



Terrestrial & Marine Ecology Technical Study in relation to the Environmental Impact Assessment (EIA) for a new Thermal Treatment Facility (TTF)

As per ERA requirements stipulated for
PA/O6O96/23

Report



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TABLE OF CONTENTS

1	Introduction.....	1
1.1	Project Description.....	1
2	Terms of Reference.....	3
3	Methodology	4
3.1	Area of Influence.....	4
3.2	Desktop study.....	8
3.3	Impact Assessment.....	8
4	Baseline Study.....	13
4.1	General description.....	13
4.2	Desktop review.....	13
4.2.1	Local Plans.....	13
4.2.2	The Strategic Plan for the Environment and Development (SPED).....	17
4.2.3	S.L. 549.44 (repealing the Flora, Fauna and Natural Habitats Protection Regulations, 2006 [LN 311 of 2006]).....	18
4.2.4	S.L.549.123 (Trees and Woodlands Protection Regulations).....	25
4.2.5	Terrestrial Ecology Baseline Study – Doublet and Zammit (2022).....	26
4.2.6	Ecology study in relation to EA 0057/18 - Marine environment	29
4.3	Site survey.....	31
4.3.1	Flora.....	31
4.3.2	Fauna	43
5	Impact Assessment	44
5.1	Construction phase	44
5.1.1	Impacts on protected species - terrestrial	44
5.1.2	Impacts on protected species – marine	47
5.1.3	Impacts on Natura 2000 sites.....	47
5.1.4	Removal of soil and rubble walls.....	47
5.1.5	Loss of ecological characteristics of the site.....	47
5.1.6	Spillover effects.....	47
5.1.7	Light impacts.....	48
5.1.8	Noise and vibration impacts.....	48
5.2	Operational phase	49
5.2.1	Increased run-off	49
5.2.2	Increased vehicular traffic.....	49
5.2.3	Lighting	49

5.2.4	Emissions.....	49
5.2.5	Noise.....	50
5.3	Decommissioning phase.....	50
6	Mitigation Measures.....	51
7	Residual Impacts.....	53
8	Summary of Impacts Table.....	54
9	Cumulative Impacts.....	58
9.1	Interactions between impacts.....	58
9.2	Interactions or interference with natural or anthropogenic processes.....	58
9.3	Interactions between the proposed development and prior or planned developments.....	59
9.4	Wider cumulative impacts.....	60
10	Cumulative Impacts Summary Table.....	62
11	Monitoring Programme.....	64
	Appendix 1.....	66
	Appendix 2.....	73
	Appendix 3.....	77

LIST OF FIGURES

Figure 1: Proposed site for the new Thermal Treatment facility.....	2
Figure 2: Area of Influence for the terrestrial ecology study.....	5
Figure 3: Terrestrial protected areas relevant to the study.....	6
Figure 4: Marine protected areas relevant to the study.....	7
Figure 5: Naxxar coastal and rural environmental constraints map (Central Malta Local Plan, 2006) Site marked with red X.....	15
Figure 6: Areas of Ecological Importance (A-G) around the site are marked with a green outline (PA Geoserver) Site marked with a red X.....	16
Figure 7: Nearby sites protected within the Natura 2000 framework considered in the study.....	19
Figure 8: Boundary of the Żona fil-Baħar fil-Grigal SPA.....	20
Figure 9: boundary of the Żona fil-Baħar Madwar Ġhawdex.....	21
Figure 10: Boundary of the Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Ġhawdex) u il-Qaliet SCI.....	22
Figure 11: Boundary of the Salini SAC.....	24
Figure 12: Boundary of the L-Ġhadira s-Safra u l-Iskol ta l-Ġhallis SCI/SPA.....	25
Figure 13: Habitat map of the AOS – Proposed scheme site marked with green border (Source: Baseline and impact assessment..., Doublet and Zammit, 2022).....	27
Figure 14: Trees in the AOS – Proposed scheme site marked with green border (Source: Baseline and impact assessment..., Doublet and Zammit, 2022.....	28
Figure 15: Benthic habitat map for the surveyed area.....	30

Figure 16: Soft landscaping, predominantly olive trees around the existing biodigester plant	31
Figure 17: Narrow strip of land surrounding the existing Biodigester plant dominated by the invasive <i>Arundo Donax</i>	32
Figure 18: degraded excavated land bordered by almond trees.....	32
Figure 19: Bare land bordered by maquis community remnants including carob trees	33
Figure 20: Bare fields bordered by remnants of maquis communities including one olive tree	33
Figure 21: Remnants of maquis communities included Lentisk shrubs	34
Figure 22: Dead trees present within the AOI.....	34
Figure 23: Scattered plants of St John's Worth observed within the excavated areas.....	35
Figure 24: Example of rubble walls within the AOI (Photo taken July 2024)	36
Figure 25: Vegetation growing within degraded rubble walls and rubble structures (photo taken July 2024)	36
Figure 26: Agricultural tree species bordering bare fields and excavated area (photo taken July 2024).....	37
Figure 27: Stand of alien tree species bordering bare fields (Photo taken July 2024)	38
Figure 28: Trees and shrubs present within the site footprint (Site survey held July 2024)	42
Figure 29: Proposed landscaping plan	46
Figure 30: Planning Applications (PA) and Development Notification Orders (DNO) marked in purple, proposed development marked with red X.....	59
Figure 31: Large-scale Naxxar coastal and rural environmental constraints map (Central Malta Local Plan, 2006)	74
Figure 32: Large-scale Trees within proposed site	75
Figure 33: Large-scale proposed landscaping plan	76

LIST OF TABLES

Table 1: Duration of Impact Criterion Description	9
Table 2: Extent of Impact Criterion Description	9
Table 3: Consequences of Impact Criterion Description.....	9
Table 4: Effect of Impact Criterion Description.....	10
Table 5: Reversibility of Impact Criterion Description	10
Table 6: Sensitivity of Resources to Impact Criterion Description.....	10
Table 7: Probability of Impact Occurring Criterion Description	11
Table 8: Impact Significance Criterion Description	11
Table 9: Residual Impact Significance Criterion Description.....	11
Table 10: List of vegetative species encountered on site	38
Table 11: Quantity of tree species and/or protected species within the site footprint.....	40
Table 12: Proposed Landscaping plan tree species	44

1 INTRODUCTION

This report describes the Terrestrial and Marine Ecology impacts arising from the construction and operation of the proposed development of a new Thermal Treatment Facility (TTF). The facility is being proposed for the incineration of hazardous waste, and is hereafter referred to as 'the Scheme'.

The proposed development will form part of the ECOHIVE Complex and will operate in conjunction with the other waste management facilities at Magħtab.

This technical study identifies the terrestrial and marine ecological features in the area and assesses the impacts caused in relation to the EIA for the proposed development, in line with the requirements issued by the ERA under EA/00020/22.

1.1 PROJECT DESCRIPTION

This scheme is being proposed to establish a new hazardous waste incineration plant as part of a strategy to centralise all the major waste operations carried out by Wasteserv Malta at one location. The project entails the construction of a new hazardous waste incineration plant comprising of two independent lines, and space for a potential third independent line in the future. The proposed development will form part of the ECOHIVE Complex and will operate in conjunction with the other waste management facilities at Magħtab.



FIGURE 1: PROPOSED SITE FOR THE NEW THERMAL TREATMENT FACILITY

2 TERMS OF REFERENCE

The Terms of Reference related to the study on land cover and land uses for the EIA were issued by the ERA in June 2024. They are replicated in Appendix 1 for reference.

3 METHODOLOGY

3.1 AREA OF INFLUENCE

The Area of Influence (AoI) for the ecology chapter of the EIA comprised of a 100m buffer zone around the proposed development. Additional consideration was given to the nearby protected areas, both terrestrial and marine.

The relevant AoIs are mapped in Figure 2 to Figure 4 overleaf.



FIGURE 2: AREA OF INFLUENCE FOR THE TERRESTRIAL ECOLOGY STUDY



FIGURE 3: TERRESTRIAL PROTECTED AREAS RELEVANT TO THE STUDY

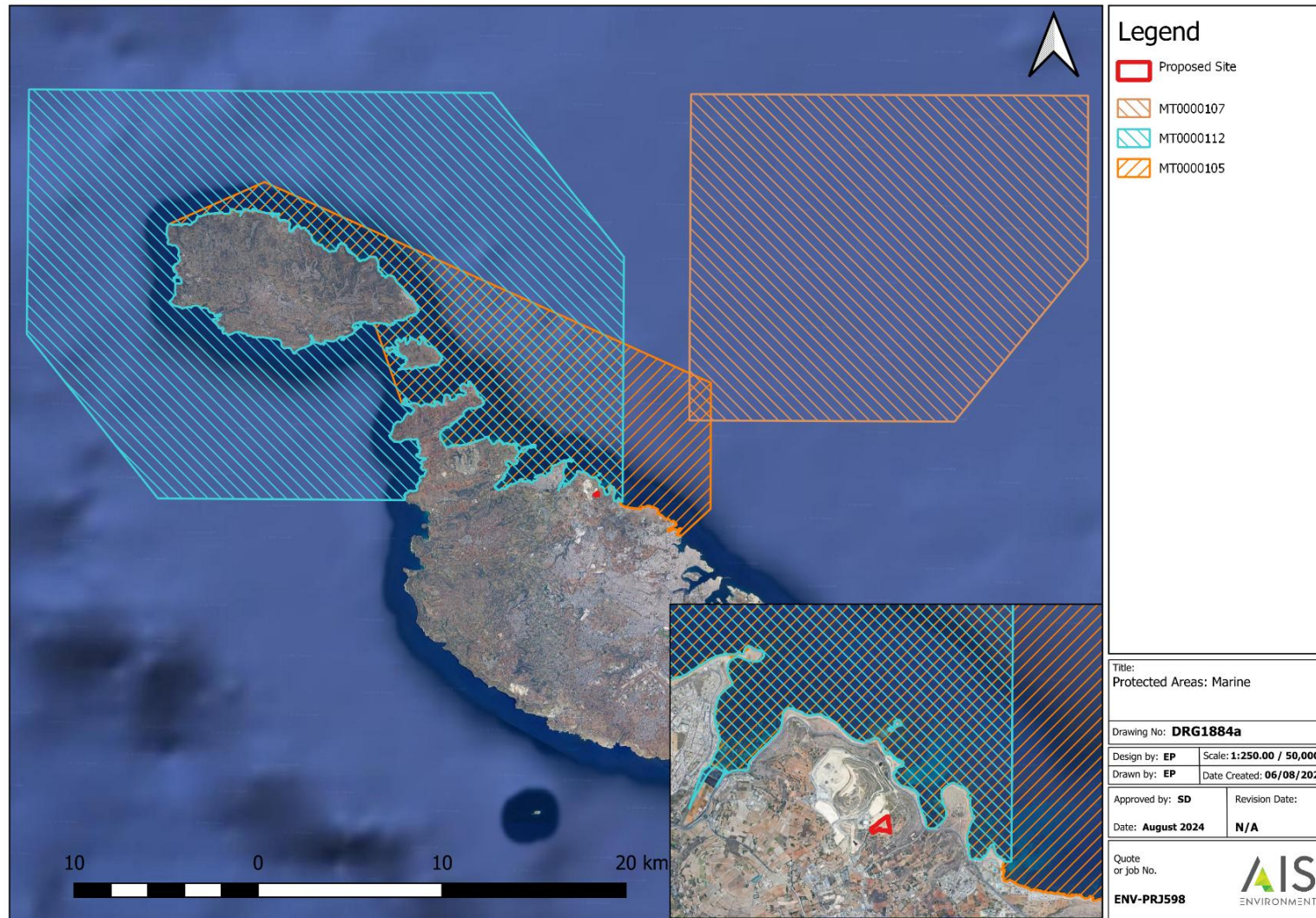


FIGURE 4: MARINE PROTECTED AREAS RELEVANT TO THE STUDY

3.2 DESKTOP STUDY

This study describes the existing ecology present within the project footprint and surrounding areas. This information was then used to assess the impact of the proposed project on the area's ecology.

The Consultant first carried out a thorough literature review of readily available data and previous studies in the AOI. This included a review of the following sources:

- Central Malta Local Plan, 2006
- SPED (Strategic Plan for the Environment and Development)
- S.L. 549.44
- S.L. 549.123
-
- Previous environmental studies carried out in the same area (if available)

Following on from the desktop study, the Consultant conducted a broad-brush terrestrial survey within the AOI in July 2024. The Consultant recorded the vegetation assemblages and any faunal species encountered during the surveys. The baseline survey also included a survey of all species present within the site and buffer zone, including their scientific and vernacular name to identify species protected in line with the TREES AND WOODLANDS PROTECTION REGULATIONS (S.L.549.123) and the FLORA, FAUNA, AND NATURAL HABITATS PROTECTION REGULATIONS (S.L.549.44). Photographic evidence was collected during the field survey.

The report details the conservation status and ecological condition of the area and the state of health of its habitats, species and ecological features. All protected, endangered, rare, unique, endemic, high-quality, keystone, invasive/deleterious, or otherwise important species, habitats, ecological assemblages, and ecological conditions found in the area under study were also noted.

3.3 IMPACT ASSESSMENT

The Consultant evaluated the potential impacts arising from the construction and operation of the proposed Scheme on the local terrestrial and marine ecology. The potential impacts also provided a basis for comparison between the existing conditions and the new conditions established during the operation of the Scheme.

The following information, where available, has been provided for each of the identified impacts:

- Project phase (construction or operational phase)
- Policy importance
- Extent of effect (local, national or international)
- Duration (temporary or permanent)
- Type (beneficial or adverse)
- Severity (low, moderate, high)
- Reversibility (reversible or irreversible)

- Sensitivity of receptors (high, medium or low)
- Probability of occurrence (certain, likely, uncertain, unlikely or remote)
- Scope for mitigation or enhancement (very good, good or none)

Based on the above criteria, the Consultants assessed the significance level of each of the identified impacts. Different criteria were used for the different components of the study, as summarised in Table 1 to Table 9.

TABLE 1: DURATION OF IMPACT CRITERION DESCRIPTION

DURATION OF IMPACT

Permanent	Impact would still be detectable following decommissioning of project
Temporary	Impact would persist throughout the phase of project under consideration only

TABLE 2: EXTENT OF IMPACT CRITERION DESCRIPTION

EXTENT OF IMPACT

Widespread	Impact is expected to affect in the entire area of study and/or may extend beyond the boundaries of direct intervention into adjacent areas
Localised	Impact is expected to affect receptors in the immediate vicinity of its source

TABLE 3: CONSEQUENCES OF IMPACT CRITERION DESCRIPTION

CONSEQUENCES OF IMPACT

Direct	Changes that result from the cause-effect consequences of interactions between the environment and project activities
Indirect	Changes that result from cause-effect consequences of interactions between the environment and direct impacts
Cumulative	The cumulative consequences of ecological impact refer to the gradual and long-term effects that result from the combined impact of various ecological disturbances or stressors on an ecosystem over time.

