



## Summary

- The client, Sustrans Cymru, commissioned Gail Quartly-Bishop and Lucia Ruffino to carry out an NVC habitat survey of an a 1.1km section of the Dee Estuary SSSI, SAC and SPA known as Flint Marsh, where the client are proposing to build a new cycle and footpath linked to the Wales Coast Path. As there was no access to some parts of the survey area, areas with no access but visible from elsewhere on site, were mapped using Phase 1 Habitat survey categories.
- The NVC and Phase 1 surveys recorded the following vegetation communities and habitats within the survey area:
  - The saltmarsh communities SM13 *Puccinellia maritima* saltmarsh community, SM16 *Festuca rubra* saltmarsh community, SM18 *Juncus maritimus* saltmarsh community, SM20 *Eleocharis uniglumis* saltmarsh community, SM28 *Elytrigia repens* saltmarsh community
  - Vegetation of the transition to terrestrial habitats: S21 *Bolboschoenus maritimus* swamp and MG11 *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland
  - The mesotrophic grassland communities MG1 *Arrhenatherum elatius* grassland and MG6 *Lolium perenne-Cynosurus cristatus* grassland
  - The scrub communities W24 *Rubus fruticosus-Holcus lanatus* underscrub, W22 *Prunus spinosa-Rubus fruticosus* scrub, W23 *Ulex europaeus-Rubus fruticosus* scrub
  - The open vegetation communities OV24 *Urtica dioica-Galium aparine* community and OV27 *Chamerion angustifolium* community.
  - Amenity grassland
  - Ephemeral vegetation
  - Poor semi-improved grassland
  - Improved grassland
  - Continuous scrub
- Of the communities recorded, all the saltmarsh communities and the vegetation of the transition to terrestrial habitats are considered of high conservation value and included within the Atlantic salt meadows habitat type, which is the primary reason for selection of the Dee Estuary/ Aber Dyfrdwy as an SAC.
- The saltmarsh communities do not appear to be over-grazed and the negative indicator *Spartina anglica* is not considered to be on the increase within the areas surveyed. Two of the main saltmarsh communities (SM13 and SM16) and the swamp community S21 have the required set of characteristic species for saltmarsh zones. However, the other communities (SM18, SM28 and MG11) were found to be species-poor and therefore did not meet the criterion of characteristic species. The marsh surveyed did not appear to be subject to major anthropogenic disturbance or pollution, with the exception of compaction and trampling noted along the line of the current footpath.

- The proposed cycle and footpath would cross an estimated 165m of upper saltmarsh communities and transitional vegetation, potentially leading to a loss of approximately 495m<sup>2</sup> of vegetation of international importance for conservation.
- The project would also cross an estimated 420m of MG6 *Lolium perenne-Cynosurus cristatus* grassland, which is of importance for conservation at national level because of its coastal location, thus potentially leading to a loss of approximately 1260m<sup>2</sup> of habitat.
- Mitigation measures should be taken to avoid damage to habitats within the SAC, including the use of tracked, lightweight vehicles; limiting the areas accessed by machinery and not allowing storage of construction materials or machinery with the SAC boundaries.
- Where the proposed new path crosses areas of scrub, hedgerows or trees, such as in the north of the site, there is potential for damage to or loss of active nests during any vegetation clearance works and therefore legal compliance must be maintained.

**Contents**

1.	Introduction .....	5
1.1.	Background and site description.....	5
1.2.	Objectives of the survey.....	6
2.	Methodology.....	6
2.1.	Survey limitations .....	7
3.	Results .....	7
3.1.	Overview.....	7
3.2.	Rare and/or notable species .....	10
3.3.	Non-native invasive species.....	11
3.4.	NVC Maps .....	11
3.5.	Community descriptions – saltmarsh communities.....	17
3.5.1	SM13 <i>Puccinellia maritima</i> saltmarsh community .....	17
3.5.2	SM16 <i>Festuca rubra</i> saltmarsh community .....	18
3.5.3	SM28 <i>Elytrigia repens</i> saltmarsh community .....	19
3.5.4	S21 <i>Bolboschoenus maritimus</i> swamp.....	19
3.6.	Community descriptions – other vegetation .....	20
3.6.1	MG1 <i>Arrhenatherum elatius</i> grassland .....	20
3.6.2	MG6 <i>Lolium perenne-Cynosurus cristatus</i> grassland .....	22
3.6.3	W24 <i>Rubus fruticosus-Holcus lanatus</i> underscrub .....	23
3.7.	Description of communities covering smaller areas.....	24
4.	Discussion.....	27
4.1.	Assessment criteria for vegetation communities .....	27
4.2.	Conservation assessment.....	27
4.2.1	Conservation assessment of saltmarsh communities .....	27
4.2.2	Conservation assessment of other habitats .....	29
4.3.	Considerations on vegetation conditions – saltmarsh communities.....	31
4.3.1	Vegetation height .....	31
4.3.2	Characteristic species.....	31
4.3.3	Vegetation composition: negative indicator species - <i>Spartina anglica</i> .....	32
4.3.5	Other negative indicators: pollution, anthropogenic disturbance or damage etc. ....	32
4.4.	Assessment of likely ecological impacts.....	33
5.	Conclusion .....	34

# 1. Introduction

## 1.1. Background and site description

The client, Sustrans Cymru, commissioned Gail Quartly-Bishop and Lucia Ruffino to carry out an NVC habitat survey of an a 1.1km section of the Dee Estuary SSSI, SAC and SPA known as Flint Marsh. The Dee Estuary is designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protected Area (SPA) and RAMSAR site. The survey area falls mostly within the designated site, with the exception of the area south of the railway track. The results of the survey and the consequent assessment will be used to inform the proposed construction of a new cycle and footpath linked to the Wales Coast Path.

There was no access to some parts of the survey area. In areas with no access but visible from elsewhere on site, habitats were mapped using Phase 1 categories. Areas which could not be seen were not mapped. Figure 1 below shows the survey area in red and also contains some explanatory notes about access.



Figure 1: Survey area shown in red.

## 1.2. Objectives of the survey

The aims of the survey are as follows:

- To classify and map accessible habitats within the survey area in accordance with the National Vegetation Classification protocol.
- To classify and map non-accessible but visible habitats within the survey area in accordance with Phase 1 protocol.
- To give a conservation assessment of the vegetation communities and habitats recorded, with particular emphasis on upper saltmarsh communities.
- To assess the likely ecological impact of the scheme on habitats surveyed, including direct (e.g. loss) and indirect impacts.

## 2. Methodology

An NVC survey was carried out by Gail Quartly-Bishop and Lucia Ruffino on 13<sup>th</sup> and 14<sup>th</sup> May 2019, in good weather conditions, with good visibility. Habitats were recorded and classified following the standard NVC protocol<sup>1</sup> where access allowed and according to the Phase 1 protocol<sup>2</sup> where non-accessible areas were visible from the site.

A Garmin 62st GPS was used to record locations. Maps were produced using QGIS 2.18.2 Las Palmas (2016).

Nomenclature of higher plant species follows Stace (1997)<sup>3</sup>. For clarity, the names of NVC communities and sub-communities have also been modified to follow Stace (1997). Therefore, for instance, the community S21, which Rodwell calls *Scirpus maritimus* swamp, is called *Bolboschoenus maritimus* swamp in this report.

In accordance with the NVC methodology, five or more quadrats were recorded for most vegetation communities. However, for vegetation communities which covered smaller areas, fewer quadrats were recorded. In this case, each quadrat was analysed separately and the community was assigned on the basis of the components of each quadrat.

For very small, fragmentary stands of vegetation, a full species list was made, and abundance was noted using the DAFOR scale. The whole stand was then compared to the NVC descriptions and assigned to a community on this basis.

---

<sup>1</sup>J. S. Rodwell (2006) National Vegetation Classification: Users' Handbook. JNCC. Peterborough.

<sup>2</sup> JNCC, Handbook for Phase 1 Habitat Survey: a Technique for Environmental Audit (2007)

<sup>3</sup> Stace, C (1997) New Flora of the British Isles. Second Edition. Cambridge University Press.

Some vegetation which could not be classified satisfactorily as an NVC community was described in the target notes (see Appendix 2) and given a suitable definition.

### 2.1. Survey limitations

As mentioned above, some parts of the site were not accessible at the time of the survey, however the main area of saltmarsh vegetation was surveyed to NVC level.

The survey was carried out early in the year, therefore making it difficult to accurately identify some plant species. This particularly applies to the genus *Atriplex*, as plants encountered at the time of the survey were only just seedlings. Plants which could not reliably be identified to species were either recorded to genus or marked cf. if the species was suspected but could not be checked.

## 3. Results

### 3.1. Overview

A total of 48 quadrats, 129 plant species (including 3 bryophyte species) were recorded throughout the survey area. Location of quadrats is shown on the map at Figure 2, below.

A list of all plant species recorded on site and all quadrat data (in Excel format) are collated in Appendix 3. Target notes to the NVC survey are included in Appendix 2.

The main semi-natural vegetation communities of saltmarshes recorded on site can be summarised as follows:

- Low-mid marsh vegetation: SM13 *Puccinellia maritima* saltmarsh community: species-poor grassland dominated by the grass *Puccinellia maritima* (Common Saltmarsh-grass) with associates such as *Aster tripolium* (Sea Aster), *Triglochin maritimum* (Sea Arrowgrass), and *Suaeda maritima* (Annual Sea-blite).
- Mid-upper saltmarsh vegetation: SM16 *Festuca rubra* (Red Fescue) saltmarsh community. This is a grassland community with *Festuca rubra* (Red Fescue), *Plantago maritima* (Sea Plantain) *Glaux maritima* (Sea-milkwort) and *Juncus gerardii* (Saltmarsh Rush) as constant species. This vegetation occurs throughout the main saltmarsh area, generally landwards of SM13 *Puccinellia maritima* saltmarsh community.
- Upper saltmarsh vegetation: SM28 *Elytrigia repens* saltmarsh community. This is a grassland dominated by *Elytrigia repens* (Common Couch), with associates such as *Agrostis stolonifera* (Creeping Bent) and *Festuca rubra* (Red Fescue).



