Cleator Moor Innovation Quarter

NATIONAL VEGETATION CLASSIFICATION REPORT

784-B029668 Rev 1

Copeland Borough Council

November 2021

Prepared on Behalf of Tetra Tech Group Limited

Tetratecheurope.com

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Prepared by: **Elizebeth Wilcox** Assistant Ecologist	**Checked by** **Dr Tim Rich** Principal Ecologist		**Approved By:** Rachel Kerr Associate
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CONTENTS

EXECUTIVE SUMMARY

Contents	Summary
Site Location	The 'site' is located in Cleator Moor, Cumbria and is centred at Ordnance Survey National Grid Reference NY 01570 15529. The site comprises main Site A and extension sites B and C. This report refers to Site A only, which is approximately 17 hectares in size and lies on the north side of Leconfield Street.
Proposals	The Cleator Moor Innovation Quarter (CMIQ) site has been used as an industrial estate since 1980s. It is proposed for re-development into an Innovation Quarter for West Cumbria.
Existing Site Information	Previous reports available for the site: • Tetra Tech (2021) Cleator Moor Innovation Quarter: Ecological Appraisal. On behalf of Copeland Borough Council. Ref: 784-B029668 • WYG (2020) – Leconfield Industrial Estate – Ecological Appraisal • White Young Green (2007) – Leconfield, Cleator Moor – Preliminary Ecological Appraisal
Scope of this Survey(s)	• NVC survey of five species-rich areas on Site A (Figure 2) including provision of habitat descriptions, species lists and site photographs; • Categorise habitats on site to NVC vegetation types; • Convert NVC vegetation types into UK Hab habitat types; • Evaluate if areas qualify as priority habitats under UK Hab and evaluate using Site of Scientific Interest (SSSI) selection criteria.
Results	• TN1 & TN5: MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community • TN2 & TN3: W1 *Salix cinerea – Galium palustre* woodland • TN4: M23b *Juncus effusus – Galium palustre* rush-pasture, *Juncus effusus* subcommunity
Recommendations	• It is recommended that grassland turves at TN1 are translocated to a suitable area of habitat creation within Site A.

GLOSSARY

CIEEM	Chartered Institute of Ecology & Environmental Management
CMIQ	Cleator Moor Innovation Quarter
DEFRA	Department for the Environment, Food and Rural Affairs
EA	Ecological Appraisal
HPI	Habitat(s) of Principal Importance
HMP	Habitat Management Plan
JNCC	Joint Nature Conservation Committee
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NVC	National Vegetation Classification
PEA	Preliminary Ecological Appraisal
SPI	Species of Principal Importance
SSSI	Site(s) of Special Scientific Interest

1.0 INTRODUCTION

1.1 BACKGROUND

Tetra Tech was commissioned by Copeland Borough Council on May 2021 to undertake a National Vegetation Classification (NVC) Survey of the site known as Cleator Moor Innovation Quarter (CMIQ).

This report has been prepared by Assistant Ecologist Elizebeth Wilcox and the conditions pertinent to it are provided in Appendix A.

1.2 SITE LOCATION

The 'site' is located in Cleator Moor and is centred at Ordnance Survey National Grid Reference NY 01570 15529 – see Figure 1 for site location plan. CMIQ comprises Main Leconfield Site A and Expansion Sites B and C. Site A is 17.60ha in size and is located north of Leconfield Street. Site B is 13.50ha and is located to the north-east of Site A. Site C is 4.03ha and is located to the south-east of Site A.

Site A predominantly comprised several industrial / commercial buildings with associated hard standing, roads and amenity grassland. These were surrounded by pockets of habitats that included broadleaved and mixed woodland plantation, scattered trees, dense and scattered scrub (including willow carr), semi-improved neutral grassland, unimproved neutral grassland, marshy grassland, tall ruderal vegetation, and bare ground. There were several areas of derelict hardstanding where previous buildings had been demolished.

Site A was surveyed on the 28th November 2019 for an Ecological Appraisal (EA) (WYG, 2020). The report recommended that more detailed habitat / botanical surveys of the wet woodland and the species-rich unimproved and marshy grasslands should be undertaken during the peak survey season (spring / summer), to gather a detailed list of plants in order to ascertain the conservation value of the habitats located on Site A.

1.3 DEVELOPMENT PROPOSALS

The CMIQ site has been used as an industrial estate since the 1980s. It is proposed that it will be re-developed and regenerated to create an Engineering Community Hub in West Cumbria. The confidential masterplan showing the proposed site re-development is depicted in Appendix B.

