovina*, wild marjoram *Origanum vulgare*, mouse-ear hawkweed *Pilosella officinarum*, salad burnet *Sanguisorba minor*, oxeye daisy *Leucanthemum vulgare* and common knapweed *Centaurea nigra*. Locally frequent stands of pyramidal orchid, betony *Stachys officinalis* and wood sage *Teucrium scorodonia* were observed at the margins with adjacent woodland.

Semi-improved neutral grassland

Two areas of semi-improved neutral grassland were observed on site; one area located in the south-western corner and the other along Lime Pit Lane in the southern part of the site. The sward in these areas was dominated by grass species such as cock's-foot *Dactylis glomerata* and false oat-grass *Arrhenatherum elatius*, with other species including bird's-foot trefoil, germander speedwell *Veronica chamaedrys*, ragwort *Senecio sp.* and wild strawberry *Fragaria vesca*.

Species poor semi-improved neutral grassland

Species poor semi-improved neutral grassland was present on site forming two large sloping fields to the south-west and around the helipad in the north. The sward in these areas had recently been mown to c. 5 – 10 cm and was dominated by grass species including perennial rye-grass, cock's-foot, Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera*, common bent *Agrostis capillaris* and timothy *Phleum pratense*. Other species included bird's foot trefoil, black knapweed *Centaurea nigra*, cut-leaved cranesbill *Geranium dissectum*, common mouse-ear *Cerastium fontanum* and bugle *Ajuga reptans*. Pockets of tall ruderal vegetation were noted at the northern and southern end of the south-western fields. Locally abundant field bindweed *Convolvulus arvensis* was noted in the north of this area and in the south a small mound of unmanaged grassland contained common knapweed, fennel *Foeniculum vulgare*, rough hawksbeard *Crepis biennis*, common mallow *Malva sylvestris* and musk mallow *Malva moschata*.

Unimproved calcareous grassland

The Downs Range grassland in the south of the site contained unimproved calcareous grassland which was divided into two areas by a fence line. The sward was dominated by grass species, growing to c. 20 cm, such as fescue *Festuca sp.*, with other species including bird's-foot trefoil *Lotus corniculatus*, field scabious *Knautia arvensis*, wild marjoram *Origanum vulgare*, wild strawberry *Fragaria vesca* and wild thyme *Thymus polytrichus*. Occasional stands of pyramidal orchid *Anacamptis pyramidalis* were also observed. Scrub containing bramble *Rubus fruticosus*, hawthorn *Crataegus monogyna*, dogwood *Cornus sanguinea* and wayfaring tree *Viburnum lantana* was encroaching significantly across the grassland.

The full list of species identified is included within the Appendix.

4.4 WOODLAND DESCRIPTION

Broad-leaved plantation woodland

A linear area of broad-leaved plantation woodland was located along the western site boundary. This habitat also extended around much of the semi-improved grassland in the western part of the site. The canopy consisted of ash *Fraxinus excelsior*, beech *Fagus sylvatica*, cherry *Prunus sp.*, crab apple *Malus sylvestris*, English oak *Quercus robur*, field maple *Acer campestre*, rowan *Sorbus aucuparia*, silver birch *Betula pendula*, sweet chestnut *Castanea sativa*, whitebeam *Sorbus aria* agg. and yew *Taxus baccata*, with an understorey of cherry laurel *Prunus laurocerasus*, dogwood *Cornus sanguinea*, hawthorn *Crataegus monogyna* and hazel *Corylus avellana*. The ground flora comprised bramble *Rubus fruticosus* agg., cleavers *Galium aparine*, clematis *Clematis sp.*, common nettle *Urtica dioica*, cow parsley *Anthriscus sylvestris*, dandelion *Taraxacum officinale* agg., germander speedwell *Veronica chamaedrys* and vetch *Vicia sp.*