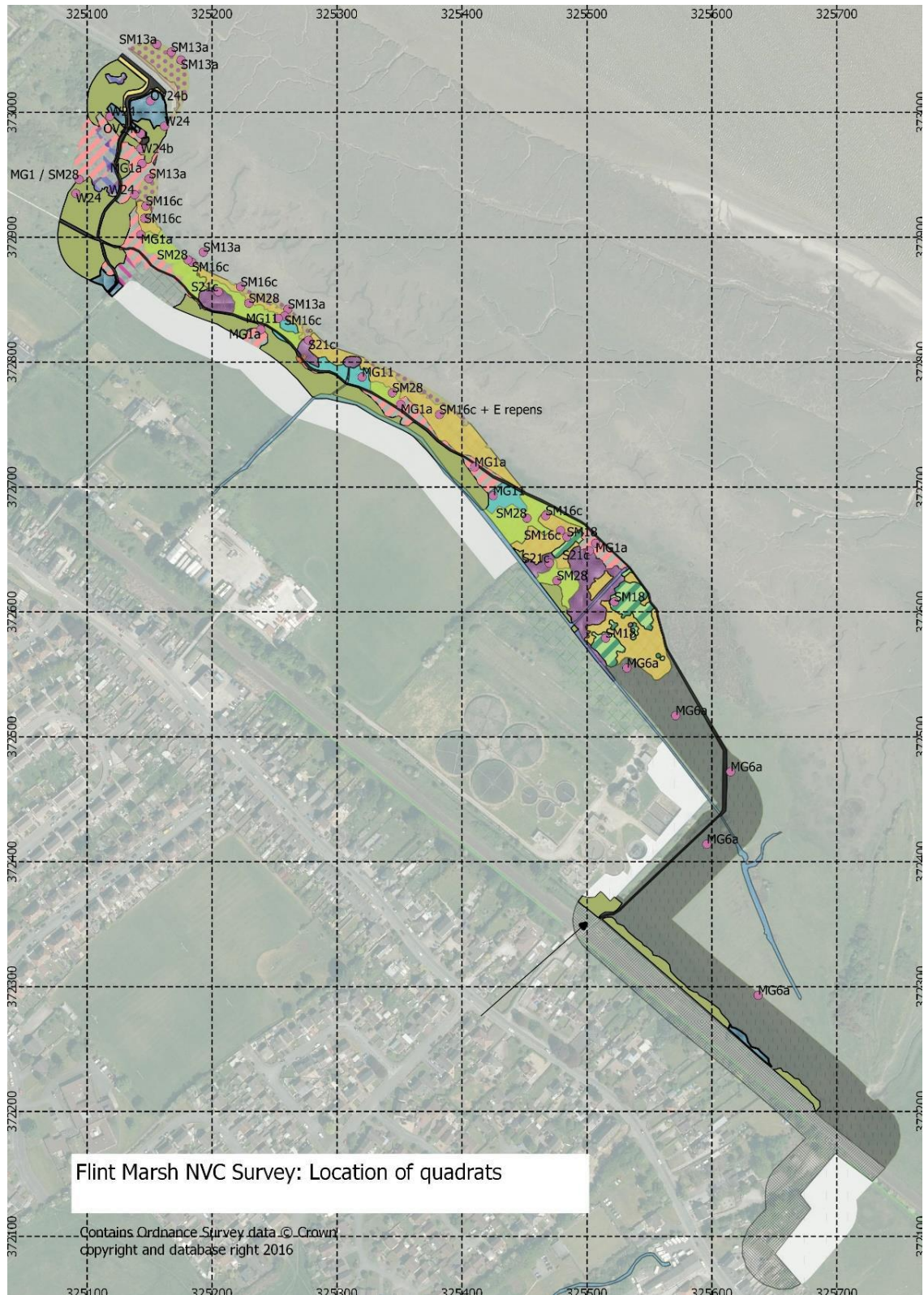


Figure 2: Location of quadrats throughout survey area.



- Upper saltmarsh vegetation: SM18 *Juncus maritimus* saltmarsh community. Clumps of Sea Rush dominate this community, usually with an understorey of *Agrostis stolonifera* (Creeping Bent), *Festuca rubra* (Red Fescue) and *Juncus gerardii* (Saltmarsh Rush).
- Vegetation of the transition to terrestrial habitats: S21 *Bolboschoenus maritimus* swamp. Several stands of this swamp community are present within the survey area. It is dominated by *Bolboschoenus maritimus* (Sea Club-rush) with only a few other associates, such as *Agrostis stolonifera* (Creeping Bent) and *Rumex crispus* (Curled Dock).
- Vegetation of the transition to terrestrial habitats: MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland, a mesotrophic grassland community found in areas which are frequently inundated with either fresh or brackish water.

Other grassland, scrub and tall ruderal vegetation communities were also recorded:

- MG1 *Arrhenatherum elatius* grassland
- MG6 *Lolium perenne*-*Cynosurus cristatus* grassland
- OV24 *Urtica dioica*-*Galium aparine* community
- OV27 *Chamerion angustifolium* community
- W22 *Prunus spinosa* – *Rubus fruticosus* scrub
- W23 *Ulex europaeus*-*Rubus fruticosus* scrub
- W24 *Rubus fruticosus* agg - *Holcus lanatus* underscrub

The Phase 1 habitat survey recorded the following habitats:

- Improved grassland
- Poor semi-improved grassland
- Continuous scrub

There were stands of vegetation which could not be classified satisfactorily as an NVC community. Therefore, the vegetation was described in the target notes (see Appendix 2) and given a suitable definition. This applied to areas of amenity grassland (mown grass verges at the edge of the path in the north of the site) and ephemeral vegetation (along the side of the tarmac track and down a muddy bank on the sea defences).

The main vegetation communities of the marsh are described in more detail at section 3.5 below. Section 3.6 describes non-saltmarsh communities which cover large areas of the site, and section 3.7 has brief descriptions of the other communities recorded on the site.

Photographs of the main vegetation communities are shown in Appendix 1. Table 1 below sets out the areas covered by each of the vegetation communities on this site.

Table 1. Areas covered by vegetation communities and Phase 1 habitats within the survey area

<b>NVC Community</b>	<b>Area ha</b>
SM13a	0.21
SM16c	0.65
SM18	0.16
SM20	0.00
SM28	0.37
S21	0.29
MG11	0.11
MG1a	0.45
MG6a	1.91
OV24	0.12
OV27	0.02
W22	0.08
W23	0.06
W24	1.04
<b>Phase 1 Habitats</b>	<b>Area ha</b>
Amenity grassland	0.03
Continuous scrub	0.50
Ephemeral vegetation	0.01
Improved grassland	0.61
Poor semi-improved grassland	0.92
Bare mud	0.01

### 3.2. Rare and/or notable species

No European protected plant species<sup>4</sup>; Schedule 8<sup>5</sup> or Section 7<sup>6</sup> plant species were recorded during the survey.

The following notable species were recorded during the survey:

- *Oenanthe lachenalii* (Parsley Water-Dropwort): this plant species is widespread at national level but it is scarce in Flintshire<sup>7</sup>, where it is known from 6 tetrads only and all records are pre-2000. The species is scattered throughout the saltmarsh communities within the

<sup>4</sup>These are species protected under the Conservation of Habitats and Species Regulations 2010.

<sup>5</sup> Species protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

<sup>6</sup> Species included under Section 7 of the Environment (Wales) Act 2016.

<sup>7</sup> Wynne, G; Phillips, J; Williams, D (2008) The Rare Plants of Flintshire – A Register of the rare, scarce or threatened plants in the old county of Flintshire, botanical vice-county 51. Botanical Society of the British Isles

survey area (present in SM16c, SM18 and S21). This record is in a different location to the populations listed in the Rare Plant Register (Wynne et al, 2008).

- *Eleocharis uniglumis* (Slender Spike-rush): this coastal species is not rare at national level but it is considered rare in Flintshire, where it is recorded only in 1 tetrad. This is an old record (1982) from a different location (SJ06M).
- *Juncus maritimus* (Sea Rush): this species is not rare at national level, but it is scarce in Flintshire (Wynne et al, 2008), having been recorded in only 5 tetrads.

### 3.3. Non-native invasive species

The following plant species listed under Schedule 9 of the Wildlife and Countryside Act 1981 were recorded on this site:

- *Fallopia japonica* – recorded in a few locations in the north of the site, close to the tarmac track and in scrub (SJ25110 73022).
- *Rosa rugosa* – recorded in scrub at SJ25121 73023.

Other non-native species recorded were *Quercus ilex*, *Pinus nigra*, *Buddleia davidii* and *Ligustrum ovalifolium*. Although *Quercus ilex* and *Pinus nigra* cannot be considered invasive species, it was surprising to find that both were actually planted around the new track in the north of the site. It would be more appropriate for suitable native species to be chosen for future planting.

### 3.4. NVC Maps

Five NVC habitat maps covering the survey area are shown below.