1.4 PURPOSE OF THE REPORT

The purpose of this report is to complete:

- Report results of the NVC survey of five species-rich areas on Site A (Figure 2) including provision of habitat descriptions, species lists and photographs;
- Categorise selected habitats on Site A to NVC vegetation types;
- Convert NVC vegetation types into UK Hab habitat types.
- Evaluate if areas qualify as priority habitats under UK Hab and evaluate using the Site of Scientific Interest (SSSI) selection criteria.

Scientific names in *italics* are given at the first mention of a species' name and thereafter by their common species name, following the standard British flora (Stace 2019), except in NVC and UK Hab habitat names, where the scientific names are used only.

2.0 METHODOLOGY

2.1 NVC

The NVC was created in 1975 by the Nature Conservancy Council to provide a comprehensive and systematic catalogue and description of the natural, semi-natural and major artificial plant communities of Britain (Rodwell, 2006), but not deliberately man-made combinations such as crops, orchards or plantations. It is the standard method for classifying and assessing vegetation in Britain.

The NVC survey was undertaken on the 28th June 2021 in dry, warm (19°C) and sunny weather. The survey was undertaken by Tetra Tech (TT) Principal Ecologist Penny Ward (MCIEEM) assisted by TT Assistant Ecologist Elizebeth Wilcox.

Five areas on Site A were selected for their botanical interest (Figure 2), based on information gathered from previous reports (White Young Green, 2007; WYG, 2020). In addition, areas identified as potential Priority Habitats on MAGIC www.magic.gov.uk - DEFRA's interactive, web-based database were also included. The MAGIC Priority Habitats layer includes Habitats of Principal Importance (HPI), as listed on Section 41 of NERC Act 2006. HPI identified onsite included:

- Open mosaic (Site A)
- Deciduous woodland (Site A)
- Good quality semi-improved grassland (Non Priority) (Site B)
- No main habitat but additional habitat exists: fens (Site B)

No HPI were shown on the MAGIC Priority Habitats layer within the boundary of Site C.

All the areas selected for NVC assessment comprise secondary vegetation, i.e. vegetation that has recolonised an area after the previous vegetation was partially or completely removed (Begon et al., 1996). There is little information on the soils present on Site A. Soilscapes: Cranfield University's online soil map classified the natural soils as '*Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, with impeded drainage'* but the vegetation is believed to have colonised over dumped industrial material comprising iron slag several metres thick, which provides a basic, nutrient-poor substrate but may be more acidic in places (WYG, 2007). North Associates (2014) noted that historic maps of Site A showed it as 'Hematite iron and steel works' and the presence of a reservoir and slag heaps were indicated.

The standard NVC method (Rodwell, 2006), comprising collection of quadrat data was adapted. Five areas determined as being floristically-rich and distinct from one another were selected and a full species list of vascular plants and bryophytes, as well as a description of the vegetation and abundance values (collected using the DAFOR scale: D=dominant, A=Abundant, F=frequent, O=Occasional, R= Rare) was documented. These species lists were compared to the descriptions and floristic tables in British Plant Communities Volumes 1-5 and resulting community allocations are discussed in Section 4.0 of this report.

2.2 CONVERSION TO UK HAB

NVC vegetation types were allocated to UK Hab types using the correspondence table (UK Habitat Classification Working Group, 2018a).

2.3 LIMITATIONS

The optimal period for botanical surveys is generally between April-September. This survey was completed in June which is inside the optimal survey window. As such this is not considered to be a limitation to the accurate assessment of the habitats and the dominant species of the respective vegetation types were visible and identifiable.

The details of this report will remain valid for a period of two years from the date of the survey, after which the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) should there be any changes to the red line boundary or development proposals which this report was based on.

3.0 RESULTS

TN1

TN1 was a 0.06 ha area of species rich, structurally diverse grassland. The sward height varied from 5cm - 150cm and false-oat grass *Arrhenatherum elatius* was the tallest species present. Forbs were dominant within the sward and there was an overall herb coverage of 40 - 80%. The sward was open, with no single species completely dominant.

In total 59 species were recorded within TN1 (Appendix C). Four species of orchid are present including common twayblade *Listera ovata*, common spotted-orchid *Dactylorhiza fuchsii*, Northern marsh orchid *Dactylorhiza purpurella* and bee orchid *Ophrys apifera*. Frequent *Carex* sedges and mosses such as red-stemmed feather-moss *Pleurozium schreberi* indicated damp conditions.

This area was allocated to the **MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community.**

Photograph 1 – Species rich grassland at TN1 facing NE.