Broad-leaved semi-natural woodland

The site was encircled by pockets of broad-leaved semi-natural woodland. The majority of these areas were classed as ancient woodland. Though varying in density, the canopy composition was generally consistent throughout, containing English oak, sweet chestnut *Castanea sativa* and ash, with rarely occurring to occasional beech, larch *Larix decidua* and cypress species *Cupressus sp.* Locally frequent stands of silver birch were also observed particularly in the northern woodland. Understorey species comprised stands of coppiced hazel, field maple, elder *Sambucus nigra*, yew, holly *Ilex aquifolium*, hawthorn and cherry laurel. Bramble scrub was noted throughout the woodland forming sparse, low-growing patches to dense stands which dominated the field layer in some areas. Other species in the field layer included bluebell *Hyacinthoides non-scripta*, wood avens *Geum urbanum*, wood speedwell *Veronica montana*, wood dock *Rumex sanguineus*, dog's mercury *Mercurialis perennis*, wood anemone *Anemone nemorosa*, male fern *Dryopteris filix-mas*, enchanter's nightshade *Circaea lutetiana*, lords and ladies *Arum maculatum*, three veined sandwort *Moehringia trinervia*, clematis *Clematis sp.*, lady fern *Athyrium filix-femina* and pendulous sedge *Carex pendula*. A pocket of woodland located to the west of the Downs Range contained a more diverse field layer containing many of the species listed above and with garlic mustard *Alliaria petiolata*, bugle *Ajuga reptans*, wood sage *Teucrium scorodonia*, crosswort *Cruciata laevipes*, yellow archangel *Lamium galeobdolon*, hairy brome *Bromus ramosus* and primrose *Primula vulgaris* also observed. Common feather moss *Kindbergia praelonga* was observed growing in locally dominant patches, particularly throughout the northern woodland.

Coniferous plantation woodland

Two narrow strips of coniferous plantation woodland were present on site; one area was located to the north of the large building complex and the other area was located to the south-west. These areas were dominated by Scots pine *Pinus sylvestris* standards, all of a similar size and age, growing to c.20 m tall. A sparse understorey of English oak, sweet chestnut and holly saplings was present with ground flora dominated by bramble, English bluebell and honeysuckle *Lonicera sp.*

Mixed plantation woodland

Three parcels of mixed plantation woodland were present on site; one area was located along Crow Drive in the north-eastern part of the site, one area was located to the north of Armstrong Close and west of Fort Road, and another area was located in the south-western corner of the site. The canopy was dominated by spruce *Picea sp.*, although ash, English oak, rowan, silver birch and sweet chestnut were also present, with an understorey of buddleia *Buddleia davidii*, cherry laurel, cotoneaster *Cotoneaster sp.*, elder, hawthorn, holly and willow *Salix sp.* The ground flora contained a few species indicative of ancient woodlands, including bluebell, wood anemone and wood sorrel *Oxalis acetosella*. Other species present included bracken, common nettle, creeping jenny *Lysimachia nummularia*, ground-elder *Aegopodium podagraria*, lesser celandine *Ficaria verna* and stitchwort *Stellaria sp.*

4.5 PROTECTED, NOTABLE AND INVASIVE SPECIES

Protected and notable species

No protected plant species were observed during the suite of survey work. Numerous indicator species for calcareous grassland and ancient woodland were observed, contributing to the overall diversity and value of the habitats on site.

Invasive species

A small amount of rhododendron *Rhododendron ponticum* was recorded growing within the Old Fort area, which is located in the centre of the site. In addition, an unidentified cotoneaster species *Cotoneaster sp.* was recorded within the area of mixed plantation woodland located to the north of Armstrong Close and west of Fort Road. As this cotoneaster could not be identified to species level, the possibility of it being an invasive species could not be ruled out.

Japanese knotweed *Fallopia japonica* was also recorded during the survey. This was located off site, approximately 300 m from the boundary, within an area of scrub adjacent to London Road.