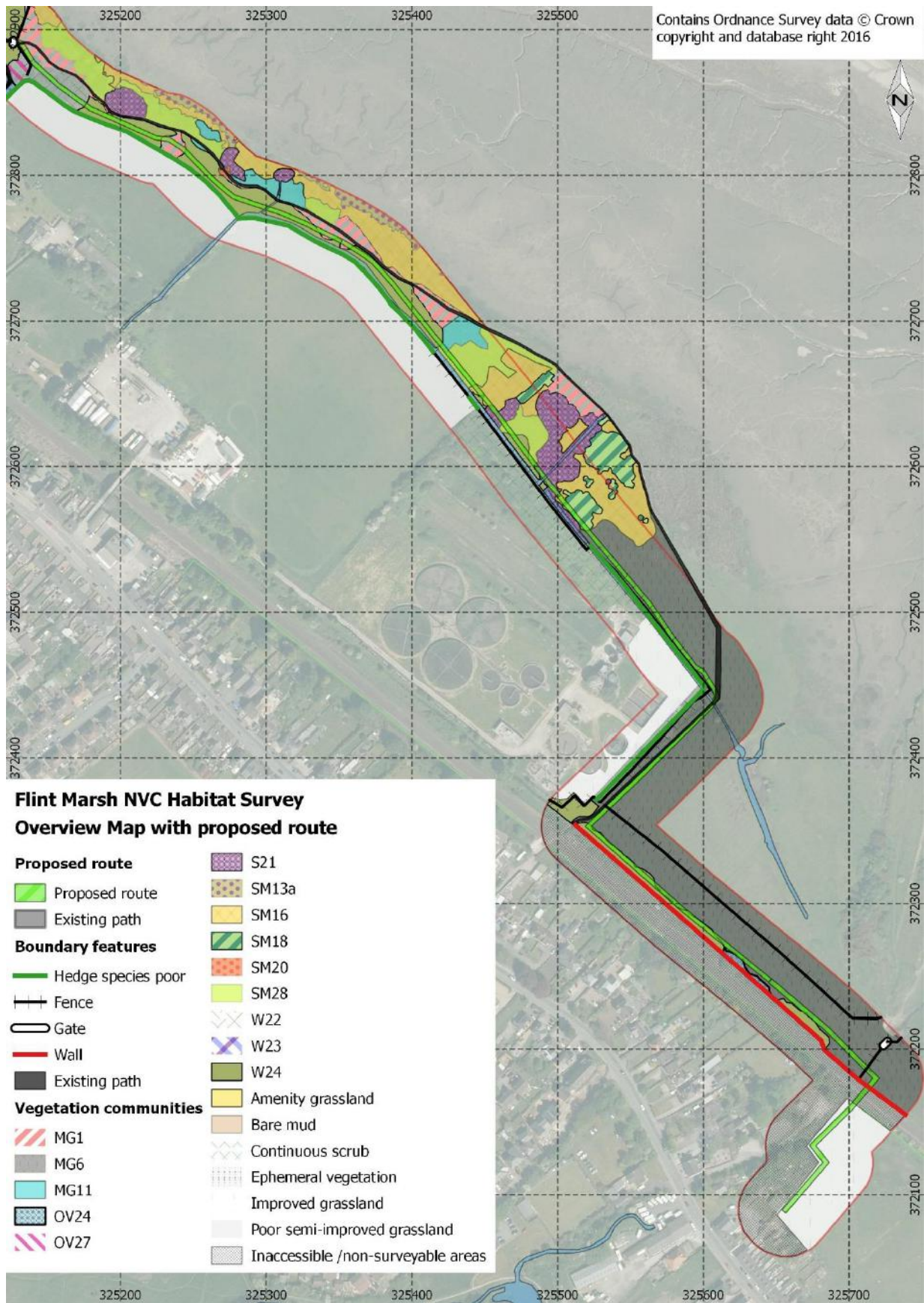


Figure 3: NVC habitat map – Overview of habitats with proposed route



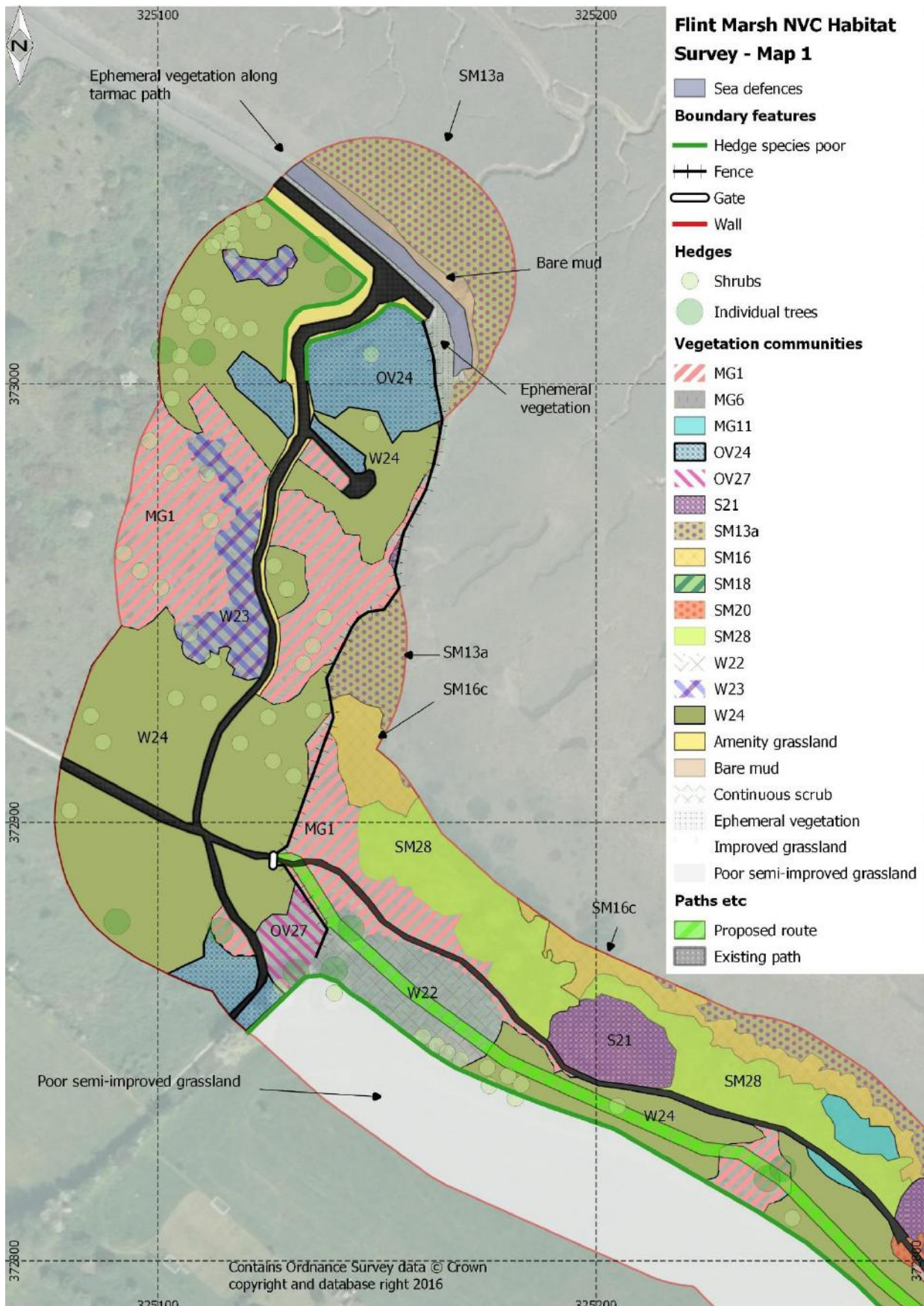


Figure 4: NVC habitat Map 1

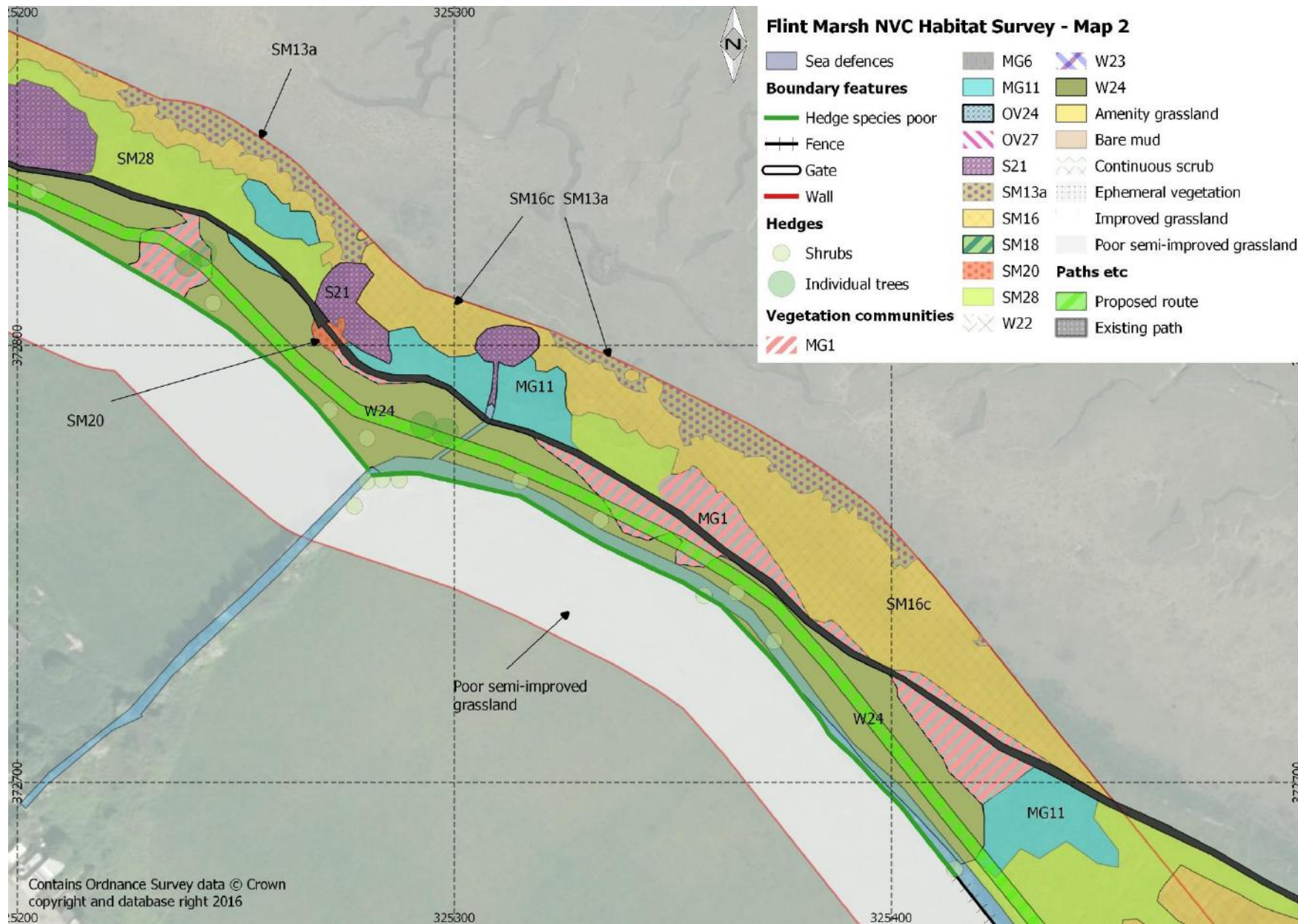


Figure 5: NVC habitat map 2



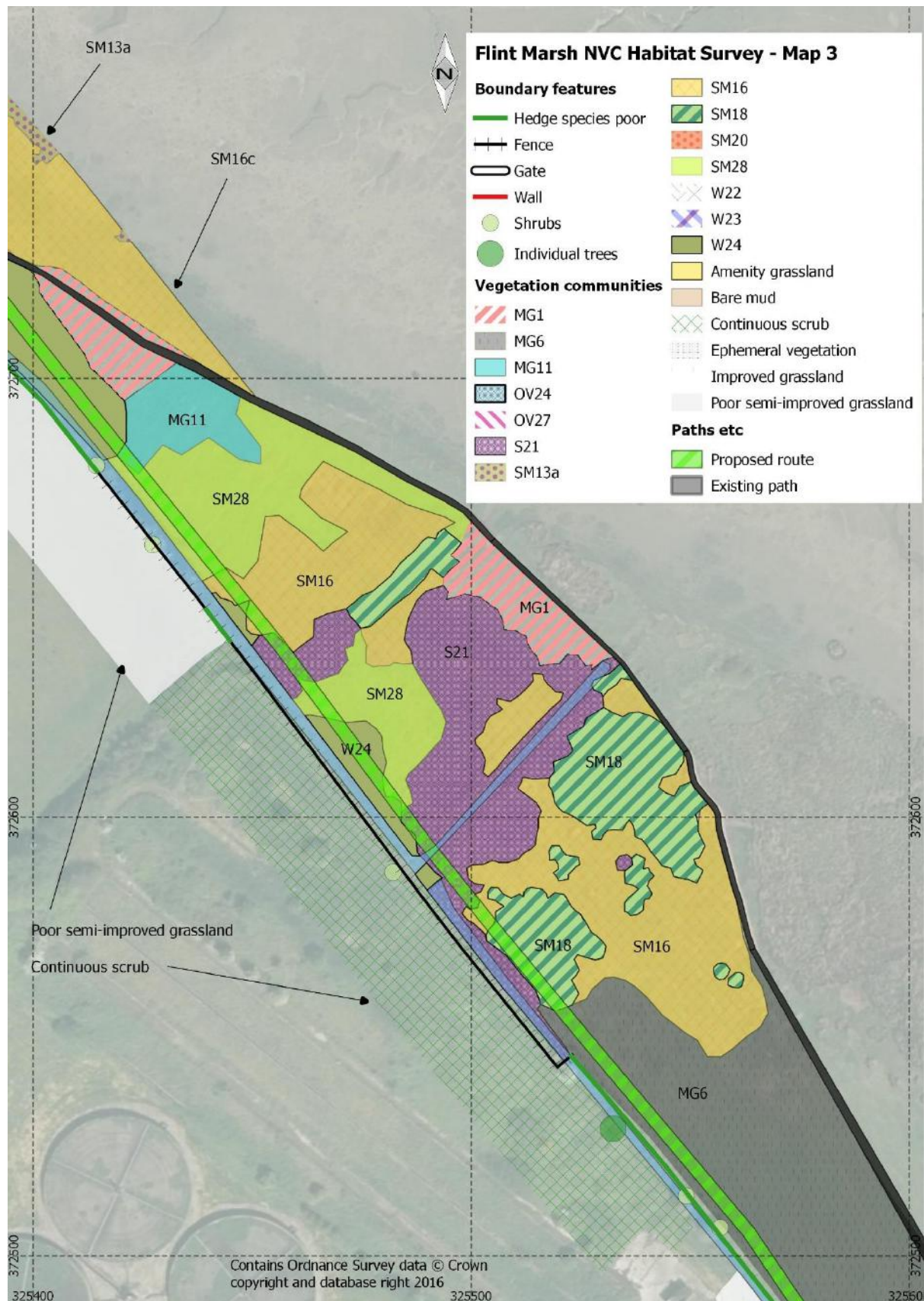


Figure 6: NVC habitat map 3



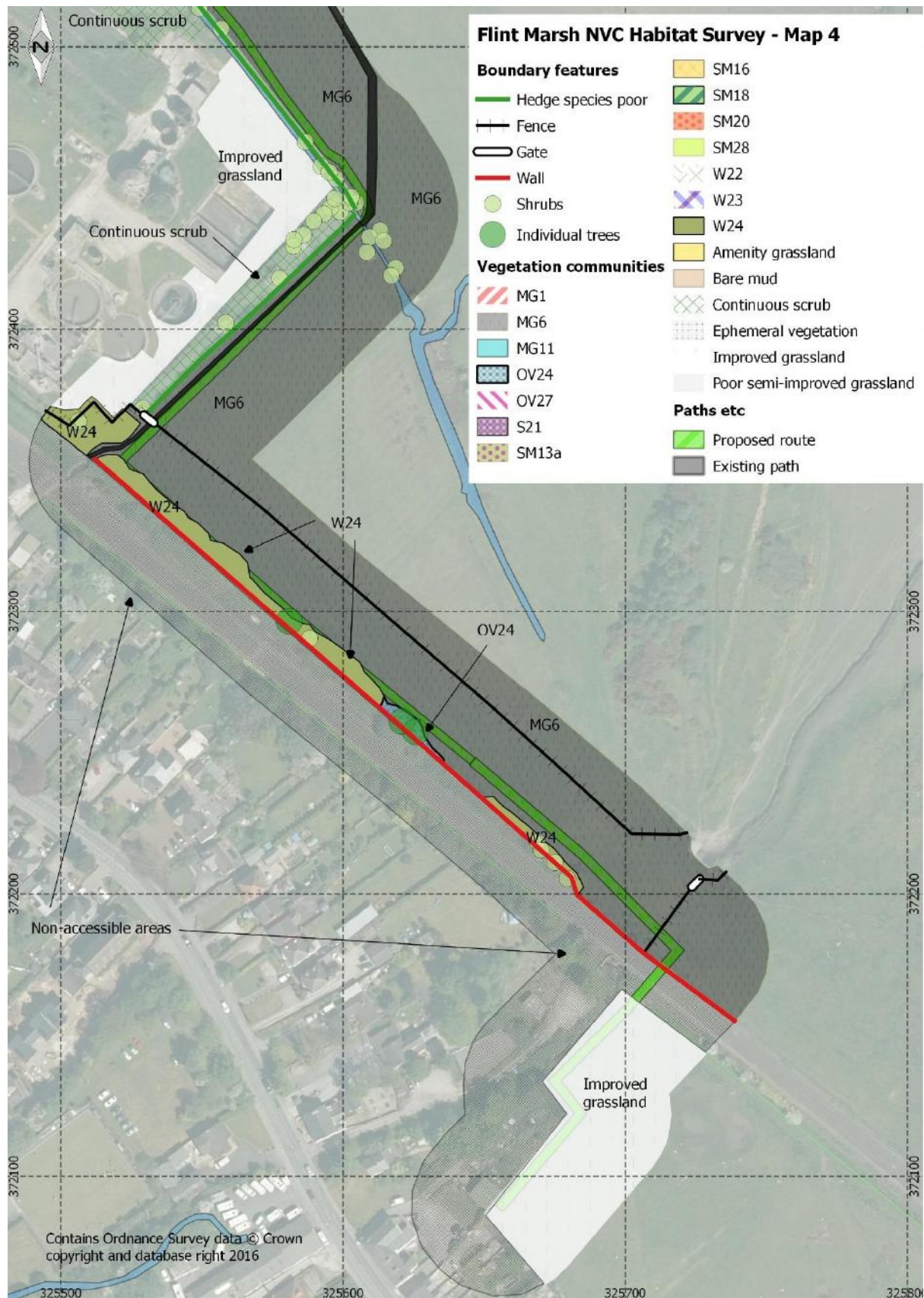


Figure 7: NVC habitat map 4

### 3.5. Community descriptions – saltmarsh communities

#### 3.5.1 SM13 *Puccinellia maritima* saltmarsh community

This is a low-mid marsh community which can be described as species-poor grassland dominated by the grass *Puccinellia maritima*. Other associates, such as *Aster tripolium*, *Triglochin maritimum*, *Suaeda maritima* are present but they are usually at low cover. On this site, the majority of the vegetation fits within SM13a, the sub-community with *Puccinellia maritima* dominant.

Although the vegetation community on this site is a good fit to this community, it differs from the national NVC data by lacking *Glaux maritima*, *Armeria maritima*, annual *Salicornia* agg. and *Limonium vulgare*. *Aster tripolium* is over-represented on this site.