TN2

TN2 was a mixed scrub community, with a canopy approximately 9m tall, with 80% cover. The canopy was diverse with a variety of tree and shrub species: abundant downy birch *Betula pubescens*, frequent grey willow *Salix cinerea*, with hazel *Corylus avellana*, ash *Fraxinus excelsior*, silver birch *Betula pendula*, oak *Quercus* sp. and rowan *Sorbus aucuparia* also present. Fallen dead wood was frequent. The canopy was open and allowed light to penetrate. A well-developed ground flora occurred including approximately 30% leaf-litter. The ground flora comprised mosses, rushes (frequent hard rush *Juncus inflexus* and occasional compact rush *Juncus conglomeratus*), grasses and occasional herbs such as common twayblade and lesser spearwort *Ranunculus flammula*. A shrub layer was also apparent in places ranging in height from 2-3m, comprised of hawthorn *Crataegus monogyna* and regenerating birch.

This area was allocated to the **W1 *Salix cinerea – Galium palustre* woodland community.**

Photograph 2 – Mixed scrub with mire ground flora and regenerating birch.

TN3

TN3 was a discrete area within the wet woodland which had a distinctive well-developed mire ground flora. The canopy species were the same as those found within TN2. The canopy was 5-10m in height with a ground flora that varied from 5cm - 2m. The ground was undulating, with *Sphagnum* hummocks and tracks holding standing water. The ground flora was primarily comprised of mosses: blunt leaved bog-moss *Sphagnum palustre* and spikey bog-moss *Sphagnum squarrosum* were a frequent component, becoming locally abundant in places. Springy turf moss *Rhytidiadelphus squarrosus* and red-stemmed feather-moss *Pleurozium schreberi* were occasional. Marsh horsetail *Equisetum palustre*, wild angelica *Angelica sylvestris* and marsh thistle *Cirsium palustre* were also a consistent element of the ground flora and there was frequent birch regeneration. A small pocket of swamp vegetation comprised of bulrush *Typha latifolia* was also located.

This area was allocated to the **W1 *Salix cinerea – Galium palustre* woodland community.**

Photograph 3 – Sphagnum lawn and water-filled track within wet woodland at TN3.

TN4

TN4 comprised an area of species-rich, marshy grassland, located southeast of the main road, between Unit 18 and areas of derelict hardstanding. The grassland at TN4 was structurally diverse and varied from 5cm - 1m in height. The sward was wet underfoot in places and was primarily comprised of rushes and sedges. The abundant species were hard and compact rush, marsh thistle and marsh bird's-foot trefoil *Lotus pedunculatus*. Many of the forbs present were tolerant of wet conditions, such as ragged robin *Silene flos-cuculi*, valerian *Valeriana officinalis* and yellow-iris *Iris pseudacorus*.

This area was allocated to the **M23b *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture *Juncus effusus* sub-community.**

Photograph 4 – Marshy grassland strip between two areas of derelict hardstanding, facing southeast.

TN5

TN5 was similar to the grassland at TN1 but was taller and more uniform in appearance. Sedges *Carex* spp. were present but occurred only occasionally and grasses such as sweet vernal-grass *Anthoxanthum odoratum* and red fescue *Festuca rubra* were more frequent, which is indicative of drier conditions. The abundant species were common knapweed *Centaurea nigra* and Yorkshire fog *Holcus lanatus* and overall the area was forb-rich, with herb species comprising over 30% of the sward. A total of 33 species were recorded (Appendix C).

This area was allocated to the **MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community.**

Photo 5 – Species-rich grassland on north-facing slope at TN5.

4.0 DISCUSSION

Table 1 Summarises the areas surveyed and their NVC communities. The full species lists are included in Appendix C.

Table 1 Closest fit NVC communities

Target Note (TN)	NVC community (closest fit)	Corresponding UK Hab community	Priority habitat
1	MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community	g3c5 *Arrhenatherum* neutral grassland	**No** UK Hab lists MG4, MG5 and MG8 as priority habitats only (Annex 1 6510 – lowland hay meadows). SSSI selection criteria includes high quality MG1 grasslands, but this area doesn't quality due to small size (<0.5ha).
2 & 3	W1 *Salix cinerea* – *Galium palustre* woodland community	w1d Wet woodland	**Yes –** wet woodland priority habitat description
4	M23b *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture *Juncus effusus* sub-community	f2b Purple moor grass and rush pastures	**No** SSSI selection criteria includes M23 mire under grassland communities of high botanical nature conservation value, but this area does not quality due to small size (<0.5ha).
5	MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community	g3c5 *Arrhenatherum* neutral grassland	**No** UK Hab lists MG4, MG5 and MG8 as priority habitats only (Annex 1 6510 – lowland hay meadows). SSSI selection criteria includes high quality MG1 grasslands, but this area doesn't quality due to small size (<0.5ha).