5. DISCUSSION AND CONCLUSIONS

5.1 SUMMARY OF PROPOSALS

The proposals for the site are as follows:

Hybrid planning permission comprising:

In detail:

- *Demolition of existing buildings;*
- *Change of use and works to buildings Q13 and Q14 (including landscaping and public realm);*
- *Primary and secondary accesses.*

In outline:

- *Development of business space (use classes B1a/b/c) of up to 27,659 sq m GEA;*
- *Works within the 'X' enclave relating to energetic testing operations, including fencing, access, car parking;*
- *Development of up to 750 residential dwellings;*
- *Development of a mixed-use village centre (use classes A1/A3/A4/A5/B1a/D1/D2);*
- *Development of a one form entry primary school;*
- *Change of use of Fort Area and bunkers to Historic Interpretation Centre (use class D1) with workshop space;*
- *Roads, pedestrian and cycle routes, public transport infrastructure, car parking, utilities infrastructure, drainage;*
- *Landscaping, landforming and ecological mitigation works.*

5.2 HABITAT ASSESSMENT

During the baseline surveys completed by Waterman Group between 2006 and 2013 detailed botanical survey work was undertaken. During the suite of surveys carried out by Middlemarch Environmental Ltd during 2018, the site appeared generally in a similar condition as identified during the previous surveys.

Grassland assessment

The unimproved calcareous grassland in the south of the site appeared to have deteriorated in condition with significantly more encroaching scrub observed during the 2018 surveys. This grassland previously comprised a mosaic of calcareous grassland resembling CG2, CG3 and CG6 communities. Despite the increase in scrub, the underlying composition appeared somewhat similar, with species including bird's foot trefoil, pyramidal orchid, wild marjoram and wild thyme recorded within the sward. In contrast, a greater diversity of species was recorded within the semi-improved calcareous grassland in the Fort. Areas of the grassland had been left to grow and contained a richer diversity of species than previously identified in this area, including a greater number of species associated with calcareous grassland. The management was similar, though perhaps less intensive in recent years, which appeared to have allowed the grassland to develop. Previously the Fort had not been accessible for NVC assessment; however, it was noted grassland did not strongly resemble an existing NVC community. During 2018 surveys the more diverse areas of the sward loosely resembled CG2 grassland, containing sheep's fescue, mouse-eared hawkweed, rough hawkbit, bird's-foot trefoil, ribwort plantain and salad burnet; however, the distribution of these species was highly variable throughout the sward.

Both the Downs Range and the Fort were previously noted as having potential to support notable species typical of calcareous grassland in Kent. This is still the case, though no such species have been observed.

The remaining grassland on site, including the semi-improved and species-poor semi-improved neutral grasslands and amenity grassland verges, appeared in a very similar condition as recorded during previous surveys. As previously noted, the verges appeared more diverse than typically associated with amenity grassland, with species including pyramidal orchid and violet helleborine noted. The neutral grassland areas also appeared of similar diversity containing a range of generally more common herbs and grasses typically associated with these habitat types.

Woodland assessment

The woodland on site appeared in a similar condition as when previously surveyed with no significant changes observed. The woodland in the north and west of site was previously classified as W8 woodland while the pockets to the east and south were classified as W10 woodland. A small pocket in the north-east comprised a transition woodland between the two communities.

Updated assessment found the woodland to be in a similar condition with the same overall array of species and diversity. The woodlands in the north contained species associated with W8 woodland including ash, hazel, bramble, dog's mercury and common feather moss, which was locally dominant in places. The woodlands in the south had canopies predominantly containing English oak with honeysuckle sprawling at field level and pockets of densely growing bracken and bramble, associated with W10 woodland. Diversity varied throughout the pockets with some signs of neglect as bramble and bracken encroached to form dense stands in places. Ancient woodland indicator species including yellow archangel, English bluebell, wood speedwell, wood anemone, hairy brome and bugle were observed within many of the pockets, with greater diversity observed in areas of well-developed ground flora particularly in the south-west.

5.3 CONCLUSIONS

Following the botanical surveys at Fort Halstead, the grassland and woodland on site appears in a similar condition as when previously surveyed by Waterman Group between 2006 and 2013. Deterioration in the condition of the habitats on site was recorded during the previous surveys, and this trend has continued with further deterioration particularly noted within the unimproved calcareous grassland in the south of the site, through lack of suitable management. However, overall the site continues to support unimproved and semi-improved calcareous grassland, and ancient broad-leaved semi-natural woodland considered of district value.