TABLE 4: EFFECT OF IMPACT CRITERION DESCRIPTION

EFFECT OF IMPACT

Adverse	A negative effect on the sustainability of the resource under consideration, which are distinguishable from background fluctuations
Beneficial	A positive effect on the sustainability of the resource under consideration, which are distinguishable from background fluctuations

SEVERITY OF IMPACT

Low	The magnitude of the impact is considered to be minimal
Moderate	The magnitude of the impact is considered to be significant
High	The magnitude of the impact is considered to be catastrophic

TABLE 5: REVERSIBILITY OF IMPACT CRITERION DESCRIPTION

REVERSIBILITY OF IMPACT

Reversible	The state of the resource is expected to return to baseline state following cessation of the source of impact
Irreversible	The state of the resource is not expected to return to baseline state following cessation of the source of impact

TABLE 6: SENSITIVITY OF RESOURCES TO IMPACT CRITERION DESCRIPTION

SENSITIVITY AND RESILIENCE OF RESOURCES TO IMPACT

High	The resource under consideration is highly susceptible to a detectable deviation from the background state and its general dynamics
Moderate	The resource under consideration is vulnerable but able to tolerate a degree of detectable deviation from the background state and its general dynamics
Low	The resource under consideration is highly tolerant to a detectable deviation from the background state and its general dynamics

TABLE 7: PROBABILITY OF IMPACT OCCURRING CRITERION DESCRIPTION

PROBABILITY OF IMPACT OCCURRING

Inevitable	Impact will occur irrespective of any mitigation measures taken
Likely	Impact may occur despite the implementation of mitigation measures
Unlikely	Impact would only occur in cases of major mitigation failure
Remote	Impact would only occur in exceptional circumstances
Uncertain	Probability of impact cannot be predicted reliably due to missing information or unknown factors

TABLE 8: IMPACT SIGNIFICANCE CRITERION DESCRIPTION

IMPACT SIGNIFICANCE

Major	The effect on the existing state of the feature under consideration will lead to a high or large-scale change in its resilience
Moderate	The effect of the existing state of the feature under consideration will lead to an observable but contextually restricted change, which is sufficiently important for its long-term resilience
Minor	The effect on the existing state of the feature under consideration will lead to no, low or small-scale change that will not alter its resilience

TABLE 9: RESIDUAL IMPACT SIGNIFICANCE CRITERION DESCRIPTION

RESIDUAL IMPACT SIGNIFICANCE

Major	The effect on the existing state of the feature under consideration will lead to a high or large-scale change in its resilience after application of mitigation measures (if any) and impact cessation
Moderate	The effect of the existing state of the feature under consideration will lead to an observable but contextually restricted change, which is sufficiently important for its long-term resilience after application of mitigation measures (if any) and impact cessation
Minor	The effect on the existing state of the feature under consideration will lead to low or small-scale change that will not alter its resilience after application of mitigation measures (if any) and impact cessation

RESIDUAL IMPACT SIGNIFICANCE

Negligible	The effect on the existing state of the feature under consideration will lead to no significant change that will alter its resilience after application of mitigation measures (if any) and impact cessation
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The technical report includes:

- A comprehensive list of mitigation measures to prevent, minimise and offset significant adverse effects of the proposed development;
- A description and quantification of any residual impacts remaining after the implementation of the recommended mitigation measures; and
- A monitoring plan for all phases of the project (before, construction, operational and decommissioning), if deemed appropriate.

4 BASELINE STUDY

4.1 GENERAL DESCRIPTION

The site is situated in the Eastern region of the ECOHIVE complex, across the road from the Żwejra landfill and adjacent to the existing Anaerobic Digester (AD) Plant. The proposed site adjoins the site of the proposed Material Recovery Facility. The footprint of the entire site is around 18,185 sq.m.

The site currently comprises agricultural land cleared of its topsoil layer, dense patches of low-lying indigenous trees, scattered agricultural trees and remnants of local maquis/advanced garigue community.

The area surrounding the site is mostly rural in character, excluding the engineered landfills and waste management operations conducted by Wasteserv Malta. The ecological features nearest to the site area small pockets of afforested areas, coastal garigue and other natural communities reminiscent of garigue, steppe and degraded areas.

While the scheme site and buffer do not directly encroach any protected areas, several terrestrial and marine Natura 2000 sites are present within walking distance of the proposed development. The potential impacts on the habitats and species within these areas have been considered within the assessment.

4.2 DESKTOP REVIEW

4.2.1 Local Plans

The area of influence and its surroundings were assessed through a desktop review of the relevant local plans, legislations and any applicable policy documents. Sites of ecological and environmental importance have been identified in the immediate surroundings.

The CENTRAL MALTA LOCAL PLAN (Malta Environment and Planning Authority, 2006) shows that the scheme site is located within an Ecological Area (CG22) as indicated in Figure 5. The surrounding areas are classified as 'Agricultural Area' (CG24) awaiting classification of agricultural value (see Figure 5). A large-scale version of this map can be found in Appendix 1.

Two areas are marked as Sites of Scientific Importance (CG22), within the vicinity of the scheme site. One lies to the North of the facility well outside of the Area of Influence of the scheme, while the second is positioned further South and in close proximity to the ECOHIVE complex South entrance. The area to the South of the site will be considered due to potential ecological impacts arising from the transportation of material to and from the Scheme site via the adjacent access roads. Both areas will be considered within the operational impacts assessment. Both areas are marked in a light purple outline in Figure 5.

The entire coastal stretch of Qalet San Marku is also designated as a “Protected Natural Coast with public access” (NA04). This area was considered sufficiently detached from the scheme to be buffered from impacts of the construction works. The area was considered within the operational impact assessment.

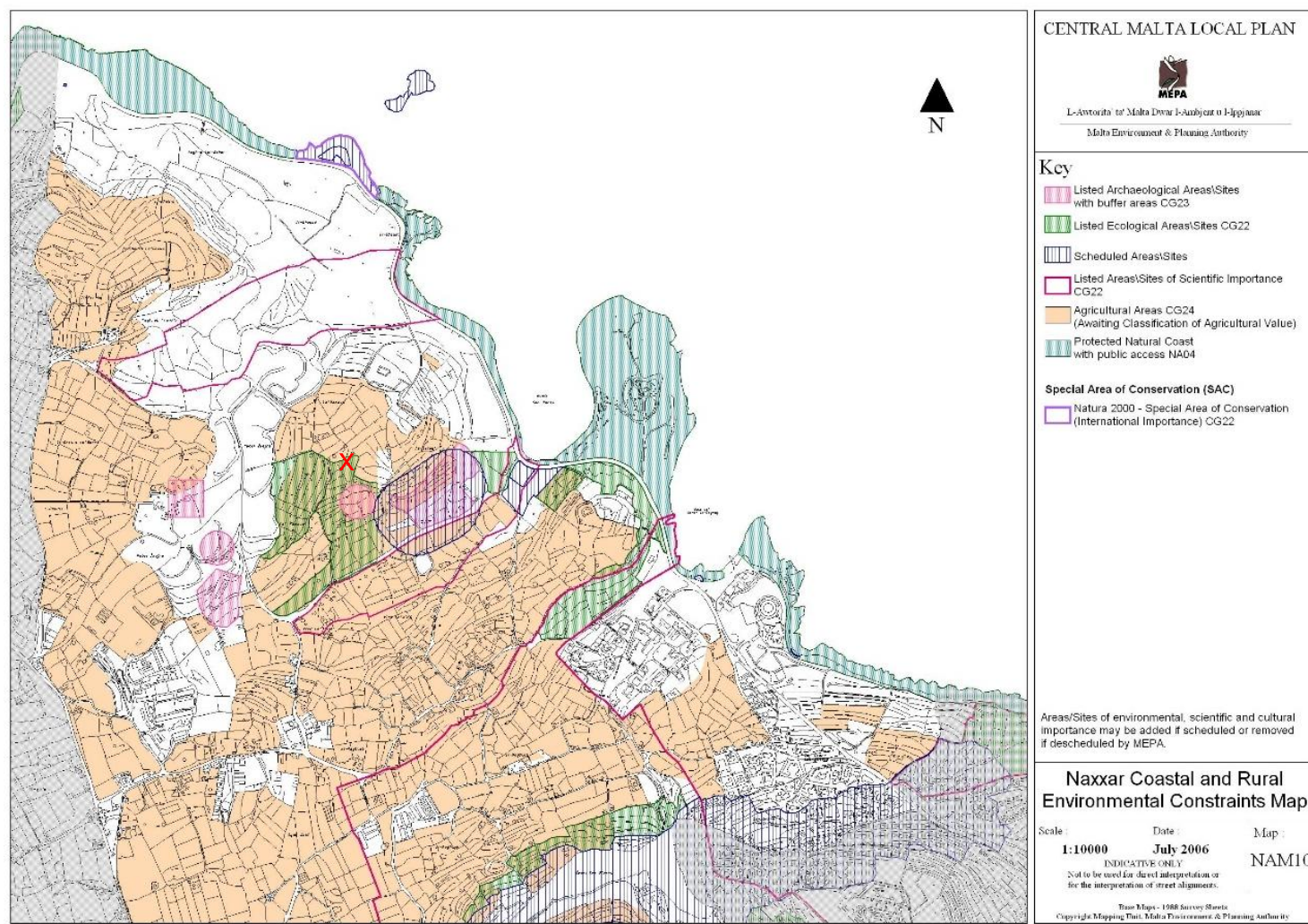


FIGURE 5: NAXXAR COASTAL AND RURAL ENVIRONMENTAL CONSTRAINTS MAP (CENTRAL MALTA LOCAL PLAN, 2006) SITE MARKED WITH RED X

In Figure 6, seven Areas of Ecological Importance (AEI) surrounding the scheme and AOI are marked as A to G. These AEIs were identified during the NHLP survey in 1996 and have been used to designate protected areas in the Local Plans of 2006.

Site A is granted a level 4 degree of environmental protection due to its dense vegetation of maquis-like shrubs and trees intermingled with agricultural land. Both the scheme site and the majority of the AOI fall within the boundaries of Site A. The remaining 6 areas are found in the near vicinity of the scheme site. While these sites are present at a considerable distance from the scheme and/or access roads to and from the scheme, the likely impact of deposition/pollution from the envisaged stack included in this development was considered, as these sites fall within the 6km radius considered as the AOI within the Air Dispersion Model.

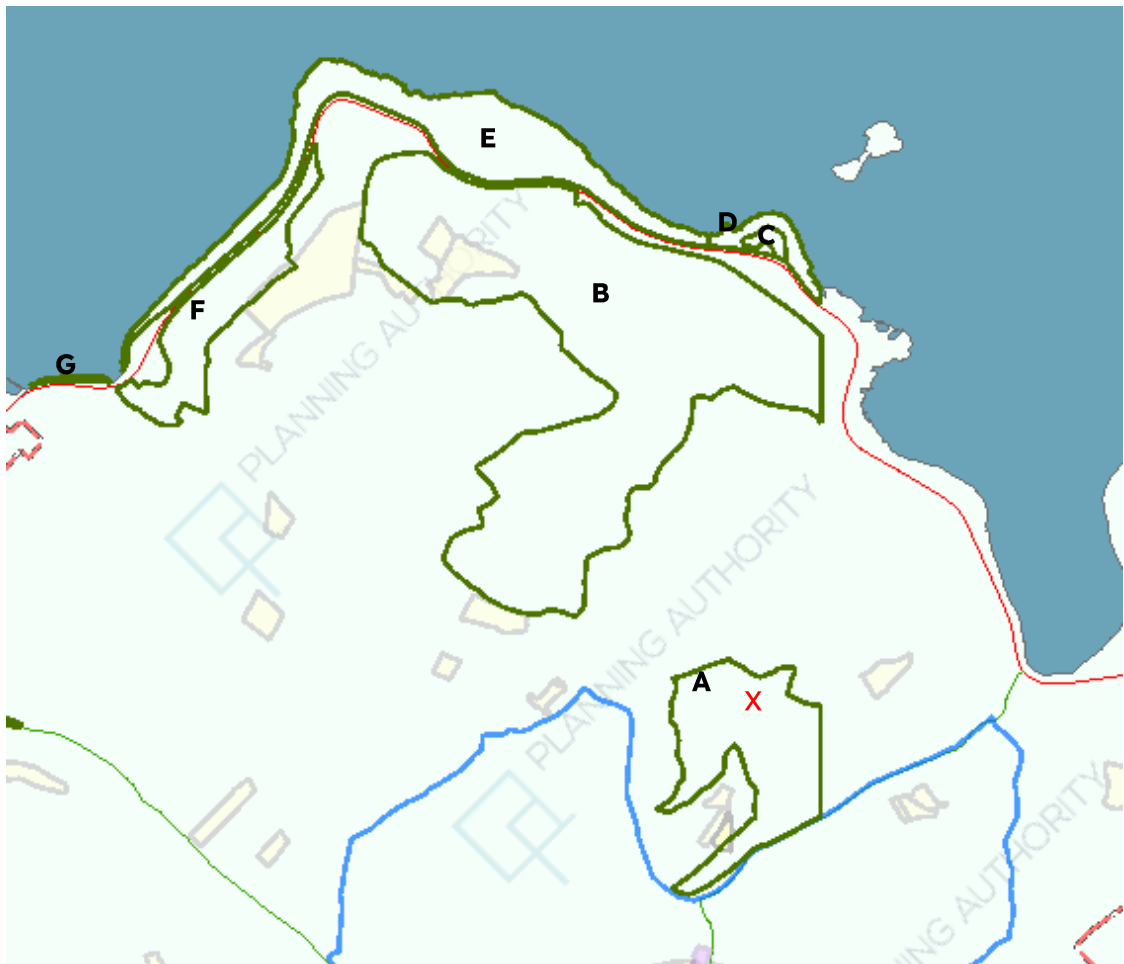


FIGURE 6: AREAS OF ECOLOGICAL IMPORTANCE (A-G) AROUND THE SITE ARE MARKED WITH A GREEN OUTLINE (PA GEOSERVER) SITE MARKED WITH A RED X

4.2.2 The Strategic Plan for the Environment and Development (SPED)

The SPED issued by the Planning Authority in 2015, describes Malta's strategic vision on planning, environmental, economic and social matters to address overarching concepts of sustainable management of land and sea resources as well as the protection of the environment. A number of thematic objectives are directly applicable to the project and its effect on the biodiversity:

- Socio-Economic Development, Thematic Objective 1: To manage the available potential space and environmental resources on land and sea sustainably to ensure that socio-economic development needs are met whilst protecting the environment and limiting land take up within the Rural Area by:
 - Socio-economic development should ensure that rural areas are not exploited by uses which are not legitimate or necessary
- Socio-Economic Development, Thematic Objective 7: to promote the efficient use of resources including local stone, water and soil, and manage waste in a manner that safeguard natural processes, and minimises impacts on cultural heritage, landscape and human health by:
 - Supporting the implementation of the National Waste Management Plan and setting out site selection criteria for the location of waste to energy facilities
- Socio-Economic Development, Thematic Objective 8: To safeguard and enhance biodiversity, cultural heritage, geology and geomorphology by:
 - Controlling activities which might have an impact on areas, buildings, structures, sites, spaces and species with a general presumption against the demolition of scheduled and vernacular buildings
- Rural Objective 3: To guide development which is either justified to be located in the Rural Area in approved government policies, plans or programmes, or is incompatible with urban uses and where alternatives are not possible, to the Rural Areas away from protected areas and areas of high landscape sensitivity, preferably on Areas of Containment, previously developed land or existing buildings while ensuring the improvement of the quality of the rural environment by:
 - Setting out policy framework to control the location and design of such development and guide appropriate environmental measures
 - Controlling the cumulative effect of such development
 - Requiring compensation measures to enhance the rural environment

The development is at odds with the following SPED Objectives:

- Socio-Economic Development, Thematic Objective 7: to promote the efficient use of resources including local stone, water and soil, and manage waste in a manner that safeguard natural processes, and minimises impacts on cultural heritage, landscape and human health by:
 - Controlling the location of development to prevent soil sealing and erosion
 - Protecting agricultural land and gardens to prevent loss of soil and soil sealing

- Rural Objective 1: To facilitate sustainable rural development and the diversification of activities within the Rural Area to sustain agriculture and safeguard its distinctiveness by
 - Protecting good quality agricultural land from development

There are several justifications for this inconsistency. The centralisation of waste management in Malta brings about many operational advantages in terms of logistics and transportation. A centralised waste management system can counteract issues of economies of scale which would make multiple decentralised systems unfeasible.