4.1 TN1 – MG1E *ARRHENATHERUM ELATIUS* GRASSLAND *CENTAUREA NIGRA* SUB-COMMUNITY

MG1 grassland is dominated by coarse grasses, particularly false-oat grass, cock's foot *Dactylis glomerata* and Yorkshire fog and often occurs in areas that are infrequently mown, (Rodwell 1992). The common knapweed sub-community is more species rich and varied than other sub-communities (Rodwell 1992). False-oat grass is less dominant, and the sward has a layered structure with false-oat grass and cock's foot in the tallest layer, with herbs including common knapweed, oxeye daisy *Leucanthemum vulgare* and hogweed *Heracleum sphondylium*, over finer herbs and grasses including red fescue and ribwort plantain *Plantago lanceolata* (Rodwell 1992). This layered structure was apparent during the survey.

MG1e corresponds with UK Hab community g3c5 *Arrhenatherum* neutral grassland (UK Habitat Classification Working Group 2018a). MG1e/g3c5 is not identified as a priority grassland habitat type (UK Habitat Classification Working Group 2018b), under UK Hab classification. However, SSSI selection criteria (JNCC, 2021) includes species-rich examples of MG1c-e, the criteria for selection are: sites larger than 5ha (although exceptional examples may be selected if <0.5ha), with 15 or more species per 4m^2. Although, TN1 qualifies for SSSI selection in regard to species-richness, it does not meet the qualifying size threshold.

As this is an exceptionally rich area of grassland, even if secondary in origin, it is suggested that it is translocated to an area of habitat creation within Site A.

4.2 TN2 / TN3 – W1 *SALIX CINEREA – GALIUM PALUSTRE* WOODLAND

Although TN2 and TN3 were assessed separately in the field due to differences in the ground flora, the two areas share the same NVC community overall and differences in the ground flora between the two areas show variation within the community. TN2 and TN3 are discussed together below.

Rodwell (1991a) describes W1 woodland as a variable woodland type dominated by grey willow, with occasional downy birch. Other woody species that can occur within the canopy include alder *Alnus glutinosa,* oak and silver birch, all of which were present within TN2 and TN3. In well-established stands of W1, willow often forms an open canopy appropriately 4-9m tall, with an herb-rich ground flora (Rodwell 1991a). The W1 stands at TN2 and TN3 were approximately 9m tall and had this characteristic canopy structure, formed by multi-stemmed willow trees (pictured in Photograph 2).

Within the W1 ground flora, marsh bedstraw *Galium palustre* is the most constant species and generally occurs with frequent soft rush *Juncus effusus* and water mint *Mentha aquatica* (Rodwell 1991a). Marsh bedstraw and soft rush were recorded as frequent within the sward at TN2, with water mint also present. Several other herbs associated with the community such as wild angelica, lesser spearwort and marsh thistle were also recorded. Mosaics within the ground flora are common in W1 woodland due to gaps in the canopy and differences due to undulating ground (Rodwell 1991a), which may explain superficial differences in the flora between TN2 and TN3.

W1 *Salix cinerea* woodland was identified as the best fit community for TN2 and TN3, as this is a pioneer habitat that establishes on topogenous wetlands on mineral soils (wetlands formed through overland or vertical water flow and water collecting due to compounded drainage; McBride et al. 2011). Grey willow is tolerant of standing water conditions and can establish in a variety of conditions providing areas of standing water dry in early summer, to allow seeds to germinate (Rodwell 1991a). Standing water and signs of impeded drainage were noted throughout Site A, but were particularly apparent at TN2/TN3, where most of the waterbodies were concentrated.

W1 woodland corresponds with UK Hab community W1d Wet woodland (UK Habitat Classification Working Group 2018a). W1d is identified as a priority habitat type (wet woodland) (UK Habitat Classification Working Group 2018), under UK Hab classification. It is usually not considered for selection for SSSI in its own right but may support other woodland types (JNCC, 2021).

4.3 TN4 – M23B *JUNCUS EFFUSUS – GALIUM PALUSTRE* RUSH-PASTURE, *JUNCUS EFFUSUS* SUBCOMMUNITY

M23b mire occurs on a variety of moist soil types, including both soligenous and topogenous mires in the lowlands of western Britain (Rodwell 1991b). *Juncus* species dominate the community but frequent grasses also typically occur including Yorkshire fog, creeping bent *Agrostis stolonifera*, sweet vernal-grass and rough meadow grass *Poa trivialis* (Rodwell 1991b). Tall growing herb species such as marsh thistle, common sorrel and wild angelica are common, as well as lower growing species such as marsh bedstraw and marsh bird's-foot trefoil, all of which were recorded at TN4 (Appendix C).