6. RECOMMENDATIONS

All recommendations provided in this section are based on Middlemarch Environmental Ltd's current understanding of the site proposals, correct at the time the report was compiled. Should the proposals alter, the conclusions and recommendations made in the report should be reviewed to ensure that they remain appropriate.

R1 Broad-leaved, semi-natural ancient woodland

The proposed works could potentially impact several Ancient Woodland and Non-Statutory Sites if appropriate preventative measures are not implemented. Therefore, a Construction Ecological Management Plan (CEcMP) should be compiled for the site. The aim of the CEcMP is to minimise the potential impact of the construction phase of the development on the existing ecology of the site and off-site receptors, and ensure works proceed in accordance with current wildlife legislation. This document should be agreed with the Local Planning Authority ecologist prior to any works commencing.

R2 Unimproved and semi-improved calcareous grassland

'Lowland calcareous grassland' is a Habitat of Principal Importance for Nature Conservation in England and 'Chalk grassland' is a priority habitat on the Local BAP. The unimproved calcareous grassland on site is of intrinsic ecological value due to its species richness, calcareous features, and potential to support a range of protected/notable species. As such, the development proposals should be designed in such a way as to allow for the retention of the semi-improved and unimproved calcareous grassland on site. The CEcMP recommended in **R1** should also detail protective measures for habitats that are being retained, including the calcareous grassland.

R3 Grassland and woodland management

A Landscape Ecological Management Plan should be compiled for the site. This should detail appropriate management of the grassland and woodland areas in order to manage encroaching scrub and maintain / improve the quality of the habitats on site. This approach should focus on developing the existing seedbank by introducing scrub management and annual hay cuts of grassland areas, and by avoiding the use of fertilisers and additional seed mixes, to encourage the native, local species currently present to thrive.

R4 Schedule 9 Plants

A Method Statement must be developed for the proposed works to ensure that they do not result in the spread of any invasive non-native species. This method statement should reflect established best management practices for the treatment of the species.

REFERENCES AND BIBLIOGRAPHY

- Cooper, E. A. (1997). *Summary Descriptions of National Vegetation Classification Grassland and Montane Communities*.
- Dahl, E. and Hadač, E., (1941), Strandgesellschaften der Insel Ostoy in Oslofjord. Eine pflanzensoziologische Studie. *Nytt Magazin for Naturvidenskapene B*, **82**, 251-312.
- Fuller, R.M.(1987). The changing extent and conservation interest of lowland grasslands in England and Wales: A review of grassland surveys 1930-1984. *Biological Conservation*, **40**, 281 -300.
- Rodwell J.S. (1998). *British Plant Communities Volume 3 Grassland and Montane Communities*.
- Rose, F and O'Reilly, C. (2006). [The Wild Flower Key \(Revised Edition\) - How to identify wild plants, trees and shrubs in Britain and Ireland](#). Warne.
- Smart, S. (no date). Modular Analysis of Vegetation Information System. MAVIS. DART Computing and Centre for Ecology and Hydrology, Lancaster.
- Stace, C. (1991). *New Flora of the British Isles*. Cambridge University Press, Cambridge.
- Waterman Group (2015) *Ecological Appraisal: Fort Halstead, Kent*. Report Number EED12715-102.R.2.3.7.LM.
- Waterman Group (2015) *Protected Species and Habitats Survey: Fort Halstead, Kent*. Report Number EED12715-102.R.3.3.6.LM
- Waterman Group (2015) *Environmental Statement - Ecology and Nature Conservation: Fort Halstead, Kent*.