Additionally, the grouping together of similar developments may reduce environmental impacts, as the take up of land and any other spill-over effects will affect only one location rather than being spread out across many areas in Malta. The proposed site for the TTF is adjacent to the existing Magħtab landfill, which has historically been significantly impacted by waste management of the past.

The proposed Thermal Treatment Facility will contribute to locate targets of Malta's Long-Term Waste Management Plan, by reducing the amount of unprocessed waste sent to landfill. The reduced pressure on landfilling will indirectly decrease the potential uptake of further land to accommodate future landfills.

4.2.3 S.L. 549.44 (repealing the Flora, Fauna and Natural Habitats Protection Regulations, 2006 [LN 311 of 2006])

This legislation establishes a National Ecological Network of special areas of conservation having National or International Importance. The Legal Notice transposes the obligations of the HABITATS DIRECTIVE which call for the establishment of a European Network of Special Areas of Conservation (Natura 2000) composed of sites having the natural habitat types and species listed in Annexes I and II to the Directive (listed under Schedule I and II of the same Legal Notice). Schedule III lists animal and plant species of community importance whose conservation requires the designation of Special Areas of Conservation, whilst Schedule IV lists the criteria for selecting sites eligible for identification as Sites of National Importance and of International Importance and Designation as Special Areas of Conservation. Schedule V lists animal and plant species of community interest in need of strict protection, whilst Schedule VI lists animal and plant species of national interest in need of strict protection.

Schedule VII lists animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures, whilst Schedule VIII lists animal and plant species of national interest whose taking in the wild and exploitation may be subject to management measures. Schedule IX includes provisions for identification and monitoring, whilst Schedule X lists endemic species not covered by Regulation 26 of the same Legal Notice.

There are no Special Areas of Conservation within the scheme site or its Area of Interest. The closest protected areas under the Natura 2000 framework are replicated in Figure 7 and discussed in the following sections.

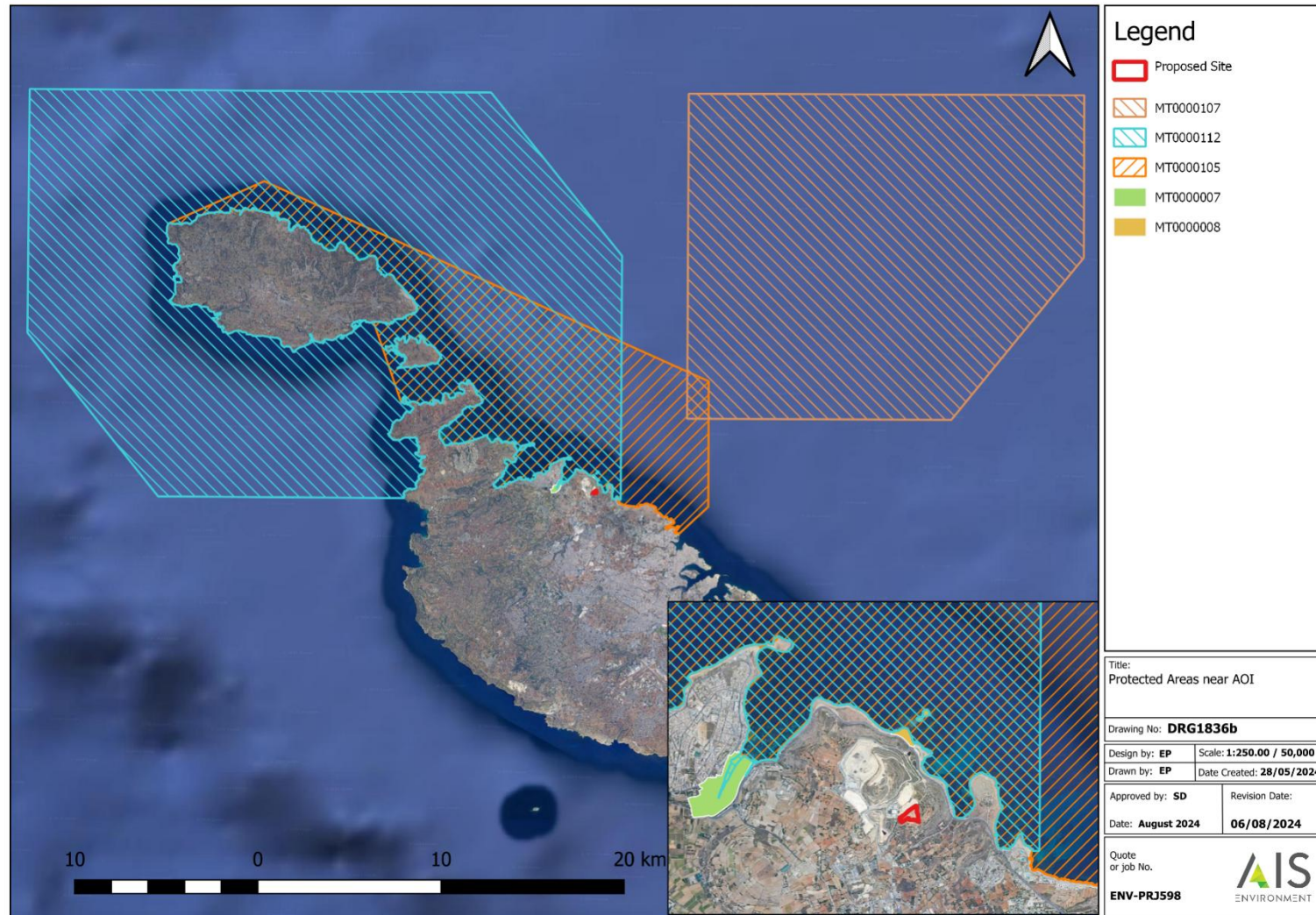


FIGURE 7: NEARBY SITES PROTECTED WITHIN THE NATURA 2000 FRAMEWORK CONSIDERED IN THE STUDY

4.2.3.1 MT0000107 - Żona fil-Baħar fil-Grigal

Żona fil-Baħar fil-Grigal (MT0000107) was designated as a Special Protected Area (SPA) through Government Notice No. 1311 of 2016, and comprises an area of 351.65km².

The site was identified in the Maltese marine IBA inventory as result of the EU LIFE+ Malta Seabird Project (LIFE10 NAT/MT/090) due to its importance for *Hydrobates pelagicus* and *Puffinus yelkouan*. This site is considered further in the Avifauna chapter.

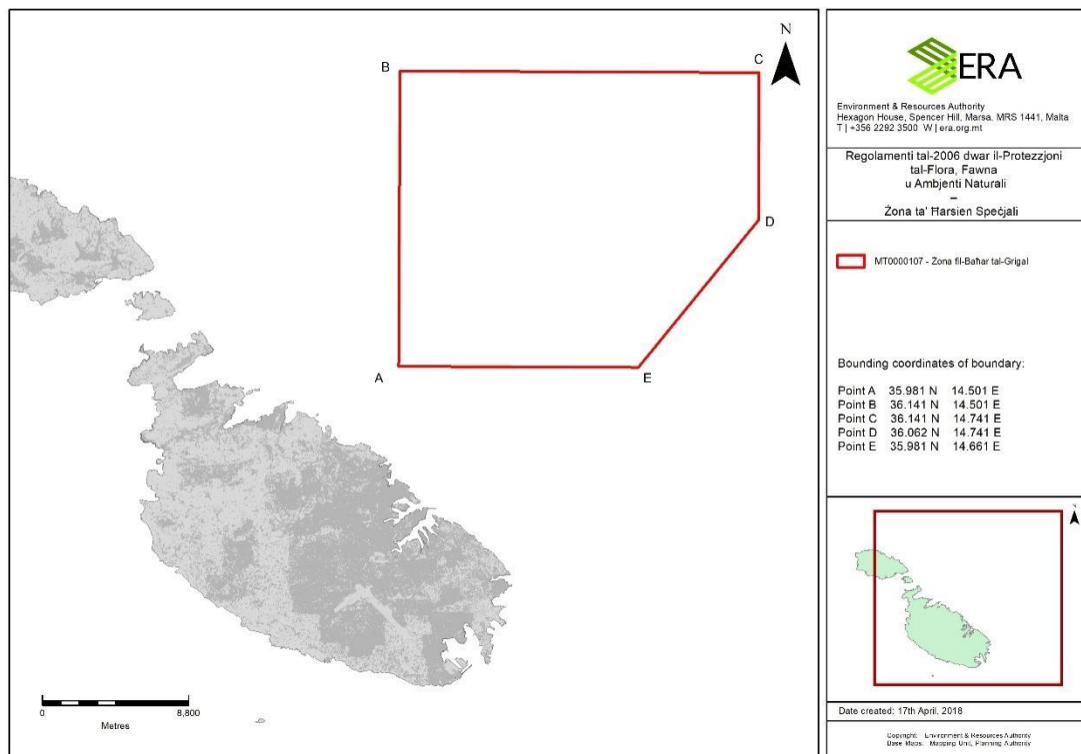


FIGURE 8: BOUNDARY OF THE ŻONA FIL-BAĦAR FIL-GRIGAL SPA

4.2.3.2 MT0000112 - Żona fil-Baħar Madwar Għawdex

The Żona fil-Baħar Madwar Għawdex (MT0000112) was designated as a Special Protection Area via Government Notice No. 1311 of 2016, and comprises an area of 556.33km².

The site was identified in the Maltese marine IBA inventory as result of the Eu LIFE+ Malta Seabird Project (LIFE10NAT/MT090) due to its importance for *Calonectris diomedea*, and *Puffinus yelkouan* during the breeding season. This site is considered further in the Avifauna chapter.

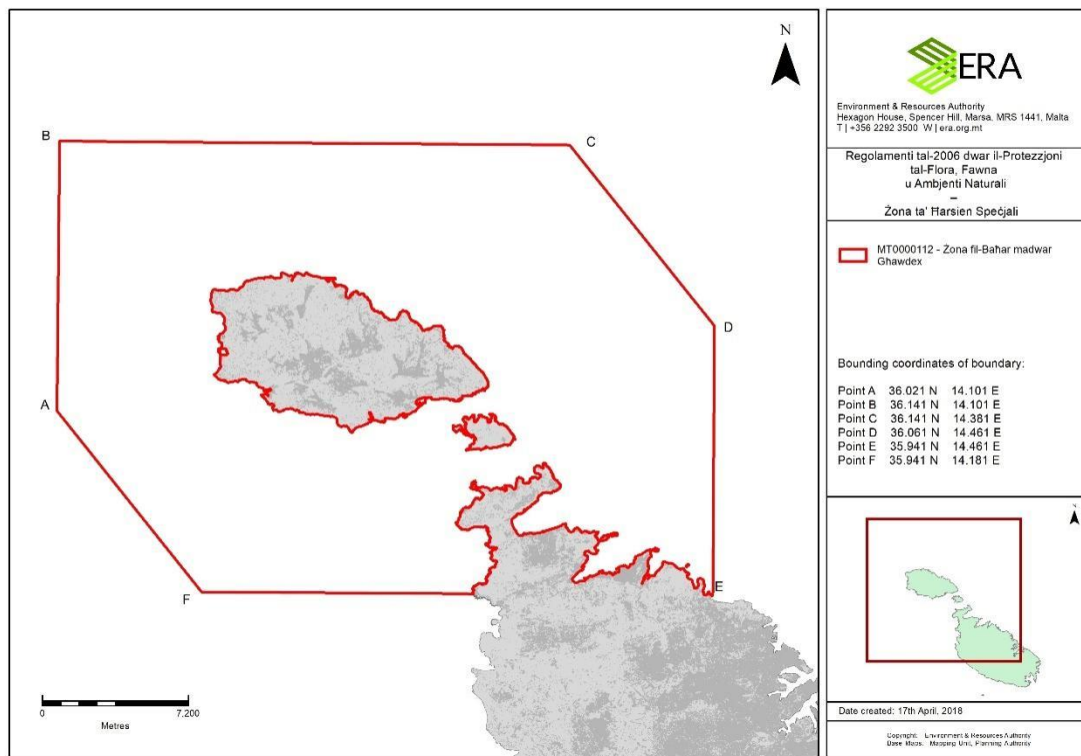


FIGURE 9: BOUNDARY OF THE ŻONA FIL-BAĦAR MADWAR GĦAWDEX

4.2.3.3 MT0000105 - Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u il-Qaliet

This protected area hosts the largest variety of *Posidonia* sub-types among marine sites selected to be part of the Natura 2000 Network, with the representativity of each subtype considered superior to comparable European sites. The site boundary covers an area of 158.8km².

The subtypes present in this site include:

- *Posidonia* settled on matte (Habitat Code: 1120): These meadows are typically continuous and exhibit a high density.
- *Posidonia* settled on rock (Habitat Code: 1170): This subtype shows a reticulate distribution of dense strands.
- *Posidonia* settled on sand (Habitat Code: 1110): Characterized by continuous beds that generally display low densities and variable percentage cover.
- Mosaic morphology: An intermixed structure of *Posidonia oceanica*, *Cymodocea nodosa*, and coarse sand, showing a reticulate pattern.
- Ecomorphosis of 'barrier reef' *Posidonia* meadows.

The *Posidonia* meadows within this site are also recognised for their high degree of connectivity and percentage coverage. It is evident that these meadows are abundant and healthy, particularly in White Tower Bay, which likely hosts the highest shoot

density in the Mediterranean. Additionally, sandbanks formed by associations of *Cymodocea nodosa* (Habitat Code: 1110) are present within this site, including:

- Sandbanks with associations of *Cymodocea nodosa* on well-sorted fine sands.
- Sandbanks with associations of *Cymodocea nodosa* on superficially muddy sands in sheltered waters.
- Facies with *Cymodocea nodosa* occurring within coarse sands and gravels with varying amounts of mud.

Reefs (Habitat Code: 1170) have also been identified within this site, occurring on hard beds and rocks. The following subtypes are present:

- Reefs with associations of *Dictyopteris polypodioides*.
- Reefs with associations of *Halopteris scoparis* and *Padina pavonica*.
- Reefs with associations of *Flabellia petiolata* and *Peyssonnellia squamaria*.
- Reefs with associations of *Cystoseira* spp.

Partially submerged caves are also located along the coast of Comino, although no quantitative data is available for this habitat type. Among the important species within this site is *Lithothamnion minervae*, which has been included in national legislation as a plant species of national interest, necessitating its conservation through the designation of Special Areas of Conservation. This site was proposed as a Site of Community Importance (SCI) in 2010, confirmed as an SCI in 2012, and was subsequently extended in 2018.