Within the *Juncus effusus* sub-community, tufted hair-grass *Deschampsia cespitosa* and creeping bent are associates and crested dog's tail can also occur in some stands (Rodwell 1991b). The structure of M23b mire is defined by management, generally via grazing or mowing. On Site A, TN4 is mown as observed on 1st July 2021 (Tetra Tech, 2021).

M23b mire corresponds with UK Hab community f2b Purple moor grass and rush pastures (UK Habitat Classification Working Group 2018a). F2b Purple moor grass and rush pastures is not a priority habitat. SSSI selection criteria (JNCC, 2021) includes M23b under fen meadows, but this area does not quality for selection due to small size (<0.5ha). As this area is dependent on the underlying hydrology to determine the floristic composition, translocation is not recommended as the species present are unlikely to persist and the translocated habitat will degrade over time (Nowak et al., 2018).

4.4 TN5 – MG1E *ARRHENATHERUM ELATIUS* GRASSLAND *CENTAUREA NIGRA SUB*-COMMUNITY

The vegetation at TN5 is similar to TN1 and has been characterised to the same NVC community MG1e (see section 4.1). Common knapweed and Yorkshire fog were abundant in both areas, but glaucous and black sedge were occasional rather than frequent at TN5, which is suggestive of drier conditions. The vegetation at TN5 was also present on a slope which will aid drainage and result in less damp conditions. In addition, the sward at TN5 was taller than that at TN1 and appears to be mown less frequently (EW personal observation: TN1 and TN4 were mown on the 1st July 2021, but TN5 was not).

Under the current masterplan (Appendix B), the majority of the grassland at TN5 will be retained as part of the new development and will be subject to appropriate management/enhancement measures as outlined in the Habitat Management Plan (HMP) for Site A.

5.0 REFERENCES

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FIGURES

Site Location Plan
CLEATOR MOOR INNOVATION QUARTER

Copeland Borough Council

Legend

Site boundary

Expansion B

Main Site

Expansion C

Notes:

Drawn by: CL
Checked by: GP
Office: Southampton

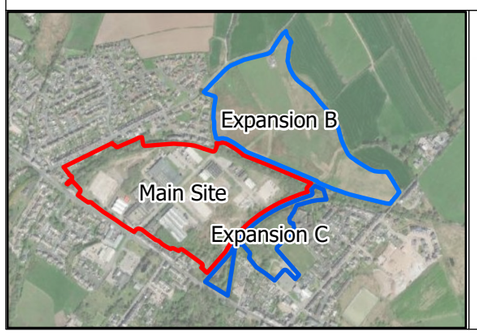
Figure No. 1
Revision No. A

0 70 140 210 Meters

Scale 1:5,000 @A3

21 October 2021

NGR: 301752E 515602N



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National Vegetation Classification (NVC) Survey

Leconfield Industrial Estate

Avison Young

- Site boundary
- M23b Juncus effusus/acutiflorus – Galium palustre rush-pasture Juncus effusus sub-community
- MG1e Arrenatherum elatius grassland Centaurea nigra sub-community
- W1 Salix cinerea – Galium palustre woodland community
- Target note

Notes:

Drawn by: MS
Checked by: EW
Office: Southampton

Figure No. 2
Revision No. A

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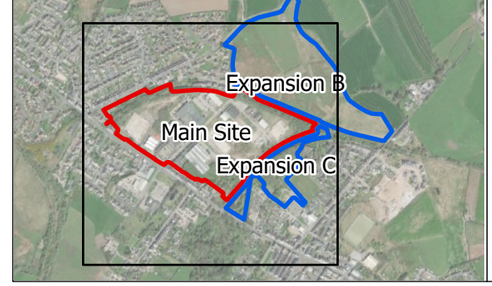
Scale 1:3,000 @A3

04 November 2021
NGR: 301603E 515488N



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APPENDIX A – REPORT CONDITIONS

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The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.