APPENDICES

APPENDIX 1: Grassland Species List

APPENDIX 2: Woodland Species List

APPENDIX 1

Grassland Species List

Grassland Species	
Scientific Name	English Name
<i>Agrostis capillaris</i>	Common bent
<i>Agrostis stolonifera</i>	Creeping bent
<i>Anacamptis pyramidalis</i>	Pyramidal orchid
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass
<i>Arrhenatherum elatius</i>	False oat-grass
<i>Bellis perennis</i>	Common daisy
<i>Brachypodium pinnatum</i>	Heath false-brome
<i>Brachypodium sylvaticum</i>	False-brome
<i>Centaurea nigra</i>	Common knapweed
<i>Cerastium fontanum</i>	Common mouse-ear
<i>Cirsium sp.</i>	Thistle species
<i>Clematis vitalba</i>	Old man's beard
<i>Clinopodium vulgare</i>	Wild basil
<i>Convolvulus arvensis</i>	Field bindweed
<i>Cornus sanguinea</i>	Dogwood
<i>Crataegus monogyna</i>	Hawthorn
<i>Crepis biennis</i>	Rough hawk's-beard
<i>Cruciata laevipes</i>	Crosswort
<i>Dactylis glomerata</i>	Cock's-foot
<i>Epipactis purpurata</i>	Violet helleborine
<i>Festuca ovina</i>	Sheep's-fescue
<i>Festuca rubra</i>	Red fescue
<i>Foeniculum vulgare</i>	Fennel
<i>Fragaria vesca</i>	Wild strawberry
<i>Galium mollugo</i>	Hedge bedstraw
<i>Geranium dissectum</i>	Cut-leaved cranesbill
<i>Hieracium sp.</i>	Hawkweed
<i>Holcus lanatus</i>	Yorkshire-fog
<i>Hyacinthoides non-scripta</i>	Bluebell
<i>Knautia arvensis</i>	Field scabious
<i>Lathyrus pratensis</i>	Meadow vetchling
<i>Leontodon hispidus</i>	Rough Hawkbit
<i>Leucanthemum vulgare</i>	Oxeye daisy
<i>Lolium perenne</i>	Perennial rye-grass
<i>Lotus corniculatus</i>	Common bird's-foot-trefoil
<i>Malva moschata</i>	Musk mallow
<i>Malva sylvestris</i>	Common mallow
<i>Origanum vulgare</i>	Wild marjoram
<i>Phleum pratense</i>	Timothy
<i>Pilosella officinarum</i>	Mouse-ear-hawkweed
<i>Plantago lanceolata</i>	Ribwort plantain
<i>Potentilla sterilis</i>	Barren strawberry
<i>Prunella vulgaris</i>	Selfheal
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rumex acetosa</i>	Common sorrel
<i>Sanguisorba minor</i>	Salad burnet
<i>Senecio jacobaea</i>	Common ragwort
<i>Senecio sp.</i>	Ragwort species
<i>Sonchus asper</i>	Prickly sow-thistle
<i>Stachys officinalis</i>	Betony

Grassland Species	
Scientific Name	English Name
<i>Teucrium scorodonia</i>	Wood sage
<i>Thymus polytrichus</i>	Wild thyme
<i>Tragopogon pratensis</i>	Goat's-beard
<i>Trifolium campestre</i>	Hop trefoil
<i>Veronica chamaedrys</i>	Germander speedwell
<i>Viburnum lantana</i>	Wayfaring tree
<i>Vicia sativa</i>	Common vetch
<i>Viola sp.</i>	Violet species