Of the saltmarsh communities recorded within the survey boundary, SM13 *Puccinellia maritima* saltmarsh community covers the third largest area (approx. 2,077m<sup>2</sup>) and it is found on the seaward edge of the survey area.

Table 2. Constancy table for quadrats of SM13a *Puccinellia maritima* saltmarsh community, sub-community with *Puccinellia maritima* dominant

Species	Constancy	Domin range		
<i>Puccinellia maritima</i>	V	5	-	9
<i>Aster tripolium</i>	V	1	-	3
<i>Suaeda maritima</i>	IV	1	-	3
<i>Triglochin maritimum</i>	III	4	-	8
<i>Atriplex</i> sp.	II	1	-	2
<i>Plantago maritima</i>	II	1	-	4
<i>Agrostis stolonifera</i>	I	4	-	4
Algal mat	I	2	-	2
<i>Atriplex portulacoides</i>	I	1		1
<i>Festuca rubra</i>	I	3	-	3
<i>Spartina anglica</i>	I	2	-	2
Mean no of species per quadrat/range	4.67	4	-	7
No of samples	6			

### 3.5.2 SM16 *Festuca rubra* saltmarsh community

This upper saltmarsh community is a closed grassland in which *Festuca rubra*, *Juncus gerardii* and *Agrostis stolonifera* dominate, with a number of other associates such as *Plantago maritima* and *Glaux maritima* (see Photographs x and x, Appendix 1).