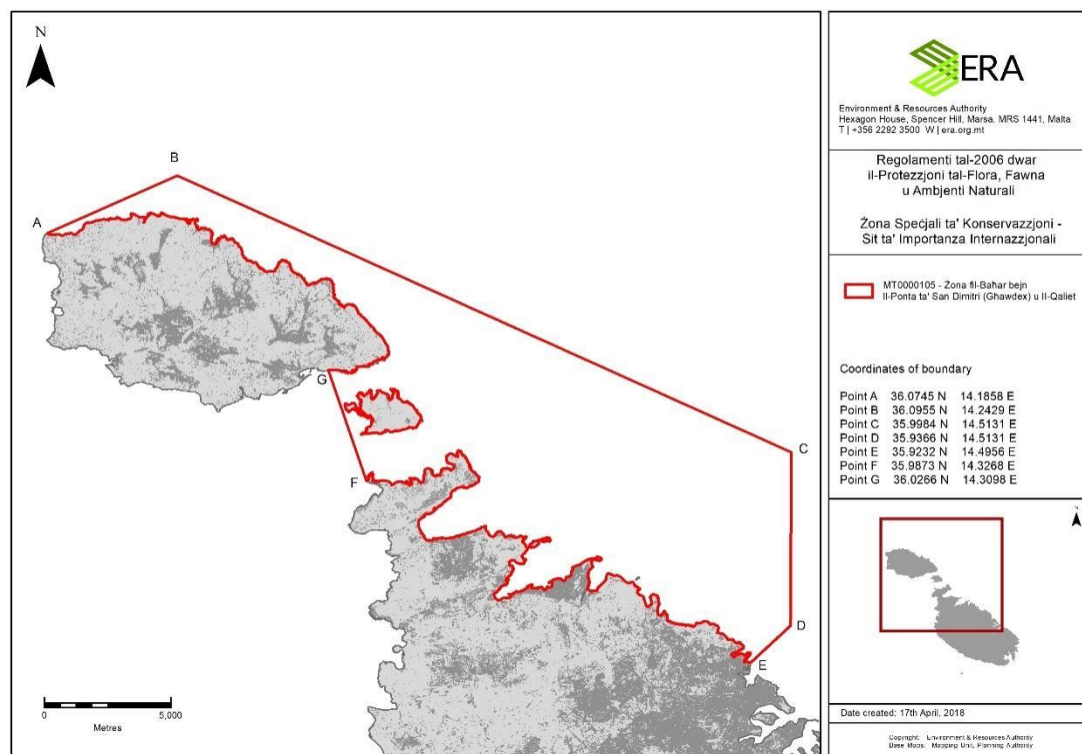


FIGURE 10: BOUNDARY OF THE ŻONA FIL-BAHAR BEJN IL-PONTA TA' SAN DIMITRI (GHAWDEX) U IL-QALIET SCI

4.2.3.4 MT0000007 - is-Salini

Is-Salini (MT0000007) is recognized as a Special Area of Conservation (SAC) of international significance, encompassing several key habitats listed in the Flora and Natural Habitats Protection Regulations. These include:

- Habitat 1150: Coastal lagoons
- Habitat 1310: Salicornia and other annuals colonizing mud and sand
- Habitat 1410: Mediterranean salt meadows
- Habitat 1420: Mediterranean and thermo-Atlantic halophilous scrubs
- Habitat 92D0: Southern riparian galleries and thickets

Covering an area of 236,700m², Is-Salini is one of the last remaining salt marshes in Malta, characterized by an estuary where seawater mixes with freshwater from nearby valleys. This unique hydrology distinguishes it from other marshlands in the region, which are typically more saline. The site also includes agricultural land and an afforested area known as Kennedy Grove, featuring various tree plantations. The marshland supports a diverse range of flora and fauna, including notable species such as:

- Common plants: *Limbarda crithmoides*, *Suaeda vera*, *Salsola soda*, *Arthrocnemum macrostachyum*, *Phragmites australis*.
- Rare plant species: *Elymus flaccidifolius*, *Ruppia maritima*, *Calystegia sepium*, *Parapholis filiformis*, *Orobanche cernua*.
- Annex II species: *Acrocephalus scirpaceus* (Eurasian reed warbler) and *Aphanius fasciatus* (Mediterranean Killifish).

Additionally, Is-Salini hosts a variety of endemic species including *Trochoidea spratti* (Maltese top snail) and *Muticaria macrostoma* (Maltese door snail). The management plan for the site emphasises the importance of maintaining its ecological integrity while promoting sustainable use and conservation efforts.

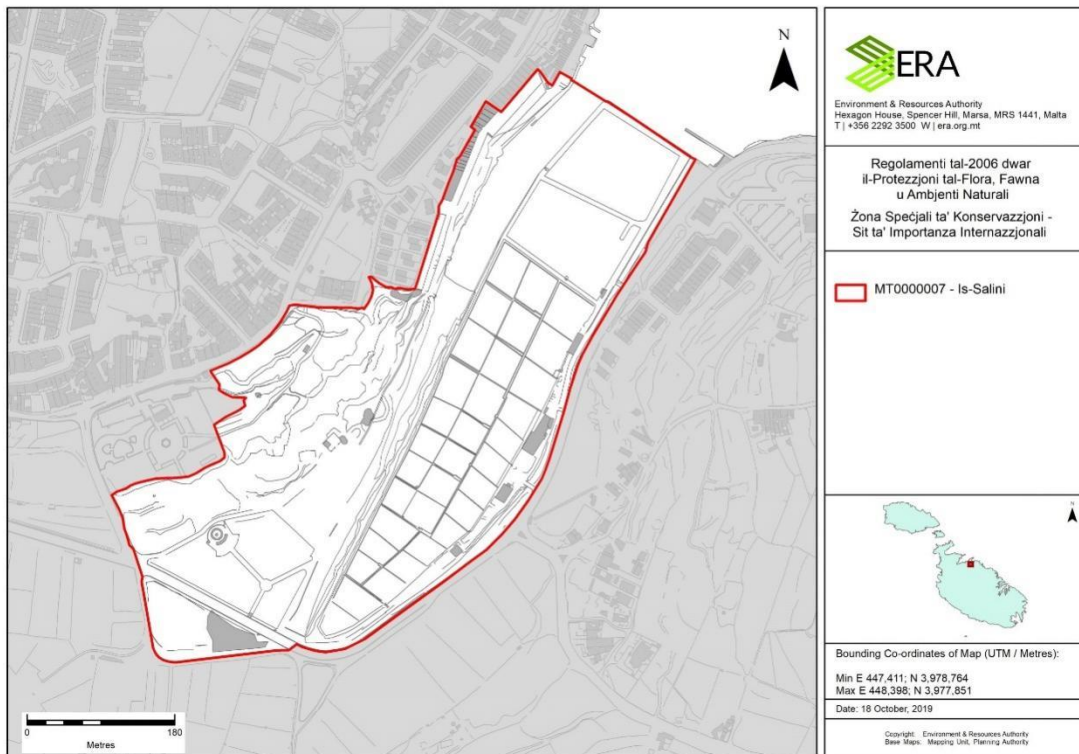


FIGURE 11: BOUNDARY OF THE SALINI SAC

4.2.3.5 MT0000008 - L-Għadira s-Safra u l-Iskol ta l-Għallis

L-Għadira s-Safra is a 15,400 m² transitional coastal wetland in Malta, designated as a Special Area of Conservation under G.N. 1379 of 2016. This site is notable for its brackish water ecosystem, which is rare in the predominantly dry Mediterranean region. It features rockpools that receive rainwater and seawater, creating a unique environment that supports different species depending on the season.

Initially proposed as a Site of Community Importance (SCI) in 1995, L-Għadira s-Safra includes two Annex I habitat types: Mediterranean halophilous scrubs and temporary ponds. The area is home to several endangered and rare species, including prickly grass, tadpole shrimp, and fairy shrimp, along with other unique flora like *Cressa cretica* and *Polygonum maritimum*.

The dominant vegetation consists of coastal species such as plantago spp., sea fennel, and golden samphire. Conservation efforts aim to limit public access to sensitive areas, enhance natural buffers, and promote awareness of the site's ecological significance. However, the site faces threats from littering, trampling, invasive species, and nearby urban activities due to its small size and proximity to roads. Future redevelopment plans include expanding the site to improve its ecological integrity.

L-Iskoll tal-Għallis is a group of rock formations with characteristics of rocky shoals as the sea inundates them for a significant part of the year and consequently, they neither support terrestrial vegetation nor a real supralittoral zone. However, this shoal

is a significant resident bird resting and foraging site, and also important for migratory birds.

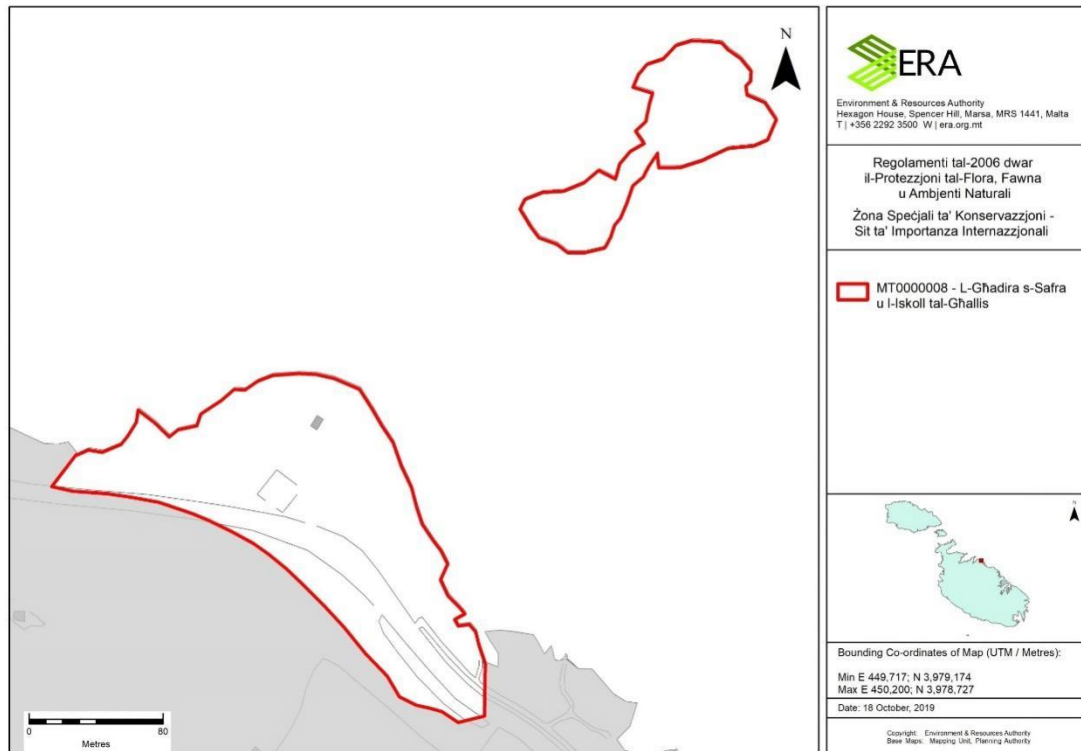


FIGURE 12: BOUNDARY OF THE L-GHADIRA S-SAFRA U L-ISKOL TA L-GHALLIS SCI/SPA

4.2.4 S.L.549.123 (Trees and Woodlands Protection Regulations)

This legislation protects trees and woodlands in the Maltese islands to safeguard them from anthropogenic activity and to regulate the activities that may have an effect on them. The legislation identifies the areas and the species of trees which merit protection, subdividing them into distinct Schedules based on their level of protection.

The first Schedule Part A Table 1, lists the trees which are protected in all locations in Malta, Table 2 lists species which are protected within protected areas, in ODZ, green areas, in natural or rural/green enclaves in an urban area or in urban public open spaces only. The Second Schedule lists down the invasive, alien or environmentally incompatible species, whilst the Third Schedule lists down the fees to be paid for registration and permit applications. The Fourth Schedule lists down the penalties to be paid by offending contraveners against these regulations.

The proposal involves the removal and transplanting of several trees protected under the schedules of this subsidiary legislation. These will be explored in more detail in subsequent chapters.

4.2.5 Terrestrial Ecology Baseline Study - Doublet and Zammit (2022)

Wasteserv Malta has commissioned an in-depth study carried out by a third-party consultant (see Appendix 3) for a terrestrial ecology baseline study in relation to proposed developments within the ECOHIVE complex, including the Thermal Treatment Facility covered by this EIA but also for the proposal of an Organic Waste Processing Plant (OPP), Materials Recovery Facility (MRF), storage area and access road within the same complex. The full title is 'Terrestrial Ecology Baseline Study in relation to the removal of soil in areas within the ECOHIVE Complex'.

The scope of the report was to assess the natural ecosystems, habitats and species present within the targeted areas. The schemes' footprints as planned at the time of writing were presented within the report for all aforementioned proposals conjoined. The report addressed Terms of Reference for a terrestrial ecology baseline study as put forward by the Environment and Resources Authority in July 2022.

The report identified a wide variety of flora and fauna recorded within the scheme site and/or observed passing through. The report concluded that impacts of the proposed schema are likely cumulative and will arise primarily from the loss of habitat and food availability for protected species during the construction phase, while during the operational phase, these impacts will persist and further impacts may arise through the illumination of the site and the surrounding area. Figure 13 and Figure 14 present the habitats and tree species recorded during the assessment.

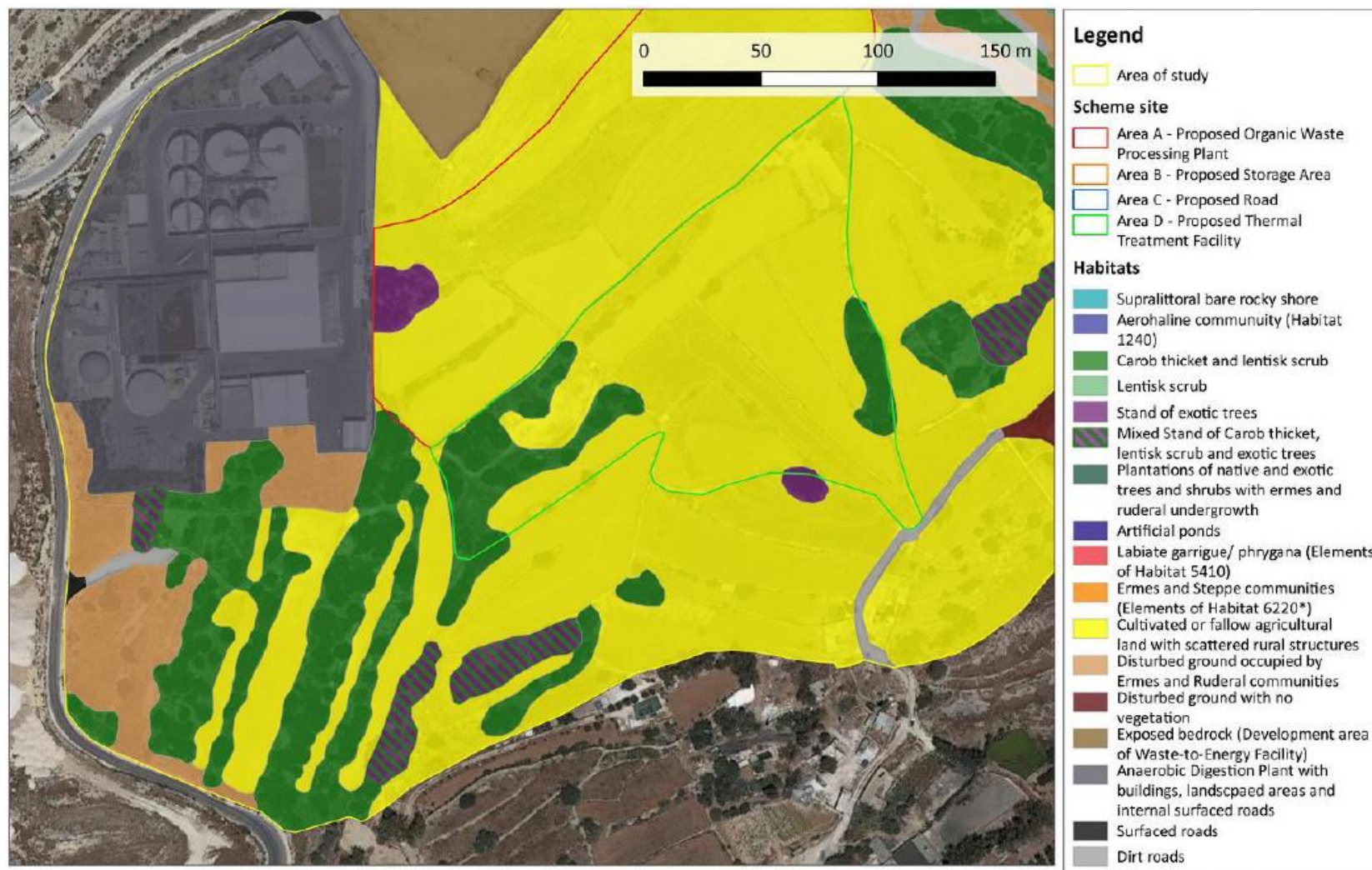


FIGURE 13: HABITAT MAP OF THE AOS – PROPOSED SCHEME SITE MARKED WITH GREEN BORDER (SOURCE: BASELINE AND IMPACT ASSESSMENT..., DOUBLET AND ZAMMIT, 2022)