APPENDIX 2

Woodland Species List

Woodland Species	
Scientific Name	English Name
<i>Acer campestre</i>	Field maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Aesculus hippocastanum</i>	Horse chestnut
<i>Ajuga reptans</i>	Bugle
<i>Alliaria petiolata</i>	Garlic mustard
<i>Anemone nemorosa</i>	Wood anemone
<i>Anthriscus sylvestris</i>	Cow parsley
<i>Arum maculatum</i>	Lords-and-ladies
<i>Asplenium scolopendrium</i>	Hart's tongue fern
<i>Athyrium filix-femina</i>	Lady fern
<i>Bellis perennis</i>	Daisy
<i>Betula pendula</i>	Silver birch
<i>Betula pubescens</i>	Downy birch
<i>Brachythecium rutabulum</i>	Brachythecium moss
<i>Bromus ramosus</i>	Hairy brome
<i>Cardamine sp.</i>	Bittercress species
<i>Carex depauperata</i>	Wood sedge
<i>Carex pendula</i>	Pendulous sedge
<i>Castanea sativa</i>	Sweet chestnut
<i>Chamaenerion angustifolium</i>	Rosebay willowherb
<i>Circaea lutetiana</i>	Enchanter's nightshade
<i>Clematis sp.</i>	Clematis species
<i>Cornus sanguinea</i>	Dogwood
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Cruciata laevipes</i>	Crosswort
<i>Dactylis glomerata</i>	Cock's foot
<i>Deschampsia cespitosa subsp. cespitosa</i>	Tufted hair-grass
<i>Digitalis lutea</i>	Foxglove
<i>Dryopteris dilatata</i>	Broad buckler-fern
<i>Dryopteris filix-mas</i>	Male fern
<i>Epilobium montanum</i>	Broad-leaved willowherb
<i>Euphorbia amygdaloides</i>	Wood spurge
<i>Fagus sylvatica</i>	Beech
<i>Festuca rubra</i>	Red fescue
<i>Fragaria vesca</i>	Wild strawberry
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Cleavers
<i>Geranium robertianum</i>	Herb Robert
<i>Geum urbanum</i>	Wood avens
<i>Hedera helix</i>	Ivy
<i>Heracleum sphondylium</i>	Hogweed
<i>Holcus mollis</i>	Creeping soft grass
<i>Hyacinthoides non-scripta</i>	Bluebell
<i>Hypnum cupressiforme</i>	Cypress-leaved plaitmoss
<i>Ilex aquifolium</i>	Holly
<i>Impatiens parviflora</i>	Small Balsam
<i>Kindbergia praelonga</i>	Common feather-moss
<i>Lamiastrum galeobdolon</i>	Yellow archangel
<i>Larix decidua</i>	Larch
<i>Ligustrum vulgare</i>	Wild privet
<i>Luzula sylvatica</i>	Great wood-rush

Woodland Species	
Scientific Name	English Name
<i>Lysimachia nemorum</i>	Yellow pimpernel
<i>Lysimachia nummularia</i>	Creeping jenny
<i>Medicago arabica</i>	Spotted medick
<i>Mercurialis perennis</i>	Dog's mercury
<i>Mnium hornum</i>	Horn calcareous moss
<i>Moehringia trinervia</i>	Three veined sandwort
<i>Pentaglottis sempervirens</i>	Green alkanet
<i>Poa annua</i>	Annual meadow grass
<i>Poa trivialis</i>	Rough meadow grass
<i>Polystichum formosum</i>	Broad shield fern
<i>Polystichum sp.</i>	Shield fern species
<i>Populus nigra</i>	Black poplar
<i>Primula vulgaris</i>	Primrose
<i>Prunus avium</i>	Sweet cherry
<i>Prunus laurocerasus</i>	Cherry laurel
<i>Prunus sp.</i>	Cherry species
<i>Prunus spinosa</i>	Blackthorn
<i>Pteridium aquilinum</i>	Bracken
<i>Quercus robur</i>	English oak
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rosa canina</i>	Dog rose
<i>Rubus fruticosus agg.</i>	Bramble
<i>Rubus idaeus</i>	Raspberry
<i>Rumex sanguineus</i>	Wood dock
<i>Sambucus nigra</i>	Elder
<i>Scrophularia nodosa</i>	Common figwort
<i>Sorbus aucuparia</i>	Rowan
<i>Stachys sylvatica</i>	Hedge woundwort
<i>Taxus baccata</i>	Yew
<i>Teucrium scorodonia</i>	Wood sage
<i>Urtica dioica</i>	Nettle
<i>Veronica chamaedrys</i>	Germander speedwell
<i>Veronica montana</i>	Wood speedwell
<i>Viburnum lantana</i>	Wayfaring-tree
<i>Viburnum opulus</i>	Guelder rose