The vegetation recorded within the survey area mostly has affinities with SM16c *Festuca rubra* saltmarsh community, *Glaux maritima* sub-community. Compared to national NVC data, the community here lacks *Armeria maritima* and *Aster tripolium*, whereas *Plantago maritima* is under-represented. *Elytrigia repens*, which was not recorded in the national NVC data, is present here at a constancy of IV.

There are also some species-poor stands of this community (particularly between the water-filled depressions at approx. SJ2546 7266) and there are stands with unusually high cover of *Elytrigia repens* (see Target Notes 27, 29 and 31 - Appendix 2).

Of the saltmarsh communities recorded within the survey boundary SM16c *Festuca rubra* saltmarsh community covers the largest area (approx. 6,500m<sup>2</sup>).

Table 3. Constancy table for quadrats of SM16c *Festuca rubra* saltmarsh community, *Glaux maritima* sub-community.

Species	Constancy	Domin range	
<i>Festuca rubra</i>	V	2	5
<i>Juncus gerardii</i>	V	7	9
<i>Glaux maritima</i>	IV	2	5
<i>Plantago maritima</i>	I	1	1
<i>Agrostis stolonifera</i>	V	3	5
<i>Triglochin maritimum</i>	IV	2	5
<i>Elytrigia repens</i>	IV	3	5
<i>Poa trivialis</i>	II	3	4
<i>Acer pseudoplatanus</i> seedling	I	1	1
Algal mat	I	1	1
<i>Leontodon autumnalis</i>	I	1	1
<i>Oenanthe lachenalii</i> cf. (seedling)	I	1	1
<i>Poa pratensis</i> agg	I	2	2
<i>Puccinellia maritima</i>	I	5	5
<i>Taraxacum</i> agg	I	1	1
Mean no of species per quadrat / range	6.25	5	7
No of samples:	8	-	-

### 3.5.3 SM28 *Elytrigia repens* saltmarsh community

Another upper saltmarsh community, this vegetation is grassland dominated by *Elytrigia repens*, usually with a variety of other associates.

Stands of this community within the survey boundaries are species-poor when compared to the NVC data: the mean number of species per quadrat on this site is 5 rather than 9 in the national data. One of the constant species, *Atriplex prostrata*, is absent. This vegetation covers the second largest area of the saltmarsh communities recorded (approx. 3,700m<sup>2</sup>).

Table 4. Constancy table for quadrats of SM28 *Elytrigia repens* saltmarsh community

Species	Constancy	Domin range		
<i>Elytrigia repens</i>	V	5	-	8
<i>Agrostis stolonifera</i>	V	4	-	7
<i>Festuca rubra</i>	V	3	-	7
<i>Atriplex prostrata</i>				
<i>Poa trivialis</i>	III	2	-	5
<i>Glaux maritima</i>	II	2	-	3
<i>Juncus gerardii</i>	II	2	-	8
<i>Agrostis capillaris</i>	I	1	-	1
<i>Rumex crispus</i>	I	1	-	1
<i>Taraxacum</i> agg	I	1	-	1
Mean no of species per quadrat / range		5	4	- 6
No of samples:	5			

### 3.5.4 S21 *Bolboschoenus maritimus* swamp

Several stands of this swamp community, dominated by Sea Club-rush, were recorded within the survey boundaries.

The vegetation is generally very dense and some of it was not accessible as it was in water and/or very soft, wet ground. The community here is closest to S21c *Bolboschoenus maritimus* swamp, *Agrostis stolonifera* sub-community. It is a fairly good fit to the NVC data, although *Elytrigia repens* is again over-represented here.

Table 5. Constancy table for quadrats of S21c *Bolboschoenus maritimus* swamp, *Agrostis stolonifera* sub-community

Species	Constancy	Domin range		
<i>Bolboschoenus maritimus</i>	V	8	-	10
<i>Elytrigia repens</i>	V	2	-	7
<i>Agrostis stolonifera</i>	IV	2	-	4
<i>Oenanthe lachenalii</i> cf (seedling)	IV	1	-	1
<i>Atriplex</i> sp.	III	2	-	2
<i>Juncus gerardii</i>	III	1	-	3
<i>Rumex crispus</i>	III	2	-	3
<i>Festuca rubra</i>	II	6	-	6
<i>Glaux maritima</i>	II	1	-	1
<i>Juncus maritimus</i>	II	4	-	4
<i>Kindbergia praelonga</i>	II	2	-	2
<i>Puccinellia maritima</i>	II	1	-	1
<i>Taraxacum</i> agg	II	1	-	1
<i>Triglochin maritimum</i>	II	2	-	2
No of species per quadrat/ range	6.75	6	-	8
No of samples:	4			

### 3.6. Community descriptions – other vegetation

#### 3.6.1 **MG1 *Arrhenatherum elatius* grassland**

This type of mesotrophic grassland is dominated by coarse grasses such as *Arrhenatherum elatius* and *Dactylis glomerata*, with a number of large umbellifer such as *Anthriscus sylvestris* and *Heracleum sphondylium*. It is typical of ungrazed areas and, on this site, it covers the banks leading up to the hedges that delimit the saltmarsh. It also covers large areas in the north of the site, where there is no grazing. Here, large stands of this community are slowly scrubbing up and turning into *Rubus fruticosus* – dominated scrub.

Vegetation within the survey area has affinities with MG1a *Festuca rubra* sub-community. Compared to national NVC data, *Achillea millefolium* and *Anthriscus sylvestris* are absent from the quadrats (though present in the stands), whereas *Festuca rubra* and *Poa pratensis* agg are over-represented.

Table 6. Constancy table for quadrats of MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community

<b>Species</b>	<b>Constancy</b>	<b>Domin range</b>		
<i>Arrhenatherum elatius</i>	V	4	-	9
<i>Dactylis glomerata</i>	III	3	-	5
<i>Elytrigia repens</i>	V	1	-	5
<i>Festuca rubra</i>	V	1	-	5
<i>Heracleum sphondylium</i>	IV	1	-	2
<i>Poa pratensis</i> agg	IV	4	-	5
<i>Agrostis capillaris</i>	III	4	-	5
<i>Agrostis stolonifera</i>	III	1	-	5
<i>Alopecurus pratensis</i>	III	5	-	8
<i>Daucus carota</i>	II	1	-	1
<i>Rubus fruticosus</i> agg.	II	1	-	1
<i>Rumex acetosa</i>	II	1	-	1
<i>Urtica dioica</i>	II	1	-	2
<i>Artemisia vulgaris</i>	I	2	-	2
<i>Carex hirta</i>	I	3	-	3
<i>Centaurea nigra</i>	I	1	-	1
<i>Cerastium fontanum</i>	I	1	-	1
<i>Cirsium arvense</i>	I	1	-	1
<i>Cynosurus cristatus</i>	I	5	-	5
<i>Dryopteris filix-mas</i>	I	1	-	1
<i>Equisetum arvense</i>	I	1	-	1
<i>Galium aparine</i>	I	1	-	1
<i>Holcus lanatus</i>	I	2	-	2
<i>Lathyrus pratensis</i>	I	1	-	1
<i>Plantago lanceolata</i>	I	1	-	1
<i>Poa trivialis</i>	I	6	-	6
<i>Prunus spinosa</i> seedling	I	1	-	1
<i>Rumex crispus</i>	I	1	-	1
<i>Senecio jacobaea</i>	I	1	-	1
<i>Sonchus arvensis</i>	I	2	-	2
<i>Taraxacum</i> agg	I	1	-	1
<i>Trifolium repens</i>	I	1	-	1
<i>Vicia hirsuta</i>	I	3	-	3
<i>Vicia sativa</i> ss <i>sativa</i>	I	2	-	2
Mean no of species per quadrat / range	11	7	-	16
No of samples:	6			

### 3.6.2 MG6 *Lolium perenne*-*Cynosurus cristatus* grassland

MG6 is another mesotrophic grassland community, typically dominated by grasses such as *Lolium perenne*, *Festuca rubra*, *Cynosurus cristatus* and *Holcus lanatus*. The vegetation here is grazed by sheep, and covers by far the largest area within the survey boundaries (>19,000m<sup>2</sup>), in the south-east of the site. It has affinities with MG6a, typical sub-community. Compared to national NVC data *Holcus lanatus* is under-represented here, whereas *Elytrigia repens* is over-represented.