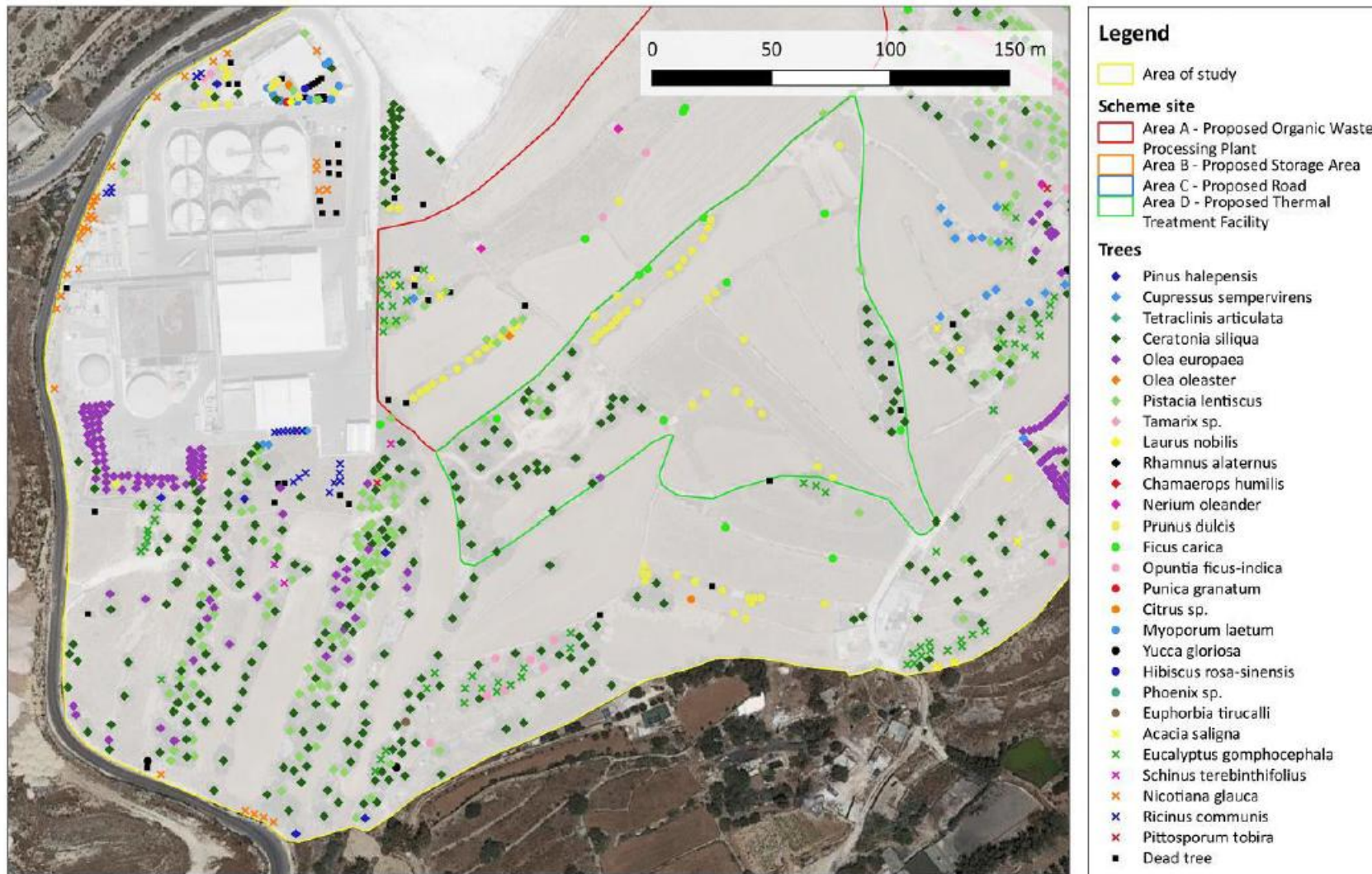


FIGURE 14: TREES IN THE AOS – PROPOSED SCHEME SITE MARKED WITH GREEN BORDER (SOURCE: BASELINE AND IMPACT ASSESSMENT..., DOUBLET AND ZAMMIT, 2022)

4.2.6 Ecology study in relation to EA 0057/18 - Marine environment

A broad-brush benthic habitat survey was carried out in relation to the Environmental Impact Assessment related to the then proposed Waste to Energy Facility, now developed within the ECOHIVE complex adjacent to the proposal covered by this EIA.

The study comprised an area of 275,000m², which was made up of a buffer of 100m flanking each side of the envisaged trajectory of the plant's cooling water system pipes.

Study findings

The benthic habitats surveyed were classified into nine assemblages using the EUNIS benthic habitat terminology, adapted for Maltese waters by Borg et al. (2013). One unique assemblage, characterised as "Low-density exposed bedrock outcrops colonised by turfing species interspersed with extensive unvegetated sandy seabed stretches," did not fit any EUNIS category. Benthic biocoenoses were grouped into 'complexes' based on their proximity within the surveyed area.

- Shallow water assemblages

The shallowest areas (up to 3-4 meters deep) featured coralline limestone outcrops with turfing species and low growths of Phaeophyceae (e.g., *Padina pavonica*) and Chlorophyceae (e.g., *Acetabularia acetabulum*). These outcrops transitioned to flatter rocky platforms dominated by photophilic communities, particularly *Dictyopteris polypodioides* and *Stypocaulon scoparium*. Seaward of these communities, a narrow belt of *Posidonia oceanica* meadows was observed, leading to unvegetated infralittoral coarse sediment seabeds with occasional Chlorophyceae and *Rhodophyceae* species.

- Deeper waters

At depths greater than 15 meters, unvegetated sandy seabeds supported low- to medium-density *Cymodocea nodosa* meadows characterized by bioturbation features. The outer margins of the transects varied, with dense *Posidonia oceanica* meadows present at Transect 1 and reticulate meadows in the others.

- Pipeline areas

The discharge and extraction points for two submarine pipelines were located within sandy seabeds featuring sparse *C. nodosa* meadows. The nearest *P. oceanica* meadows were approximately 30-40 meters from the pipeline infrastructure, with dense meadows located about 100 meters away.

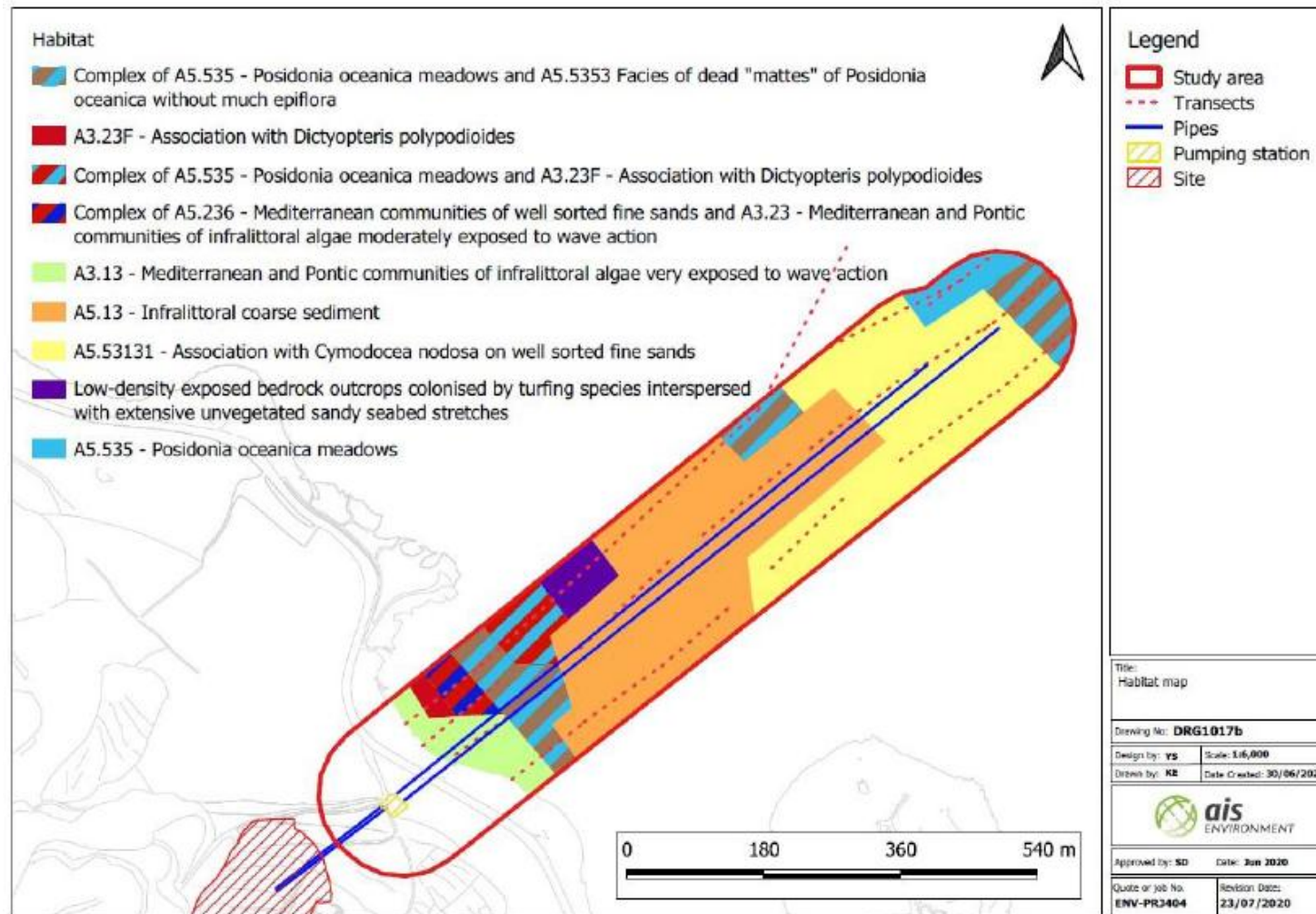


FIGURE 15: BENTHIC HABITAT MAP FOR THE SURVEYED AREA

4.3 SITE SURVEY

4.3.1 Flora

A broad-brush terrestrial survey was conducted within the AOI in July 2024. The main ecological components of the scheme site and surrounding AOI comprise of:

- soft landscaping around the existing bio-digester plant complex
- a considerable area of disturbed/excavated ground with sparse opportunistic plant species and dense pockets of native trees
- Bare fields bordered by agricultural tree species
- Small patches of alien/invasive tree species

Soft landscaping

Inside the ECOHIVE complex, the ecological landscape dynamics are considerably influenced by ongoing waste management operations.

The ECOHIVE complex is surrounded by soft landscaping which incorporates some notable tree species, including a predominance of *Olea europea* (Olive trees) and scattered *Ceratonia siliqua* (Carob trees). A number of opportunistic and/or invasive species have naturally colonised the spaces in between the native trees.



FIGURE 16: SOFT LANDSCAPING, PREDOMINANTLY OLIVE TREES AROUND THE EXISTING BIODIGESTER PLANT

Invasive species

Between the proposed site and the ECOHIVE complex lies a narrow plot of land which is currently dominated by invasive species such as *Arundo donax*.



FIGURE 17: NARROW STRIP OF LAND SURROUNDING THE EXISTING BIODIGESTER PLANT DOMINATED BY THE INVASIVE *ARUNDO DONAX*

Excavated area

The proposed site is comprised of a large area of severely degraded land. The area was excavated and cleared of any soil and remains predominantly void of vegetation cover. The native tree species were retained in small, dense pockets. The resulting landscape remains as an expanse of exposed bedrock, with scattered native tree pockets and bordered by agricultural tree species such as *Prunus dulcis* (Almond trees).



FIGURE 18: DEGRADED EXCAVATED LAND BORDERED BY ALMOND TREES



FIGURE 19: BARE LAND BORDERED BY MAQUIS COMMUNITY REMNANTS INCLUDING CAROB TREES



FIGURE 20: BARE FIELDS BORDERED BY REMNANTS OF MAQUIS COMMUNITIES INCLUDING ONE OLIVE TREE



FIGURE 21: REMNANTS OF MAQUIS COMMUNITIES INCLUDED LENTISK SHRUBS

Several dead tree individuals were observed on site. These were potentially damaged during the excavation process and will be compensated in the proposed planting scheme or within a nearby location to be determined at a later stage.



FIGURE 22: DEAD TREES PRESENT WITHIN THE AOI



FIGURE 23: SCATTERED PLANTS OF ST JOHN'S WORTH OBSERVED WITHIN THE EXCAVATED AREAS

Agricultural land

The agricultural land within the AOI is encircled by low-lying rubble walls. Due to their historical and environmental importance, the conservation and maintenance of rubble walls is governed by LEGAL NOTICE 426 OF 2007 – RUBBLE WALLS AND RURAL STRUCTURES (CONSERVATION AND MANAGEMENT). Rubble walls contribute to soil retention against the effects of surface water runoff and provide shelter for small mammals, reptiles and invertebrates which use agricultural land as their habitat. The majority of the rubble walls observed within the buffer zone were quite degraded, with the exception of the boundary wall South of the existing biodigester plant.



FIGURE 24: EXAMPLE OF RUBBLE WALLS WITHIN THE AOI (PHOTO TAKEN JULY 2024)

Vegetation species which were observed along rubble walls include *Ferula communis* (Common fennel), *Sonchus oleraceus* (Crown daisy), *Asparagus aphyllus* (Mediterranean Asparagus), one-offs of *Capparis orientalis* (Capers) as well as several monocot grasses such as *Piptatherum miliaceum* (Smilgrass).