APPENDIX B – CONFIDENTIAL MASTERPLAN


SITE A
SITE B
SITE C
PLOT A1:
Proposed: Hub Building.
PLOT A2
PLOT A3
PLOT A4
PLOT A6
PLOT A8
BOC YARD
PLOT B1
PLOT B2
PLOT BE
PLOT B3
PLOT B4
PLOT B5
PLOT B6
PLOT B7
PLOT C1
PLOT C2
THREAPLANDS
LAYFIELD LANE
JOHN COLLIGAN DRIVE
John Colligan Walk
FIR GARTH
BOWTHORN ROAD
WEDDICAR GARDENS
LECONFIELD STREET
NORBECK PARK
LITTLE CROFT
Norbeck House
Filling Station
King George's Field
(Recreation Ground)
Balancing Pond
Allotment Gardens
Football Ground
Club House

APPENDIX C – SPECIES LISTS

Tables 2 - 6. Species present at TN1 – TN5 arranged per decreasing frequency (DAFOR) value. DAFOR values: Dominant (D), Abundant (A), Frequent (F), Occasional (O), Rare (R), Locally (L).

Table 2. TN1 - NY 01755 15527		
Common name	**Scientific name**	**Frequency (DAFOR)**
Yarrow	*Achillea millefolium*	A
Common knapweed	*Centaurea nigra*	A
Yorkshire-fog	*Holcus lanatus*	A
Creeping cinquefoil	*Potentilla reptans*	A
Sweet vernal-grass	*Anthoxanthum odoratum*	F
Glaucous sedge	*Carex flacca*	F
Black sedge	*Carex nigra*	F
Common mouse-ear	*Cerastium fontanum*	F
Cock's-foot	*Dactylis glomerata*	F
Northern marsh orchid	*Dactylorhiza purpurella*	F
Red fescue	*Festuca rubra*	F
Hogweed	*Heracleum sphondylium*	F
Oxeye daisy	*Leucanthemum vulgare*	F
Common twayblade	*Listera ovata*	F
Ribwort plantain	*Plantago lanceolata*	F
Tufted vetch	*Vicia cracca*	LA-F
Wild angelica	*Angelica sylvestris*	O
False fox-sedge	*Carex otrubae*	O
Crested dog's tail	*Cynosurus cristatus*	O
Field horsetail	*Equisetum arvense*	O
Hawkweed	*Hieracium agg.*	O
Rough hawkbit	*Leontodon hispidus*	O
Common bird's-foot trefoil	*Lotus corniculatus*	O
Swans neck thyme moss	*Mnium hornum*	O
Red-stemmed feather-moss	*Pleurozium schreberi*	O
Silverweed	*Potentilla anserina*	O
Meadow buttercup	*Ranunculus acris*	O
Yellow-rattle	*Rhinanthus minor*	O
Springy turf moss	*Rhytidiadelphus squarrosus*	O
Dandelion	*Taraxacum agg.*	O

Table 2. TN1 - NY 01755 15527		
Common name	**Scientific name**	**Frequency (DAFOR)**
Red Clover	*Trifolium pratense*	O
White clover	*Trifolium repens*	O
Common spotted-orchid	*Dactylorhiza fuchsii*	O-F
Kidney vetch	*Anthyllis vulneraria*	R
False oat-grass	*Arrhenatherum elatius*	R
Rosebay willowherb	*Chamaenerion angustifolium*	R
Creeping thistle	*Cirsium arvense*	R
Spear thistle	*Cirsium vulgare*	R
Pignut	*Conopodium majus*	R
Wild carrot	*Daucus carota ssp. carota*	R
Tufted hair-grass	*Deschampsia cespitosa*	R
Great willowherb	*Epilobium hirsutum*	R
Marsh horsetail	*Equisetum palustre*	R
Meadowsweet	*Filipendula ulmaria*	R
Perforate St John's-wort	*Hypericum perforatum*	R
Ragwort	*Jacobaea vulgaris*	R
Soft rush	*Juncus effusus*	R
Marsh bird's-foot trefoil	*Lotus pedunculatus*	R
An apple	*Malus spp.*	R
Tufted forget-me-not	*Myosotis laxa*	R
Bee orchid	*Ophrys apifera*	R
Mouse-ear-hawkweed	*Pilosella officinarum*	R
Selfheal	*Prunella vulgaris*	R
Creeping buttercup	*Ranunculus repens*	R
Common sorrel	*Rumex acetosa*	R
Curled dock	*Rumex crispus*	R
Hop trefoil	*Trifolium campestre*	R
Zigzag clover	*Trifolium medium*	R
Bush vetch	*Vicia sepium*	R

Table 3. TN2 - NY 01699 15398		
Common name	**Scientific name**	**Frequency (DAFOR)**
Canopy		
Downy birch	*Betula pubescens*	A
Grey willow	*Salix cinerea*	F