Table 7. Constancy table for quadrats of MG6a *Lolium perenne*-*Cynosurus cristatus* grassland, Typical sub-community

Species	Constancy	Domin range		
<i>Lolium perenne</i>	V	2	-	8
<i>Cynosurus cristatus</i>	IV	3	-	7
<i>Trifolium repens</i>	V	2	-	7
<i>Holcus lanatus</i>	II	3	-	4
<i>Cerastium fontanum</i>	II	1	-	1
<i>Festuca rubra</i>	V	5	-	7
<i>Anthoxanthum odoratum</i>	IV	2	-	6
<i>Elytrigia repens</i>	IV	2	-	3
<i>Agrostis stolonifera</i>	III	2	-	4
<i>Alopecurus pratensis</i>	III	2	-	4
<i>Cirsium arvense</i>	III	1	-	4
<i>Poa pratensis</i> agg	III	3	-	3
<i>Ranunculus acris</i>	III	1	-	2
<i>Taraxacum</i> agg	III	1	-	2
<i>Vicia sativa</i> ss <i>sativa</i>	III	1	-	2
<i>Agrostis capillaris</i>	II	3	-	4
<i>Rumex acetosa</i>	II	1	-	3
<i>Bromus hordaceus</i>	I	1	-	1
<i>Carex hirta</i>	I	3	-	3
<i>Dactylis glomerata</i>	I	3	-	3
<i>Heracleum sphondylium</i>	I	1	-	1
<i>Lathyrus pratensis</i>	I	7	-	7
<i>Poa trivialis</i>	I	2	-	2
<i>Potentilla reptans</i>	I	1	-	1
<i>Ranunculus bulbosus</i>	I	1	-	1
<i>Ranunculus repens</i>	I	1	-	1
<i>Rumex crispus</i>	I	1	-	1
<i>Trifolium dubium</i>	I	1	-	1
<i>Vicia hirsuta</i>	I	1	-	1
Mean no of species per quadrat / range	13.8	10	-	16
No of samples:	5			



### 3.6.3 W24 *Rubus fruticosus*-*Holcus lanatus* underscrub

This is a scrub community dominated by *Rubus fruticosus* agg., and the second largest community recorded within the survey area when it comes to size of area covered. In the north of the site the scrub is found in patchwork with ungrazed stands of MG1 grassland. In the marsh it covers the banks at the landwards edge of the marsh, again alternating with areas of MG1 grassland.

The vegetation on this site has affinities with W24b, *Arrhenatherum elatius*-*Heracleum sphondylium* sub-community, as it contains species which are found in *Arrhenatherum elatius*-dominated grasslands. It should be noted that some of the stands are very species-rich, with 22 species recorded in one of the quadrats.

Table 8. Constancy table for quadrats of W24b *Rubus fruticosus*-*Holcus lanatus* underscrub, *Arrhenatherum elatius*-*Heracleum sphondylium* sub-community

Species	Constancy	Dominance range
<i>Rubus fruticosus</i>	V	8 - 10
<i>Holcus lanatus</i>	I	1 - 1
<i>Urtica dioica</i>	IV	2 - 7
<i>Heracleum sphondylium</i>	III	1 - 2
<i>Galium aparine</i>	III	3 - 9
<i>Arrhenatherum elatius</i>	II	4 - 5
<i>Centaurea nigra</i>	II	1 - 7
<i>Cirsium arvense</i>	II	1 - 3
<i>Dactylis glomerata</i>	II	5 - 5
<i>Festuca rubra</i>	II	3 - 4
<i>Hedera helix</i> ss <i>hibernica</i>	II	4 - 7
<i>Potentilla reptans</i>	II	1 - 3
<i>Vicia sativa</i> ss <i>sativa</i>	II	1 - 2
<i>Acer pseudoplatanus</i> seedling	I	1 - 1
<i>Acer pseudoplatanus</i> sapling	I	1 - 1
<i>Achillea millefolium</i>	I	2 - 2
<i>Anthriscus sylvestris</i>	I	2 - 2
<i>Artemisia vulgaris</i>	I	1 - 1
<i>Cardamine hirsuta</i>	I	2 - 2
<i>Crataegus monogyna</i>	I	1 - 1
<i>Crataegus monogyna</i> seedling	I	1 - 1
<i>Elytrigia repens</i>	I	4 - 4
<i>Fraxinus excelsior</i> sapling	I	1 - 1
<i>Fumaria bastardii</i>	I	1 - 1
<i>Geranium dissectum</i>	I	1 - 1
<i>Glechoma hederacea</i>	I	1 - 1
<i>Kindbergia praelonga</i>	I	3 - 3

<b>Species</b>	<b>Constancy</b>	<b>Dominance range</b>		
<i>Pinus nigra</i> sapling	I	1	-	1
<i>Plantago lanceolata</i>	I	4	-	4
<i>Poa pratensis</i> agg	I	3	-	3
<i>Poa trivialis</i>	I	2	-	2
<i>Quercus ilex</i> sapling	I	2	-	2
<i>Rumex crispus</i>	I	1	-	1
<i>Rumex obtusifolius</i>	I	1	-	1
<i>Senecio jacobaea</i>	I	1	-	1
<i>Senecio erucifolius</i>	I	2	-	2
<i>Symphytum x uplandicum</i>	I	1	-	1
<i>Taraxacum</i> agg	I	1	-	1
<i>Tussilago farfara</i>	1	1	-	1
Mean no of species per quadrat / range	11.6	4	-	22
No of samples:	5			

### 3.7. Description of communities covering smaller areas

Seven other vegetation communities were recorded within the survey area. These communities consisted of small stands and were therefore sampled with only 2 or 3 quadrats (see Appendix 3). For other communities, full species lists with abundances expressed using the DAFOR scale were recorded and included in the target notes at Appendix 2.

Habitats which were not accessible were described when visible from the site, then were assigned a Phase 1 category. A brief description of such habitats is given in the target notes at Appendix 2.

Table 7 below lists and describes these vegetation communities and Phase 1 habitats.

Table 9. Description of other vegetation communities recorded on site

Community	Description
SM18 <i>Juncus maritimus</i> saltmarsh community	<p>This upper saltmarsh community is dominated by large clumps of Sea Rush, usually with an understorey of <i>Festuca rubra</i>, <i>Agrostis stolonifera</i>, <i>Glaux maritima</i> and <i>Juncus gerardii</i>.</p> <p>Within the survey area however, the vegetation is much more species-poor than the NVC national data. 3 of the constant species (<i>Festuca rubra</i>, <i>Glaux maritima</i> and <i>Juncus gerardii</i>) are not present here, and on the ground there is a thick layer of litter from dead rush stems.</p>
SM20 <i>Eleocharis uniglumis</i> saltmarsh community	<p>A small stand of this upper marsh community was recorded around one of the boardwalks in the survey area. The species composition of this stand is a fairly good fit with the NVC data, and a full list of species recorded here can be found at TN24, Appendix 2.</p>
MG11 <i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> grassland	<p>This is a mesotrophic grassland community found in areas which are frequently inundated with either fresh or brackish water. Stands of this community were found in the upper marsh among stands of SM28 and SM16. The vegetation here is very species-poor when compared to NVC data, and could not be assigned a sub-community. MG11b <i>Atriplex prostrata</i> sub-community may be the closest match, as <i>Elytrigia repens</i> is one of the preferentials for this sub-community.</p>
OV24 <i>Urtica dioica</i> - <i>Galium aparine</i> community	<p>Stands of this open vegetation community were recorded mostly in the north of the site. The vegetation is closed and luxuriant, dominated by <i>Urtica dioica</i> with <i>Galium aparine</i> climbing through. The vegetation on this site has affinities with OV24b, <i>Arrhenatherum elatius</i>-<i>Rubus fruticosus</i> agg. sub-community.</p>
OV27 <i>Chamerion angustifolium</i> community	<p>This is a tall ruderal community dominated by <i>Chamerion angustifolium</i>. There is a small stand of this community in the north of the side and the vegetation has affinities with OV27b, <i>Urtica dioica</i>-<i>Cirsium arvense</i> sub-community.</p>

<b>Community</b>	<b>Description</b>
W22 <i>Prunus spinosa</i> - <i>Rubus fruticosus</i> scrub	There is a stand of this scrub community at the northern end of the marsh. It is composed of pure <i>Prunus spinosa</i> shrubs, closely grown and totally impenetrable.
W23 <i>Ulex europaeus</i> - <i>Rubus fruticosus</i> scrub	Stands of this scrub community are present in the north of the site and consist of tall, dense <i>Ulex europaeus</i> shrubs with very few other species growing between them.
Amenity grassland	This type of regularly mown grassland is found in the north of the site, at sides of the path, and it appears to have had some input from wildflower seed mixes. A full species list for this vegetation is given at TN5, in Appendix 2.
Ephemeral vegetation	Plants growing on the muddy bank under the sea defences and along the edges of the tarmac track in the north of the site were described as ephemeral vegetation/short perennials. A full species list for this vegetation is given at TN 4 & 6, in Appendix 2.
Poor semi-improved grassland	This Phase 1 habitat is present in the two fields landwards of the saltmarsh, north of the water treatment plant. One of the fields was grazed by horses, the other did not appear to be grazed at the time of the survey. Species visible from the fence were: <i>Ranunculus</i> sp., <i>Taraxacum</i> agg., <i>Plantago lanceolata</i> , <i>Anthoxanthum odoratum</i> and <i>Alopecurus pratensis</i> .
Improved grassland	Found in the grounds of the water treatment plant and in the field south of the railway line. This is fertilised, managed and highly productive grassland, with dominant <i>Lolium perenne</i> and very few other associates, such as <i>Trifolium repens</i> and <i>Ranunculus repens</i> .
Continuous scrub	This Phase 1 habitat applies to all vegetation dominated by either <i>Rubus fruticosus</i> , <i>Crataegus monogyna</i> , <i>Prunus spinosa</i> or <i>Ulex europaeus</i> . On this site, <i>Rubus fruticosus</i> -dominated scrub is visible within the water treatment plant.

## 4. Discussion

### 4.1. Assessment criteria for vegetation communities

Vegetation communities and habitats are assessed for their conservation value as follows:

- Habitats of importance at international level - referring to Annex 1 habitats;
- Habitats of importance at national level - within the framework of the Environment (Wales) Act 2016, commenting on whether they are included within Section 7 as 'habitats of principal importance for the purpose of maintaining and enhancing biodiversity' in Wales

In addition, as the vegetation communities surveyed are within an area designated as an SSSI and as an SAC, a further assessment is made as to whether the communities fall within Annex I habitat categories which are a primary reason for selection of the SAC.

### 4.2. Conservation assessment

#### **4.2.1 Conservation assessment of saltmarsh communities**

All low and mid marsh vegetation communities are of importance for conservation at international level, as they are included within Annex I Habitat 1330 Atlantic salt meadows (*Glauco-Puccinellitalia maritima*). These communities (SM13 *Puccinellia maritima* saltmarsh community, SM16 *Festuca rubra* saltmarsh, SM18 *Juncus maritimus* saltmarsh community and SM20 *Eleocharis uniglumis* saltmarsh community) are the primary reason for selection of the Dee Estuary/ Aber Dyfrdwy as an SAC.