FIGURE 25: VEGETATION GROWING WITHIN DEGRADED RUBBLE WALLS AND RUBBLE STRUCTURES (PHOTO TAKEN JULY 2024)

The AOI outside of the site boundary particularly to the East – South-East of the site comprises fallow fields bordered by trees typical of agriculture, primarily Almond trees and in some cases stands of the alien Eucalyptus tree. The fallow fields were observed

as bare in the summer months, appearing to be previously used for the cultivation of wheat which had likely been cut down following the winter months. Regrowth of native plant species was nearly non-existent in these areas.



FIGURE 26: AGRICULTURAL TREE SPECIES BORDERING BARE FIELDS AND EXCAVATED AREA (PHOTO TAKEN JULY 2024)



FIGURE 27: STAND OF ALIEN TREE SPECIES BORDERING BARE FIELDS (PHOTO TAKEN JULY 2024)

A list of floral species encountered during the broad-brush survey within the AoI is provided in Table 10. The protected tree species found directly within the site footprint are listed in Table 11.

TABLE 10: LIST OF VEGETATIVE SPECIES ENCOUNTERED ON SITE

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AoI
<i>Antirrhinum tortuosum</i>	Greater snapdragon	None	Agricultural land & disturbed areas
<i>Arundo donax</i>	Greater reed	None	Agricultural land & disturbed areas
<i>Asparagus aphyllus</i>	Mediterranean asparagus	None	Agricultural land, disturbed areas & maquis
<i>Asphodelus aestivus</i>	Summer asphodel	None	Agricultural land
<i>Avena sterilis</i>	Sterile oat	None	Agricultural land, disturbed areas

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AoI
<i>Bromus</i> spp.	Brome grass	None	Agricultural land, disturbed areas
<i>Capparis orientalis</i>	Caper bush	Schedule VIII of S.L. 549.44	Soft landscaped areas, disturbed areas
<i>Ceratonia siliqua</i>	Carob tree	Schedule I Part A Table 2 S.L.549.123	Disturbed areas
<i>Conyza bonariensis</i>	Hairy Fleabane	None	Soft landscaped area
<i>Cupressus semprevivens</i>	Cypress tree	Schedule I of legal notice [S.L. 549.123]	Soft landscaped areas, agricultural land
<i>Diplotaxis tenuifolia</i>	Perennial wall rocket	None	Agricultural land & disturbed areas
<i>Dittrichia viscosa</i>	False yellowhead	None	Agricultural land & disturbed areas
<i>Eucalyptus gomphocephala</i>	Tuart tree	None (not located in public urban space or used for beekeeping)	Agricultural land
<i>Ficus carica</i>	Fig tree	None	Disturbed areas, agricultural land
<i>Foeniculum vulgare</i>	Common fennel	None	Disturbed areas, agricultural land
<i>Galactites tomentosa</i>	Mediterranean thistle	None	Disturbed areas, agricultural land
<i>Glebionis coronaria</i>	Crown daisy	None	Disturbed areas, agricultural land
<i>Hypericum triquetrifolium</i>	Wavy-leaved St John's Wort	None	Disturbed areas
<i>Lonicera implexa</i>	Evergreen honeysuckle	None	Agricultural land

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AoI
<i>Mercurialis annua</i>	Annual mercury	None	Soft landscaped areas & disturbed areas
<i>Olea europaea</i>	Olive tree	Schedule I Part A Table 2 S.L. 549.123	Disturbed areas
<i>Oxalis pes-caprae</i>	Bermuda buttercup	None	Disturbed areas, Agricultural land
<i>Pinus halepensis</i>	Aleppo pine tree	Schedule I Part A Table 2 S.L.549.123	Soft landscaped areas, agricultural land
<i>Piptatherum miliaceum</i>	Smilgrass	None	Agricultural land, disturbed areas
<i>Pistacia lentiscus</i>	Lentisk tree	Schedule I Part A Table 2 S.L. 549.123	Disturbed areas
<i>Prunus dulcis</i>	Almond tree	None	Agricultural land, disturbed areas
<i>Sonchus oleraceus</i>	Sow thistle	None	Disturbed areas

TABLE 11: QUANTITY OF TREE SPECIES AND/OR PROTECTED SPECIES WITHIN THE SITE FOOTPRINT

SPECIES NAME	ENGLISH NAME	PROTECTION	RECORDED AMOUNT
<i>Capparis orientalis</i>	Caper bush	Schedule VIII of S.L. 549.44	Scattered individuals
<i>Ceratonia siliqua</i>	Carob tree	Schedule I Part A Table 2 S.L.549.123	45 (of which 5 are dead)
<i>Eucalyptus gomphocephala</i>	Tuart tree	None (not located in public urban space or used for beekeeping)	5

SPECIES NAME	ENGLISH NAME	PROTECTION	RECORDED AMOUNT
<i>Ficus carica</i>	Fig tree	None	1
<i>Olea europaea</i>	Olive tree	Schedule I Part A Table 2 S.L. 549.123	1
<i>Pistacia lentiscus</i>	Lentisk tree	Schedule I Part A Table 2 S.L. 549.123	4
<i>Prunus dulcis</i>	Almond tree	None	28
Total trees directly affected by the proposed development			84
Total <u>protected</u> trees directly affected by the proposed development			50

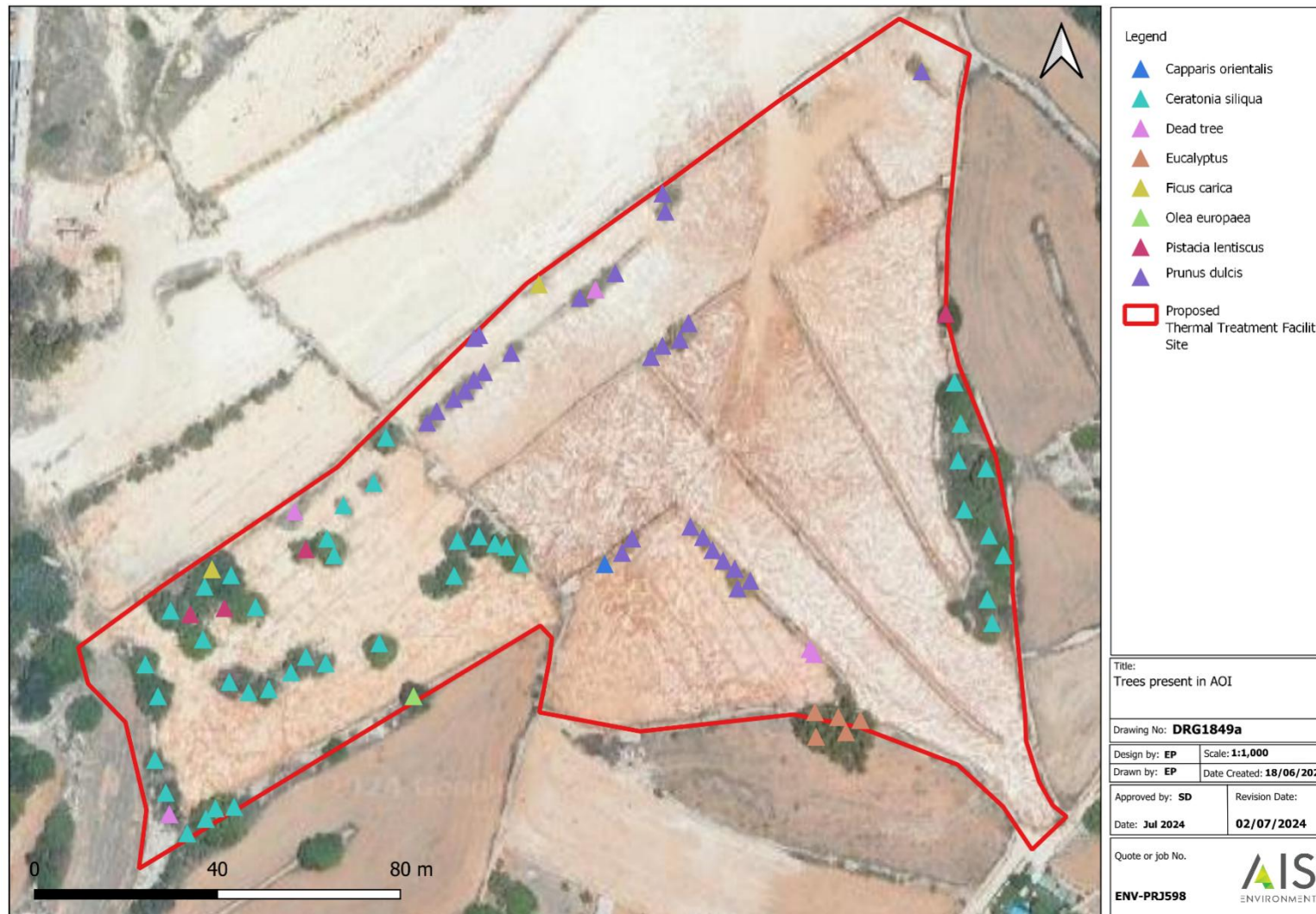


FIGURE 28: TREES AND SHRUBS PRESENT WITHIN THE SITE FOOTPRINT (SITE SURVEY HELD JULY 2024)

4.3.2 Fauna

No fauna species were observed during the survey; however, the habitat likely supports a variety of mammalian, reptile and insect species. Previous studies¹ with a seasonal sampling frequency recorded the presence of the following species: the Algerian Hedgehog (*Atelerix algirus*), the Western whip snake (*Coluber viridflavivorus*), the Leopard snake (*Elaphe situla*), the Moorish wall gecko (*Tarentola mauritanica*) and the Oscillated skink (*Chalcides ocellatus*) among others.

The presence of bats cannot be excluded from this area, as old dilapidated farmland buildings in the vicinity of the AOI can provide attractive roosting sites, and the maquis and agricultural land may offer foraging opportunities. No roosts are documented publicly within the AOI at the time of writing, however previous studies¹ recorded the presence of four species using the general area as feeding or commuting grounds.

The presence of avian species has been assessed and presented within a dedicated chapter of the EIA.

¹ Terrestrial Ecology Baseline Study by Mr Doublet and Mr Zammit (2022)

5 IMPACT ASSESSMENT

5.1 CONSTRUCTION PHASE

The site footprint takes up around 18,185m² total. The complex comprises the following areas:

- Zone A – comprising of the main plant building and a tank farm
- Zone B – comprising of a storage building with a parking area
- Zone C – an administration building with 5 parking spaces
- Zone D – an entrance building and a hardstanding area for the storage of containers
- External landscaping and internal roads

5.1.1 Impacts on protected species - terrestrial

The project will directly impact approximately 85 individual trees, 50 of which are protected species comprised predominantly by Carob trees (40 - additional 5 dead individuals), followed by Lentisk trees (4) and Olive trees (1). Some individuals of the Caper bush may also be affected.

A percentage of the pre-existing mature trees may be relocated to the perimeter of the site², which will feature a landscaping scheme of circa 7,240 sqm. The landscaping scheme as currently proposed features 67 trees and shrubs, as described in Table 12 and Figure 29.

The relocation or removal of trees will be determined by the soil depth, which will be confirmed at the start of the excavation phase. Should the soil depth be confirmed as too shallow to remove the full root ball without damages, the trees will be removed and not transplanted as the chance of survival is low.

Adequate compensation will be provided as advised by the ERA within the planned planting scheme or in the near vicinity of the site, with care taken to plant a cohort of species typical of the ecosystems expected within maquis habitats.

TABLE 12: PROPOSED LANDSCAPING PLAN TREE SPECIES

SCIENTIFIC NAME	ENGLISH NAME	QUANTITY
<i>Olea europaea</i>	Olive tree	25
<i>Ceratonia siliqua</i>	Carob tree	8
<i>Tamarix africana</i>	African tamarisk	10

² Additionally, an area to the South of the TTF proposed site is earmarked for relocation of mature specimens particularly of *Ceratonia siliqua* (Carob trees)

SCIENTIFIC NAME	ENGLISH NAME	QUANTITY
<i>Laurus nobilis</i>	Bay laurel	5
<i>Rosmarinus officinalis prostratus</i>	Rosemary	19
Total individual trees/shrubs		67
Landscaped area		Circa 7,240 m²
Green roof area		Circa 30 m²

The removal of these trees is not only an impact on the individuals themselves, but also to a host of fauna which may have utilised the pre-existing maquis habitat for their foraging, resting and breeding activities. Species such as birds, bats, hedgehogs and several species of reptiles and insects will lose a significant area of suitable habitat, and the overall area will continue to deteriorate due to natural habitat loss and fragmentation. However, one should note that no protected habitats will be directly impacted by the development in this regard.



5.1.2 Impacts on protected species - marine

There are no expected impacts on marine species as a consequence of the construction activities currently proposed.

5.1.3 Impacts on Natura 2000 sites

There are no expected impacts on Natura 2000 sites as a consequence of the construction activities currently proposed.

5.1.4 Removal of soil and rubble walls

The proposal also included the removal of all the topsoil layer of the site footprint, which comprises a considerable area (circa 18,185m²) which included numerous rubble walls, in various condition.

The removal of topsoil was permitted by the Superintendence of Cultural Heritage in September 2022, subject to TORs issued by the Superintendence which required constant monitoring from an experienced archaeologist. Additional clearance was provided by the Environment and Resources Authority in October 2022. The Authority stated that an environmental permit was not required for the soil removal as long as no interventions were carried out on protected trees. Any interventions on protected tree species would require a separate nature permit.

The removal of rubble walls and soil resulted in the loss of potential habitat and feeding grounds for numerous invertebrate, mammalian, bird and reptile species which may use agricultural land and rubble walls for shelter, feeding, commuting and nesting areas.

5.1.5 Loss of ecological characteristics of the site

The conversion of agricultural land, removal of soil, and dismantling of rubble walls lead to irreversible damage to all ecological characteristics linked to the habitat types found within the Area of Interest (AoI). This impact is particularly relevant to the flora and fauna which typically inhabit agricultural soil and rubble walls, particularly soil fauna and stationary species. The loss of ecological features is also of detriment to mobile animals, such as bats and birds, which may use agricultural land for several of their life processes.

5.1.6 Spillover effects

Excavation and construction activities may result in additional indirect impacts, particularly through the generation of fine particulate matter. This particulate matter can disperse beyond the boundaries of the development site due to wind and stormwater runoff. The dust carried by wind has the potential to adversely affect nearby trees and vegetation by obstructing and damaging their respiratory and photosynthetic surfaces. Such interference can lead to compromised physiological processes, which may result in decreased plant health and alterations in community structure, contingent upon the varying susceptibility of different species. Consequently, the dispersal of wind-borne particulates is expected to have a temporary yet significant negative impact on the vegetation within the study area.

Importantly, the nearest terrestrial Natura 2000 site, I-Għadira s-Safra, is located at a considerable distance from the construction site. Therefore, significant impacts from wind-borne dust dispersal on these protected areas are not anticipated. This assertion is further supported by prevailing Northwesterly wind patterns, which would carry airborne particulates even further away from these designated sites.

Particulate matter may also settle on the ground and be transported away from the site through rainwater runoff into adjacent protected valley systems. While predicting the extent of this impact poses challenges, it is recognised that water-borne particles can degrade substrate quality, adversely affect low-lying species, and prohibit germination of primary colonising species. Such outcomes may facilitate the proliferation of opportunistic and non-native species that are atypical of the habitat, potentially leading to competition with indigenous species if not managed appropriately.

During the use of construction vehicles, the areas surrounding the proposed site may be subject to trampling by vehicles and other machinery related to the construction. This would increase the extent of the negative impacts on floral species and prohibit the regeneration of plant species and/or cause permanent damages to trees, particularly if the trampling occurs over longer periods throughout various seasons.