Table 3. TN2 - NY 01699 15398		
Common name	**Scientific name**	**Frequency (DAFOR)**
Silver birch	*Betula pendula*	R
Hazel	*Corylus avellana*	R
Ash	*Fraxinus excelsior*	R
Oak	*Quercus sp.*	R
Rowan	*Sorbus aucuparia*	R
Ground flora		
Common twayblade	*Listera ovata*	F
Hard rush	*Juncus inflexus*	F
Lesser spearwort	*Ranunculus flammula*	F
Marsh bedstraw	*Galium palustre*	F
Marsh horsetail	*Equisetum palustre*	F
Soft rush	*Juncus effusus*	F
Black sedge	*Carex nigra*	O
Common spike-rush	*Eleocharis palustris*	O
Compact rush	*Juncus conglomeratus*	O
Creeping soft-grass	*Holcus mollis*	O
Dewberry	*Rubus caesius*	O
Glaucous sedge	*Carex flacca*	O
Ground-elder	*Aegopodium podagraria*	O
Marsh bird's-foot trefoil	*Lotus pedunculatus*	O
Red-stemmed feather-moss	*Pleurozium schreberi*	O
Springy turf moss	*Rhytidiadelphus squarrosus*	O
Swans neck thyme moss	*Mnium hornum*	O
Sweet vernal-grass	*Anthoxanthum odoratum*	O
Wild angelica	*Angelica sylvestris*	O
Yorkshire-fog	*Holcus lanatus*	O
A fern	*Dryopteris sp.*	R
Bistort	*Persicaria sp.*	R
Bittersweet	*Solanum dulcamara*	R
Bramble	*Rubus fruticosus agg.*	R
Colt's-foot	*Tussilago farfara*	R
Common bird's-foot trefoil	*Lotus corniculatus*	R
Common cotton-grass	*Eriophorum angustifolium*	R
Common ivy	*Hedera helix*	R

Table 3. TN2 - NY 01699 15398		
Common name	**Scientific name**	**Frequency (DAFOR)**
Common spotted-orchid	*Dactylorhiza fuchsii*	R
Crested dog's tail	*Cynosurus cristatus*	R
Cuckooflower	*Cardamine pratensis*	R
Dogwood	*Cornus sanguinea*	R
False fox-sedge	*Carex otrubae*	R
False oat-grass	*Arrhenatherum elatius*	R
Great willowherb	*Epilobium hirsutum*	R
Greater stitchwort	*Stellaria holostea*	R
Hawthorn	*Crataegus monogyna*	R
Honeysuckle	*Lonicera periclymenum*	R
Marsh thistle	*Cirsium palustre*	R
Meadow buttercup	*Ranunculus acris*	R
Meadow vetchling	*Lathyrus pratensis*	R
Oak	*Quercus sp.*	R
Water mint	*Mentha aquatica*	R
Wild strawberry	*Fragaria vesca*	R

Table 4. TN3 - NY 01619 15376		
Common name	**Scientific name**	**Frequency (DAFOR)**
Canopy		
Downy birch	*Betula pubescens*	A
Alder	*Alnus glutinosa*	F
Grey willow	*Salix cinerea*	F
Oak	*Quercus sp.*	O
Ground Flora		
Marsh horsetail	*Equisetum palustre*	A
Wild angelica	*Angelica sylvestris*	F
Downy birch	*Betula pubescens*	F
Marsh thistle	*Cirsium palustre*	F
Compact rush	*Juncus conglomeratus*	F
Lesser spearwort	*Ranunculus flammula*	F
Bog stitchwort	*Stellaria alsine*	F
Blunt leaved bog-moss	*Sphagnum palustre*	LA
Spikey bog-moss	*Sphagnum squarrosum*	LA

Table 4. TN3 - NY 01619 15376		
Common name	**Scientific name**	**Frequency (DAFOR)**
Bulrush	*Typha latifolia*	LD
Black sedge	*Carex nigra*	O
Common cotton-grass	*Eriophorum angustifolium*	O
Marsh bird's-foot trefoil	*Lotus pedunculatus*	O
Springy turf moss	*Rhytidiadelphus squarrosus*	O
Red-stemmed feather-moss	*Pleurozium schreberi*	O
Swans neck thyme moss	*Mnium hornum*	O
Common spotted-orchid	*Dactylorhiza fuchsii*	R
Broad buckler-fern	*Dryopteris dilatata*	R
Oak (seedling)	*Quercus sp.*	R
Northern marsh orchid	*Dactylorhiza purpurella*	R