Advice given under Regulation 33 of the Conservation (Natural Habitats &c.) Regulations 1994 for the Dee Estuary European Marine Site, lists the upper marsh community SM28 *Elytrigia repens* saltmarsh, the swamp community S21 *Bolboschoenus maritimus* swamp, and the mesotrophic grassland community MG11 *Festuca rubra-Agrostis stolonifera-Potentilla anserina* grassland, as being part of the Atlantic salt meadows habitat type, as transitional communities (even though they are not included in the JNCC list of NVC types which correspond to the Annex I Habitat 1330 Atlantic salt meadows).

Table 8. Conservation assessment of saltmarsh and transitional NVC communities

<b>NVC community</b>	<b>Conservation assessment</b>
SM13 <i>Puccinellia maritima</i> saltmarsh community s	<u>International</u> : this vegetation community is included in the Natura 2000 Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.
SM16 <i>Festuca rubra</i> saltmarsh community	<u>International</u> : this vegetation community is included in the Natura 2000 Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.
SM18 <i>Juncus maritimus</i> saltmarsh community	<u>International</u> : this vegetation community is included in the Natura 2000 Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.
SM20 <i>Eleocharis uniglumis</i> saltmarsh community	<u>International</u> : this vegetation community is included in the Natura 2000 Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.
SM28 <i>Elytrigia repens</i> saltmarsh community	<u>International</u> : although this community is not included in the JNCC types for Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), in Wales it is considered to be part of this habitat type as a 'transitional community'. It is therefore included in the Regulation 33 Advice for this site under Atlantic salt meadows, a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.
S21 <i>Bolboschoenus maritimus</i> swamp	<u>International</u> : although this community is not included in the JNCC types for Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), in Wales it is considered to be part of this habitat type as a 'transitional community'. It is therefore included in the Regulation 33 Advice for this site under Atlantic salt meadows, a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.

<b>NVC community</b>	<b>Conservation assessment</b>
MG11 <i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> grassland	<u>International</u> : although this community is not included in the JNCC types for Annex I Habitat 1330 Atlantic salt meadows ( <i>Glauco-Puccinellitalia maritimae</i> ), in Wales it is considered to be part of this habitat type as a 'transitional community'. It is therefore included in the Regulation 33 Advice for this site under Atlantic salt meadows, a habitat which is a primary reason for selection of the Dee Estuary / Aber Dyfrdwy SAC.

#### 4.2.2 Conservation assessment of other habitats

Table 9 below sets out the importance for conservation of other vegetation communities recorded on this site.

Table 9. Conservation assessment of other NVC communities and Phase 1 habitats

<b>NVC community /Phase 1 habitat</b>	<b>Conservation assessment</b>
MG1 <i>Arrhenatherum elatius</i> grassland	This vegetation community is not considered of importance for conservation at international or national level.
MG6 <i>Lolium perenne-Cynosurus cristatus</i> grassland	Although this vegetation is not particularly important for conservation in itself, at national level it is considered of importance in the context of coastal habitats. It is listed under the heading of Coastal and Floodplain Grazing Marsh, improved grassland, as a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.
OV24 <i>Urtica dioica</i> - <i>Galium aparine</i> community	This vegetation community is not considered of importance for conservation at international or national level.
OV27 <i>Chamerion angustifolium</i> community	This vegetation community is not considered of importance for conservation at international or national level.
W22 <i>Prunus spinosa</i> - <i>Rubus fruticosus</i> scrub	This vegetation in itself is not considered of importance for conservation at international or national level. However, if it is part of a boundary feature such as a hedgerow it could be considered of national importance under the heading of 'Boundary and linear features - Hedgerows', a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.



<b>NVC community /Phase 1 habitat</b>	<b>Conservation assessment</b>
<i>W23 Ulex europaeus-Rubus fruticosus</i> scrub	This vegetation in itself is not considered of importance for conservation at international or national level. However, if it is part of a boundary feature such as a hedgerow it could be considered of national importance under the heading of 'Boundary and linear features - Hedgerows', a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.
<i>W24 Rubus fruticosus</i> agg- <i>Holcus lanatus</i> underscrub	This vegetation in itself is not considered of importance for conservation at international or national level. However, if it is part of a boundary feature such as a hedgerow (as it often is on this site) it could be considered of national importance under the heading of 'Boundary and linear features - Hedgerows', a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.
Amenity grassland	This type of grassland is not considered of importance for conservation at international or national level.
Ephemeral vegetation	This type of vegetation is not considered of importance for conservation at international or national level.
Poor semi-improved grassland	Although this vegetation is not particularly important for conservation in itself, at national level it is considered of importance in the context of coastal habitats. It is listed under the heading of Coastal and Floodplain Grazing Marsh, improved grassland, as a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.
Improved grassland	Although this vegetation is not particularly important for conservation in itself, at national level it is considered of importance in the context of coastal habitats. It is listed under the heading of Coastal and Floodplain Grazing Marsh, improved grassland, as a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.
Continuous scrub	As in other scrub communities above, this vegetation in itself is not considered of importance for conservation at international or national level. However, if it is part of a boundary feature

<b>NVC community /Phase 1 habitat</b>	<b>Conservation assessment</b>
	such as a hedgerow it could be considered of national importance under the heading of 'Boundary and linear features - Hedgerows', a habitat of principal importance under Section 7 of the Environment (Wales) Act 2016.

#### 4.3. Considerations on vegetation conditions – saltmarsh communities

A number of factors can be taken into account when evaluating the condition of vegetation communities. For the purposes of this report, attributes taken from the Common Standard Monitoring Guidance for saltmarsh habitats (JNCC, 2004 .1) are used to assess the condition of the vegetation communities of the saltmarsh.

##### 4.3.1 Vegetation height

The marsh appears to be grazed by sheep - droppings were seen although no sheep were seen in the marsh at the time of the survey. Table 10 shows height ranges and mean vegetation height of the main marsh communities.

Table 10. Vegetation height range and mean vegetation height in vegetation communities of the grazed part of the marsh

<b>Community</b>	<b>Vegetation height range</b>	<b>Mean vegetation height over all quadrats</b>
SM13 <i>Puccinellia maritima</i> saltmarsh community	5cm - 10cm	7.5cm
SM16 <i>Festuca rubra</i> saltmarsh community	5cm - 30cm	15cm
SM18 <i>Juncus maritimus</i> saltmarsh community	50cm - 90cm	72cm
SM28 <i>Elytrigia repens</i> saltmarsh community	5cm - 30cm	18cm
MG11 <i>Festuca rubra</i> - <i>Agrostis stolonifera</i> - <i>Potentilla anserina</i> grassland	5cm-30cm	15cm

The overall level of grazing appears to be adequate to maintain variation in the sward, and stocking levels do not appear to be too high.

##### 4.3.2 Characteristic species

On this site, two of the main saltmarsh vegetation communities have the required typical species for saltmarsh zones. SM13 *Puccinellia maritima* saltmarsh community has *Puccinellia maritima* dominant and *Aster tripolium* and *Suaeda maritima* as frequent.

Stands of SM16 *Festuca rubra* saltmarsh community have either abundant *Juncus gerardii* or *Festuca rubra* and *Glaux maritima* and *Triglochin maritimum* as frequent.

However, stands of SM18 *Juncus maritimus* saltmarsh community in the survey area are species-poor and would not meet the characteristic species criterion. The same applies to SM28 *Elytrigia repens* saltmarsh community, which only has two abundant species (*Festuca rubra* and *Agrostis stolonifera*) but not the other two required frequent species.

MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland is also species-poor and does not meet the criterion of characteristic species.

The swamp community S21 *Bolboschoenus maritimus* swamp does meet the typical species criterion as it has constant *Bolboschoenus maritimus* and constant *Agrostis stolonifera*, and scattered *Juncus gerardii*, *Glaux maritima* and *Oenanthe lachenalii*.

#### **4.3.3 Vegetation composition: negative indicator species - *Spartina anglica***

*Spartina anglica* was recorded at very low cover in a couple of stands of SM13 *Puccinellia maritima* saltmarsh community. There is, therefore, no sign that *Spartina anglica* is on the increase on this site.

#### **4.3.5 Other negative indicators: pollution, anthropogenic disturbance or damage etc.**

- The presence of a small amount of litter left by walkers or blown from nearby houses was noted. However, the amount of litter seen was minimal and did not appear to be a concern.
- No signs of artificial drainage channels adversely affecting the hydrology of the marsh were noted during the survey.
- There were no signs of turf cutting.
- There were no signs of poaching by grazing animals on site.
- There were no signs that vehicles have access to this part of the marsh at any point.
- There were noticeable signs of compaction and trampling caused by walkers along the current path, occasionally creating areas of bare substrate.

Overall, therefore, bare substrate extent is not of concern and anthropogenic disturbance is limited to the line of the current path.

#### 4.4. Assessment of likely ecological impacts

As discussed at heading 4.2, many of the habitats within the survey area are of high conservation value and are considered as being part of the Atlantic salt meadows habitat type.

At the northern end of the marsh, the proposed new route would cross habitats of lower conservation value, mostly scrub and mesotrophic grassland communities. This would mean that the proposed new path would divert footfall away from habitats of conservation importance at this point.

South-east of SJ25400 72700, however, the proposed route would still cross important habitats up to approx. SJ25520 72550. The area in question has stands of upper marsh communities such as SM16 *Festuca rubra* saltmarsh community and SM28 *Elytrigia repens* saltmarsh community, as well as stands of transitional communities such as very wet *Bolboschoenus maritimus* swamp and MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland.

Construction of the cycle and footpath would lead to loss of areas of these important communities. A stretch of approximately 165 linear metres of the proposed new path will cross communities of importance for conservation and, in particular, habitats considered as being part of the Atlantic salt meadows habitat type. If the path is proposed to be 3m in width, the loss of habitat would be up to approximately 495m<sup>2</sup>.