These impacts can be adequately mitigated by using site hoarding around the perimeter of the planned excavation area, employing the use of wheel-washing facilities and wetting down any exposed stockpiles. No additional land take-up should be used for the storage of materials and equipment or manoeuvring of construction vehicles.

5.1.7 Light impacts

Activities related to the construction phase will be strictly confined to daylight hours. Any emergency/safety-related night-time activities will be conducted with the minimum required lighting and implement appropriate mitigation measures such as the use of down-turned luminaries. Therefore, minimal to no impacts are expected to be inflicted on sensitive receptors in this regard, as night-time lighting will not be implemented during the construction phase.

5.1.8 Noise and vibration impacts

The construction phase will inevitably increase noise levels in the area particularly during the excavation phase. Excessive noise generation can be a deterrent for faunal species, particularly if carried out during periods which are generally quiet (ex. during the night). Long-term increased noise and vibration generation may cause certain species to leave the site's surrounding area temporarily or even permanently.

The dedicated study on noise impacts on ecosystems during the construction phase resulted in a 'minor' rating, which indicates insignificant noise impacts. For both impacts, the provisions of LEGAL NOTICE 340 OF 2022 - CONSTRUCTION MANAGEMENT SITE REGULATIONS, 2022 should be followed to minimise the impacts in this regard.

5.2 OPERATIONAL PHASE

The operational phase will cause three main impacts to the surrounding area: a) increased vehicular traffic and b) increasing lighting in the currently dark areas c) increase in emissions due to the inclusion of a stack for flue gas emissions. These impacts will persist throughout the duration of the project.

5.2.1 Increased run-off

The permanent loss of agricultural land to accommodate the proposed Scheme is expected to give rise to increased rainwater runoff towards the sea. Such runoff may carry particulate matter and other forms of anthropogenic debris in the area towards the sea. This could contribute to a deterioration of seawater quality, resulting in a minor adverse impact on the marine ecosystems. Increased runoff may also influence the ecological assemblages which lie in close proximity to the runoff routes, exposing them to increased flooding risks and changes in abiotic conditions. With time, this may alter the composition of the ecological assemblages in the area, leading to a minor adverse impact.

5.2.2 Increased vehicular traffic

Due to the expansion of the ECOHIVE facility, the proposal is expected to induce an increase in vehicular traffic flow to and from the site. This will inevitably increase the deposition of particulate matter and gases related to combustion onto the surrounding land. However, the envisaged frequencies will be comparable to the current traffic present in the wider ECOHIVE complex and do not constitute a substantial increase.

5.2.3 Lighting

The proposed development will introduce lighting in an area that is currently in darkness and likely frequented by nocturnal species, which may be deterred following the proposed development. Mitigation measures such as sensor-operated lights, down-turned light fixtures and other measures as indicated in the GUIDELINES FOR ECOLOGICALLY RESPONSIBLE LIGHTING³ should be implemented to the extent possible to minimise the potential light spillover into the adjacent agricultural areas.

5.2.4 Emissions

Risks associated with atmospheric emissions from various pollutants generated by waste incineration are anticipated. The impact on wildlife of incinerated waste is largely unclear due to the wide range of potential sources and types of receptors involved. Nonetheless, this assessment will operate under the assumption that the primary health effects observed in humans are also likely to affect animal populations.

³ Source: <https://birdlifemalta.org/wp-content/uploads/2020/07/Guidelines-for-Ecologically-Responsible-Lighting.pdf>

The emission of heavy metals, dioxins, polycyclic aromatic hydrocarbons, and other volatile organic compounds can lead to harmful effects on the lungs, kidneys, skin, urinary systems, gastrointestinal tracts, and may trigger allergic reactions when ingested in high quantities over extended periods. To safeguard human health from these adverse effects, the European Commission has developed the Best Available Technology (BAT) document for Waste Incineration in accordance with the Industrial Emissions Directive 2010/75/EU. Air quality models have been formulated in line with S.L.549.59 and the Ambient Air Quality Directive, which align more closely with WHO Air Quality guidelines to assess how the proposed stack heights and operational scenarios will lead to effective dispersion of atmospheric emissions that safeguard human health and the surrounding environment.

Due to the Best Available Technology being implemented within all aspects of this proposal, it is expected that particulate matter will be released in limited quantities within a limited radius around the stack location, while bulk deposition limits will be below daily deposition thresholds. This has been confirmed in the results obtained from the stack's Air Dispersion Model, which presents results in three modelled scenarios. The models are based on baseline data collected over six weeks within the AOI. The results demonstrate a 'not significant' adverse impact caused by minimal increases of air emissions caused by the operations of the TTF within the three scenarios.

A minor adverse impact is expected at one of the sensitive receptors identified within the study (R27, 0.43km from the site), caused by cumulative emissions arising from the operations of the TTF and the nearby Waste to Energy plant.

Therefore, no significant impacts from air dispersion are envisaged on the biodiversity in the immediate vicinity and the surrounding biodiversity. Likewise, the expected rate of deposition of pollutants into the marine area is negligible, and not expected to reach levels which impact marine flora, fauna and habitats.

5.2.5 Noise

The site operations will inevitably cause an increase in noise levels of the area, due to increased vehicular traffic to the proposed site and the site operations themselves. However, the dedicated noise study for operational impacts concluded no significant impacts resulting from noise on the surrounding ecosystems.

5.3 DECOMMISSIONING PHASE

The decommissioning phase was not assessed within this report.

6 MITIGATION MEASURES

The LEGAL NOTICE 340 OF 2022 - CONSTRUCTION MANAGEMENT SITE REGULATIONS, 2022 should be enforced to avoid the impacts from being generated in the first place and to ensure that environmental degradation is kept as low as possible. These regulations provide details on the containment and transportation measures for loose construction material on site and in transit, and other measures to prevent carrying out and/or depositing particulate matter.

Some of the proposed mitigation measures related to construction best practices are highlighted below:

- Chemical spillages from machinery should be avoided by storing wastes and chemicals in bunded areas within the construction site
- Negligence during construction activities can be mitigated through regular and effective environmental monitoring to ensure that the construction impacts are not spilling over into the adjacent habitats.
- Hoarding should be set up (in line with the L.N.340 OF 2022 - CONSTRUCTION MANAGEMENT SITE REGULATIONS, 2022) along the construction site to minimise dispersion of particulates. This should be covered with suitable mesh or material that precludes dispersion of particulate matter.
- Pre-soaking, dust suppressors and covered stockpiles are considered good practices to minimise dust emissions.
- Construction vehicles and machinery should be well-maintained and serviced such that they can be operated at the best of their environmental performance.

The proposed development is not situated within any terrestrial or marine Natura 2000 site, and it does not have any direct or indirect impacts on such sites. Therefore, no mitigation measures are being suggested within the boundaries of the neighbouring Natura 2000 sites. However, there are several ecologically significant areas within the Area of Interest (AOI) that require the implementation of best practice and mitigation measures to reduce some of the identified impacts. Additionally, mitigation measures are recommended to minimise impacts of spillover and indirect effects on protected species inhabiting the nearby protected areas which may frequent the site and its surroundings.

The following measures are related to the minimising of impacts on protected flora directly within the proposed scheme site and AOI:

- Heavy machinery should not trample on natural areas located outside of the scheme site boundary
- All construction debris and soil should not be stockpiled near the base of trees and/or natural areas, but should be hauled away for proper recovery or disposal in designated waste management areas
- Compensatory planting should **not** be carried out during the summer period

- The necessary environmental permits to carry out interventions on protected species are obtained from the ERA
- Uprooting of invasive alien species should follow the recommendations in the ERA Guidelines on Works Involving Trees (2019) on managing non-native plant invaders and restoring native plant communities in terrestrial settings in the Maltese islands
- Species to be considered for transplanting/replacement/compensatory planting include: *Olea europea*, *Ceratonia siliqua* and *Pistacia lentiscus*
- Should transplanting of trees be necessary, they should be pruned (not more than 25% of overall crown) to stimulate growth and reduce water loss. The trees should be watered for two consecutive days before removal, and the branches should be tied together during the transplantation phase.
- Before transplanting mature trees, the soil depth needs to be determined. For trees which are within soil less than 75cm deep, transplanting is not recommended as the majority of the root ball will be within the bedrock
- Root pruning is recommended to ensure the root ball is of equal size to the tree canopy
- For trees found within soil of adequate depth, an excavator or hand-held tools are necessary to dig a trench around the tree which is of equal depth to the tree height. Should the root ball be confirmed by the ecological monitor to be of smaller size, a shallower excavation would be acceptable as long as the root ball is not damaged. The excavator/manual tools should also dig a new pit which is around twice the original size of the root ball
- Transplanting of *Olea europea* and *Ceratonia siliqua* should take place between February and March, and the trees should be regularly monitored for growth. Follow-ups are required for at least 3 years after the specimen has been transplanted
- Transplanting should ideally be carried out in two phases: The first year (wet season) soil depth is determined and trees earmarked for transplanting are subjected to root pruning. In the second year, the same trees are relocated to the transplanting area
- Treatment and regular monitoring of emissions of gas flue from the proposed stack are required to minimise and monitor the deposition of pollutants onto the surrounding vegetation respectively

Mitigation measures related to protected fauna species present either directly within the scheme site or known to inhabit the surrounding areas are highlighted in the following text.

- Works should not be carried out during the night time due to the recorded presence of nocturnal species in the area
- Although rodent control is encouraged when setting up a construction site, care must be taken not to negatively influence any resident fauna in the immediate surroundings
- If lighting is required, downward facing luminaires should be installed within the facility to reduce light pollution during the operational phase

7 RESIDUAL IMPACTS

Residual impacts are those impacts which are bound to remain after taking into consideration the proposed mitigation measures. Despite the comprehensive adoption of the recommended mitigation measures, a number of unavoidable residual impacts are still expected to arise. These are expected to vary between negligible to moderate adverse as listed in Section 8 . These include:

- Permanent impacts on ecologically sensitive terrestrial ecosystems and assemblages falling directly within the footprint of the site.
- Temporary accumulation of dust, vibration and noise impacts within the immediate terrestrial ecosystems abutting the construction site boundary
- Increase in night-time light in previously dark agricultural areas in the surroundings, which may be frequented by protected species
- Increase in disturbance of previously undisturbed agricultural land by vehicle traffic, which may be frequented by protected species
- Increase in pollutant deposition on the surrounding vegetation through vehicular and stack emissions

8 SUMMARY OF IMPACTS TABLE

IMPACT TYPE AND SOURCE			IMPACT RECEPTOR		EFFECT AND SCALE							PROBABILITY OF IMPACT OCCURRING (INEVITABLE/ LIKELY/ UNLIKELY/ REMOTE/ UNCERTAIN)	OVERALL IMPACT SIGNIFICANCE	PROPOSED MITIGATION MEASURES	RESIDUAL IMPACT SIGNIFICANCE	OTHER REQUIREMENTS
IMPACT TYPE	SPECIFIC INTERVENTION LEADING TO IMPACT	PROJECT PHASE	RECEPTOR TYPE	SENSITIVITY & RESILIENCE TOWARDS IMPACT	DIRECT/ INDIRECT/ CUMULATIVE	BENEFICIAL/ ADVERSE	SEVERITY	PHYSICAL/ GEOGRAPHIC EXTENT OF IMPACT	SHORT/ MEDIUM/ LONG TERM	TEMPORARY/ PERMANENT	REVERSIBLE/ IRREVERSIBLE					
Loss of terrestrial habitats and species - Circa 85 tree individuals, 50 of which are protected)	Excavation, backfilling	Construction	Vegetation & Fauna	High	Direct	Adverse	High	Localised	Long-term	Permanent	Irreversible	Inevitable	Major	Transplanting trees where possible, or compensatory planting (location TBD). Monitoring construction activities to minimise avoidable impacts	Moderate - Permanent impacts on ecologically sensitive terrestrial ecosystems and assemblages falling directly within the footprint of the site.	N/A
Loss of soil and rubble walls	Excavation under separate permit	Construction	Vegetation & Fauna	High	Direct, Cumulative	Adverse	High	Localised	Long-term	Permanent	Irreversible	Inevitable	Major	Incorporating landscaping into the proposed scheme. Monitoring construction activities to prevent spill-over effects on adjacent agricultural land.	Moderate - Partial area reinstated through landscaping	
Loss of ecological characteristics	Excavation under separate permit	Construction	Vegetation & Fauna	High	Direct, Cumulative	Adverse	High	Localised	Long-term	Permanent	Irreversible	Inevitable	Moderate	Implementation of mitigation measures during construction phase to limit impacts to the site footprint.	Moderate - Impact will not be fully mitigated, however the ecological characteristics of the site	

IMPACT TYPE AND SOURCE			IMPACT RECEPTOR		EFFECT AND SCALE							PROBABILITY OF IMPACT OCCURRING (INEVITABLE/ LIKELY/ UNLIKELY/ REMOTE/ UNCERTAIN)	OVERALL IMPACT SIGNIFICANCE	PROPOSED MITIGATION MEASURES	RESIDUAL IMPACT SIGNIFICANCE	OTHER REQUIREMENTS
IMPACT TYPE	SPECIFIC INTERVENTION LEADING TO IMPACT	PROJECT PHASE	RECEPTOR TYPE	SENSITIVITY & RESILIENCE TOWARDS IMPACT	DIRECT/ INDIRECT/ CUMULATIVE	BENEFICIAL/ ADVERSE	SEVERITY	PHYSICAL/ GEOGRAPHIC EXTENT OF IMPACT	SHORT/ MEDIUM/ LONG TERM	TEMPORARY/ PERMANENT	REVERSIBLE/ IRREVERSIBLE					
														Monitoring construction works.	are not rare or unique to the site.	
Dust generation	Excavation, backfilling, building construction	Construction	Vegetation & Fauna	Moderate	Direct	Adverse	Moderate	Localised	Short-term	Temporary	Reversible	Likely	Minor	Dust suppression techniques, regular clearing of affected areas, construction monitoring	Negligible - Temporary accumulation of dust, vibration and noise impacts within the immediate terrestrial ecosystems abutting the construction site boundary	N/A
Rainwater runoff	Excavation, backfilling, building construction, increased urbanisation	Construction & Operation	Vegetation & Fauna	Moderate	Direct	Adverse	Moderate	Localised	Short-term	Temporary	Reversible	Unlikely	Minor	Wheelwashing facilities available at site entrance/exits, collection facilities of all liquid runoff from the site	None	
Impacts from construction vehicles	Excavation, backfilling, building construction	Construction	Vegetation & Fauna	Moderate	Direct	Adverse	Moderate	Localised	Short-term	Temporary	Reversible	Unlikely	Minor	Construction vehicles limited to the site footprint and adjacent existing roads	None	
Increased lighting	Excavation, backfilling, building construction	Construction	Fauna	High	Direct	Adverse	Moderate	Localised and near vicinity	Short-term	Temporary	Reversible	Unlikely	Minor	Works will be limited to daylight hours. Use of lighting for safety	None	N/A

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of Impact Occurring (Inevitable/Likely/Unlikely/Remote/Uncertain)	Overall Impact Significance	Proposed Mitigation Measures	Residual Impact Significance	Other Requirements
Impact Type	Specific Intervention Leading to Impact	Project Phase	Receptor Type	Sensitivity & Resilience Towards Impact	Direct/Indirect/Cumulative	Beneficial/Adverse	Severity	Physical/Geographic Extent of Impact	Short/Medium/Long Term	Temporary/Permanent	Reversible/Irreversible					
														reasons should be limited to downward facing, shielded and low-frequency lights.		
Increased Vibration & Noise generation	Excavation, backfilling, building construction	Construction	Fauna	High	Direct	Adverse	Moderate	Localised and near vicinity	Short-term	Temporary	Reversible	Likely	Minor	Equipment to be well maintained to avoid excessive noise.	Negligible - Temporary accumulation of dust, vibration and noise impacts within the immediate terrestrial ecosystems abutting the construction site boundary	N/A
Increased Light, Air Pollution & Noise generation	Operation of the TTF	Operations	Vegetation , Fauna, Coastal marine area	High	Direct	Adverse	Moderate	Local and near vicinity	Long-term	Permanent	Irreversible	Likely	Minor	Minimising noise spillover by using BAT and keeping apertures shut during operational hours. Ensure equipment is well-maintained and within national emission limits via regular monitoring. Limit night-time lighting to	Negligible - Minor increases in night-time light in previously dark agricultural areas in the surroundings, increase in vehicular activity generating noise, increase in pollutant	N/A

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of Impact Occurring (Inevitable/Likely/Unlikely/Remote/Uncertain)	Overall Impact Significance	Proposed Mitigation Measures	Residual Impact Significance	Other Requirements
Impact Type	Specific Intervention Leading to Impact	Project Phase	Receptor Type	Sensitivity & Resilience Towards Impact	Direct/Indirect/Cumulative	Beneficial/Adverse	Severity	Physical/Geographic Extent of Impact	Short/Medium/Long Term	Temporary/Permanent	Reversible/Irreversible					
														the bare minimum and use of down-facing lights.	deposition on the surrounding vegetation through vehicular and stack emissions	

9 CUMULATIVE IMPACTS

9.1 INTERACTIONS BETWEEN IMPACTS

There are no foreseen cumulative impacts expected to arise from summative, synergistic, antagonistic or vicious-cycle interactions between the identified impacts arising from the proposed development. The contractors for the construction and operational phases will be bound to adhere to stringent conditions to ensure that all local and EU regulations related to the minimising or eliminating environmental impacts are adhered to in both phases.