Table 5. TN4 - NY 01640 15561		
Common name	**Scientific name**	**Frequency (DAFOR)**
Marsh thistle	*Cirsium palustre*	A
Compact rush	*Juncus conglomeratus*	A
Hard rush	*Juncus inflexus*	A
Marsh bird's-foot trefoil	*Lotus pedunculatus*	A
Crested dog's tail	*Cynosurus cristatus*	F
Common spotted-orchid	*Dactylorhiza fuchsii*	F
Field horsetail	*Equisetum arvense*	F
Imperforate St John's-wort	*Hypericum maculatum*	F
Oxeye daisy	*Leucanthemum vulgare*	F
Tufted forget-me-not	*Myosotis laxa*	F
Creeping cinquefoil	*Potentilla reptans*	F
Grey willow	*Salix cinerea*	F
Ragged robin	*Silene flos-cuculi*	F
Common twayblade	*Listera ovata*	F
Northern marsh orchid	*Dactylorhiza purpurella*	F
Meadow foxtail	*Alopecurus pratensis*	O
Wild angelica	*Angelica sylvestris*	O
Downy birch	*Betula pubescens*	O
False fox-sedge	*Carex otrubae*	O
Common mouse-ear	*Cerastium fontanum*	O
Hoary willowherb	*Epilobium parviflorum*	O

Table 5. TN4 - NY 01640 15561		
Common name	**Scientific name**	**Frequency (DAFOR)**
Ragwort	*Jacobaea vulgaris*	O
Silverweed	*Potentilla anserina*	O
Meadow buttercup	*Ranunculus acris*	O
Common sorrel	*Rumex acetosa*	O
Valerian	*Valeriana officinalis*	O
Creeping bent	*Agrostis stolonifera*	R
Common knapweed	*Centaurea nigra*	R
Creeping thistle	*Cirsium arvense*	R
Tufted hair-grass	*Deschampsia cespitosa*	R
Meadowsweet	*Filipendula ulmaria*	R
Marsh bedstraw	*Galium palustre*	R
Yorkshire-fog	*Holcus lanatus*	R
Yellow iris	*Iris pseudacorus*	R
Common bird's-foot trefoil	*Lotus corniculatus*	R
Scarlet pimpernel	*Lysimachia arvensis*	R
Selfheal	*Prunella vulgaris*	R
Lesser spearwort	*Ranunculus flammula*	R
Curled dock	*Rumex crispus*	R
Marsh Woundwort	*Stachys palustris*	R
White clover	*Trifolium repens*	R
Germander speedwell	*Veronica chamaedrys*	R
Tufted vetch	*Vicia cracca*	R
Common vetch	*Vicia sativa*	R

Table 6. TN5 - NY 01493 15654		
Common name	**Scientific name**	**Frequency (DAFOR)**
Common knapweed	*Centaurea nigra*	A
Yorkshire-fog	*Holcus lanatus*	A
Sweet vernal-grass	*Anthoxanthum odoratum*	F
Remote sedge	*Carex remota*	F
Cock's-foot	*Dactylis glomerata*	F
Red fescue	*Festuca rubra*	F
Meadow vetchling	*Lathyrus pratensis*	F
Common bird's-foot trefoil	*Lotus corniculatus*	F
Common sorrel	*Rumex acetosa*	F

Table 6. TN5 - NY 01493 15654		
Common name	**Scientific name**	**Frequency (DAFOR)**
Tufted vetch	*Vicia cracca*	F
Northern marsh orchid	*Dactylorhiza purpurella*	F
Wild angelica	*Angelica sylvestris*	O
Cuckooflower	*Cardamine pratensis*	O
Glaucous sedge	*Carex flacca*	O
Black sedge	*Carex nigra*	O
Crested dog's tail	*Cynosurus cristatus*	O
Common spotted-orchid	*Dactylorhiza fuchsii*	O
Meadowsweet	*Filipendula ulmaria*	O
Compact rush	*Juncus conglomeratus*	O
Soft rush	*Juncus effusus*	O
Oxeye daisy	*Leucanthemum vulgare*	O
Ribwort plantain	*Plantago lanceolata*	O
Silverweed	*Potentilla anserina*	O
Creeping buttercup	*Ranunculus repens*	O
Red Clover	*Trifolium pratense*	O
Germander speedwell	*Veronica chamaedrys*	O
Kidney vetch	*Anthyllis vulneraria*	R
False oat-grass	*Arrhenatherum elatius*	R
Great willowherb	*Epilobium hirsutum*	R
Water-crowfoot	*Ranunculus sp.*	R
Curled dock	*Rumex crispus*	R
Goat's-beard	*Tragopogon pratensis*	R