Approximately 75m of the new path is proposed to be a boardwalk, which would somewhat reduce the negative impact of the proposed path.

As for the loss of habitat in areas of MG6 *Lolium perenne*-*Cynosurus cristatus* grassland, this is still a loss at national level when considering that the community is listed as an important habitat for conservation under Section 7 of the Environment (Wales) Act 2016 because of its coastal location. An estimated 420m of the proposed new footpath cross this habitat, thus leading to the loss of approximately 1260m<sup>2</sup> of habitat. However, it should be noted that this habitat is of lower conservation concern when compared to the saltmarsh habitats mentioned above.

When considering the impacts of the proposed scheme it should also be noted that the use of machinery during construction may lead to damage to important habitats and, therefore, mitigation measures should be taken to avoid any residual impacts after construction. The use of tracked, lightweight vehicles should be considered, as well as

the use of bog mats for a short period of time during construction. The construction corridor should be as narrow as possible. Storage areas for construction materials and machinery should be established outside the SAC boundaries in order to avoid further damage to habitats.

There is potential for damage to or loss of active nests during any clearance of scrub or stretches of hedgerow, as well as the removal of trees. The north of the proposed new path crosses large stretches of these habitats and it will be necessary to maintain legal compliance during any vegetation clearance works. Any vegetation clearance should take place during the period September to February inclusive. If this is not possible, a competent person should check the vegetation due to be removed for active nests. If a nest is found, vegetation removal work in the area around the nest will have to stop until the competent person confirms that the nest is no longer active.

## 5. Conclusion

- The NVC and Phase 1 surveys recorded the following vegetation communities and habitats within the survey area:
  - The saltmarsh communities SM13 *Puccinellia maritima* saltmarsh community, SM16 *Festuca rubra* saltmarsh community, SM18 *Juncus maritimus* saltmarsh community, SM20 *Eleocharis uniglumis* saltmarsh community, SM28 *Elytrigia repens* saltmarsh community
  - Vegetation of the transition to terrestrial habitats: S21 *Bolboschoenus maritimus* swamp and MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland
  - The mesotrophic grassland communities MG1 *Arrhenatherum elatius* grassland and MG6 *Lolium perenne*-*Cynosurus cristatus* grassland
  - The scrub communities W24 *Rubus fruticosus*-*Holcus lanatus* underscrub, W22 *Prunus spinosa*-*Rubus fruticosus* scrub, W23 *Ulex europaeus*-*Rubus fruticosus* scrub
  - The open vegetation communities OV24 *Urtica dioica*-*Galium aparine* community and OV27 *Chamerion angustifolium* community.
  - Amenity grassland
  - Ephemeral vegetation
  - Poor semi-improved grassland
  - Improved grassland
  - Continuous scrub

- Of the communities recorded, all the saltmarsh communities and the vegetation of the transition to terrestrial habitats are considered of high conservation value and included within the Atlantic salt meadows habitat type, which is the primary reason for selection of the Dee Estuary/ Aber Dyfrdwy as an SAC.
- The saltmarsh communities do not appear to be over-grazed and the negative indicator *Spartina anglica* is not considered to be on the increase within the areas surveyed. Two of the main saltmarsh communities (SM13 and SM16) and the swamp community S21 have the required set of characteristic species for saltmarsh zones. However, the other communities (SM18, SM28 and MG11) were found to be species-poor and therefore did not meet the criterion of characteristic species. The marsh surveyed did not appear to be subject to major anthropogenic disturbance or pollution, with the exception of compaction and trampling noted along the line of the current footpath.
- The proposed cycle and footpath would cross an estimated 165m of upper saltmarsh communities and transitional vegetation, potentially leading to a loss of approximately 495m<sup>2</sup> of vegetation of international importance for conservation.
- The project would also cross an estimated 420m of MG6 *Lolium perenne-Cynosurus cristatus* grassland, which is of importance for conservation at national level because of its coastal location, thus potentially leading to a loss of approximately 1260m<sup>2</sup> of habitat.
- Mitigation measures should be taken to avoid damage to habitats within the SAC, including the use of tracked, lightweight vehicles; limiting the areas accessed by machinery and not allowing storage of construction materials or machinery with the SAC boundaries.
- Where the proposed new path crosses areas of scrub, hedgerows or trees, such as in the north of the site, there is potential for damage to or loss of active nests during any vegetation clearance works and therefore legal compliance must be maintained.

## References

Dargie, T. (2001). NVC survey of the saltmarsh and other habitats in the Dee & Clwyd Estuaries 2000. CCW Science Report No. 450. Countryside Council for Wales.

Natural England & CCW (2010). The Dee Estuary European Marine Site comprising: Dee Estuary / Aber Dyfrdwy Special Area of Conservation, The Dee Estuary Special Protection Area, The Dee Estuary Ramsar Site Natural England & the Countryside Council for Wales' advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994.

JNCC (2004). 1. Common Standards Monitoring Guidance for Saltmarsh Habitats - Version August 2004. JNCC.

JNCC (2004). 2. Common Standards Monitoring Guidance for Lowland Wetland Habitats - Version August 2004

Rodwell, J S (1991). British Plant Communities Volume 1. Woodlands and scrub. Cambridge University Press.

Rodwell, J S (1992). British Plant Communities Volume 3. Grasslands and montane communities. Cambridge University Press.

Rodwell, J S (1995). British Plant Communities Volume 4. Aquatic communities, swamps and tall-herb fens. Cambridge University Press.

Rodwell, J S (2000). British Plant Communities Volume 5. Maritime communities and vegetation of open habitat. Cambridge University Press.

Rodwell, J S; Dring, J C; Averis, A B G; Proctor, M C F; Malloch, A J C; Schaminée, J N J; & Dargie T C D (2000). Review of coverage of the National Vegetation Classification. JNCC Report, No. 302

Rodwell, J S (2006) National Vegetation Classification: Users' Handbook. JNCC.

Stace, C (1997) New Flora of the British Isles. Second Edition. Cambridge University Press.

Wynne, G; Phillips, J; Williams, D (2008) The Rare Plants of Flintshire – A Register of the rare, scarce or threatened plants in the old county of Flintshire, botanical vice-county 51. Botanical Society of the British Isles



## Appendix 1 – Photographs of main vegetation communities



Photographs 1 & 2: SM16c *Festuca rubra* saltmarsh community, *Glaux maritima* sub-community





Photographs 3 & 4: SM13a *Puccinellia maritima* saltmarsh community, sub-community with *Puccinellia maritima* dominant





Photographs 5 & 6: SM28 *Elytrigia repens* saltmarsh community





Photograph 7 & 8: S21c *Bolboschoenus maritimus* swamp, *Agrostis stolonifera* sub-community





Photographs 9 & 10: SM18 *Juncus maritimus* saltmarsh community





Photographs 11 & 12: MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community



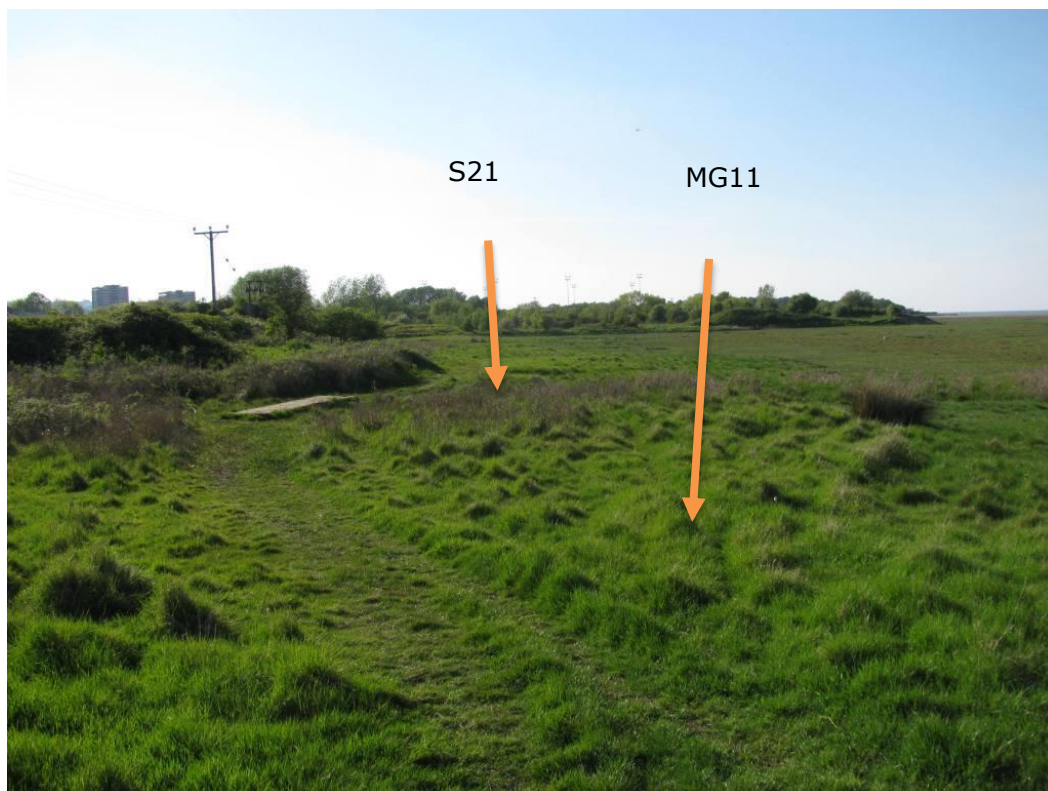


Photographs 13 & 14: MG6a *Lolium perenne*-*Cynosurus cristatus* grassland, Typical sub-community





Photograph 15: MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland



Photograph 16: S21c *Bolboschoenus maritimus* swamp, *Agrostis stolonifera* sub-community and MG11 *Festuca rubra*-*Agrostis stolonifera*-*Potentilla anserina* grassland





W24b *Rubus fruticosus*-*Holcus lanatus* underscrub, *Arrhenatherum elatius*-*Heracleum sphondylium* sub-community – Denser above and invading MG1 grassland below