9.2 INTERACTIONS OR INTERFERENCE WITH NATURAL OR ANTHROPOGENIC PROCESSES

The proposed development contributes to the fragmentation of agricultural land within the general area, which is being taken up by a series of projects not solely related to waste management but also other government initiatives, such as the development of a second interconnector and ancillary facilities within the same area, and private businesses and other development categories. A cursory look at the Planning Authority map server reveals numerous development applications within the ECOHIVE complex itself, as described further on within this document, and also within the agricultural areas around the complex. Fragmentation of agricultural land limits natural ecological processes, particularly for species with wide foraging and general commuting ranges such as bats and birds. Limiting the agricultural land available to accommodate these species' ranges limits in turn their ability and opportunity to breed successfully, thus capping the population sizes of any resident populations through limited resources both of the available land itself and the services it provides - feeding, watering, roosting, breeding and safe commuting opportunities to name a few.

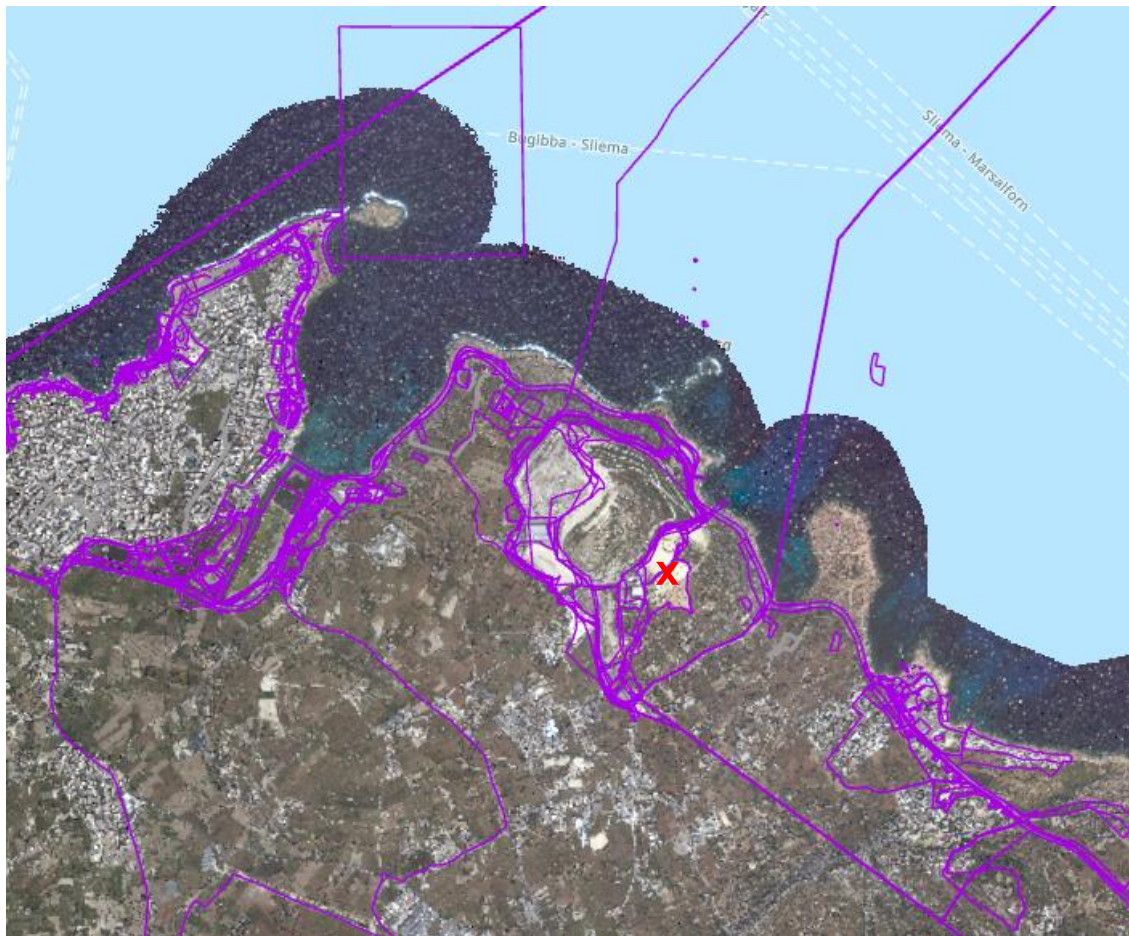


Figure 30: Planning Applications (PA) and Development Notification Orders (DNO) marked in purple, proposed development marked with red X

9.3 INTERACTIONS BETWEEN THE PROPOSED DEVELOPMENT AND PRIOR OR PLANNED DEVELOPMENTS

The proposed development will result in the permanent take-up of 18,185 sq.m of agricultural land. The proposed footprint is the minimum required size to fit all components of the thermal treatment processes and ancillary facilities such as material delivery and vehicle manoeuvring. This impact is to be considered in the context of several other developments recently enacted or foreseen within the ECOHIVE complex by the Long-Term Waste Management Strategy (2021-2030), namely:

- Material Recovery Facility (WMRO_I1)
- Organic Processing Plant (WMRO_I2)
- Waste to Energy Plant (WMRO_I6)

Siting of these developments within the same facility allows for improved synergies between the different waste treatment processes, and improved logistics. Where feasible from an operational aspect, shared needs of ancillary facilities such as water

and energy supplies, wastewater collection and treatment, and vehicular access were catered for through communal systems.

The cumulative impact enacted by multiple consecutive developments within the same area is considered. The onset of continuous construction activities within a previously dark, quiet area of agricultural land indubitably negatively impacted and continues to deter mobile species such as reptiles, birds and bats, which likely will move away from the area and resort to the use of the remaining parcels of agricultural for their roosting, feeding and breeding activities. While agricultural land is not considered to be a protected habitat, it is well-documented that these species make frequent use of this land (refer to Section 4.2.5), particularly where agricultural parcels contain mature trees of various native species, as was the case in the proposed site and the surrounding developments within the ECOHIVE. The cumulative impact of consecutive developments within an area is the subsequent displacement of these species. This impact can be partially mitigated by streamlining the various developments within the complex and avoid sensitive periods particularly for bat and bird species, where feasible.

The displacement of these species into neighbouring agricultural parcels, which over time are made sparser by pockets of development, will inevitably lead to an increased incidence of mortalities through vehicle collisions with protected species, as these will be forced to use increasingly urbanised areas bordered by roads. While this impact is difficult to quantify, road kill and injury reports are undoubtedly on the rise.

9.4 WIDER CUMULATIVE IMPACTS

1. Impacts of the development in itself

The proposed project design and footprint is a result of multiple re-design cycles following the initial layout with the aim to achieve net zero excavation, and the smallest feasible footprint which would allow for efficient operation of the site activities. Construction and Demolition Waste amounts to approximately 80% of Malta's annual waste generation, and is a significant pressure identified in the Long-Term Waste Management Plan (2021-2030). The chosen site's varying elevation was utilised to achieve this aim, as it allowed for backfilling and re-levelling on site, absorbing the generated excavation waste and eliminating the need for transport and disposal of the same. The siting of the development in close vicinity to other waste management facilities within the ECOHIVE will further streamline operations and minimise land allocation for ancillary facilities, as these can be shared.

2. Impacts on national waste management and waste recovery

The development of a state-of-the-art Thermal Treatment Facility enables a higher percentage of local processing of materials which require incineration. This facility increases the proportion of wastes treated close to source, in line with EU circular economy principles. As a result, the carbon footprint of waste treatment in relation to hazardous wastes is reduced, as travel requirements are limited to local

transportation. Additionally, any waste streams deemed to be unsuitable for incineration will be intercepted at the reception area and redirected to any of the nearby waste treatment plants as applicable, ensuring a higher overall waste recovery. The development of the new facility also allows for the scale-up of operations to respond to increased local demand over time.

3. Relocation of pressures

The operations of the existing Thermal Treatment Facility are currently located within the dense urban-industrial area of Marsa, within close proximity of office and residential buildings. The existing facility site has limited scope for expansion of the facilities to cater for the projected increase in demand, and upgrading of facilities to achieve industry excellence, due to the site restrictions. Relocation of the TTF away from the site in Marsa reduces pollution pressures within a known traffic hotspot. The ECOHIVE facility design allows for an improved traffic flow of all vehicles related to waste-management in an area which is relatively detached from residential development, thus displacing these impacts away from sensitive receptors.

10 CUMULATIVE IMPACTS SUMMARY TABLE

IMPACT TYPE AND SOURCE			IMPACT RECEPTOR		EFFECT AND SCALE							PROBABILITY OF IMPACT OCCURRING (INEVITABLE/ LIKELY/ UNLIKELY/ REMOTE/ UNCERTAIN)	OVERALL IMPACT SIGNIFICANCE	PROPOSED MITIGATION MEASURES	RESIDUAL IMPACT SIGNIFICANCE	OTHER REQUIREMENTS
IMPACT TYPE	SPECIFIC INTERVENTION LEADING TO IMPACT	PROJECT PHASE	RECEPTOR TYPE	SENSITIVITY & RESILIENCE TOWARDS IMPACT	DIRECT/ INDIRECT/ CUMULATIVE	BENEFICIAL/ ADVERSE	SEVERITY	PHYSICAL/ GEOGRAPHIC EXTENT OF IMPACT	SHORT/ MEDIUM/ LONG TERM	TEMPORARY/ PERMANENT	REVERSIBLE/ IRREVERSIBLE					
Fragmentation of agricultural land	Construction of new facility within agricultural land	Construction	Flora & Fauna	High Sensitivity, Low Resilience	Direct	Adverse	Moderate	Site and General Vicinity	Long-term	Permanent	Irreversible	Inevitable	Moderate	N/A	Moderate	N/A
Loss of agricultural land	Construction of new facility within agricultural land	Construction	Flora & Fauna	High Sensitivity, Low Resilience	Direct	Adverse	Moderate	Site	Long-term	Permanent	Irreversible	Inevitable	Moderate	Minimise spillover effects from temporary storage and site activities into adjacent land	Moderate	N/A
Continuous disturbance within dark / quiet agricultural areas	Noise-generating construction activities	Construction	Fauna	High Sensitivity, Moderate Resilience	Direct	Adverse	High	Site and General Vicinity	Cumulatively long-term, Short-term for site	Temporary	Reversible	Inevitable	Moderate	Streamlining of construction activities between sites, avoiding sensitive periods for bird and bat species	Minor	N/A
Deviation of C&D Waste from Landfill	Excavation and Backfilling	Construction	National Waste Management	High sensitivity, Low Resilience	Direct	Beneficial	N/A	National	Long-term	Permanent	Irreversible	Inevitable	Low	Mitigation is inherent of project design	Low	N/A
Expanded capacity	Increased national	Operations	National Waste	High Sensitivity	Direct	Beneficial	N/A	National	Long-term	Permanent	Irreversible	Inevitable	Moderate	N/A	Moderate	N/A

Impact Type and Source			Impact Receptor		Effect and Scale							Probability of Impact Occurring (Inevitable/Likely/Unlikely/Remote/Uncertain)	Overall Impact Significance	Proposed Mitigation Measures	Residual Impact Significance	Other Requirements
Impact Type	Specific Intervention Leading to Impact	Project Phase	Receptor Type	Sensitivity & Resilience Towards Impact	Direct/Indirect/Cumulative	Beneficial/Adverse	Severity	Physical/Geographic Extent of Impact	Short/Medium/Long Term	Temporary/Permanent	Reversible/Irreversible					
for treatment of hazardous wastes	capacity for waste treatment		Management	, Low Resilience												
Relocation of air pollution pressure from the vicinity of residential and office areas	Re-development of existing site at the ECOHIVE	Construction and Operations	Office and Residential Buildings	High sensitivity, Moderate resilience	Direct	Beneficial	N/A	Sites and surrounding areas	Long-term	Permanent	Irreversible	Inevitable	Moderate	Mitigation is inherent of project design	Moderate	

11 MONITORING PROGRAMME

Should the Scheme be permitted to be developed, a monitoring programme should be set up and implemented during the construction phases of development. The construction management plan prepared at project planning phase will be updated by the chosen contractor in order to ascertain that the best practicable environmental options available are followed through.

During the construction phase, periodic monitoring is being recommended to ensure that mitigation measures are in place and working as they should. This would ensure that no unwarranted impacts arise due to deviations from proposed working practices. Such deviations could have additional impacts over and above those originally predicted. All monitoring data should be presented to the relevant authorities at pre-agreed frequencies.

A tree specialist is recommended to oversee/enact interventions directly related to the pruning or relocation of the native tree species. All interventions related to native trees are subject to permits provided by the Environment and Resources Authority.

During the site operations, monitoring of the stack emissions will be required periodically to ensure that national emissions limits are respected and no significant adverse impacts occur in the surrounding vegetated areas.

APPENDIX I

TERMS OF REFERENCE

3.0 A DESCRIPTION OF THE SITE AND ITS SURROUNDINGS (I.E. ENVIRONMENTAL BASELINE)

The existing environmental features, characteristics and conditions, in and around the proposed development site as well as in all locations likely to be affected by the development or by ancillary interventions and operations, are to be identified and described in sufficient detail, with particular attention to the aspects elaborated further in the next sections.

The consultants should also identify (and justify) wherever relevant:

- 1. The geographic area (e.g. viewshed or other area of influence) that needs to be covered by each study;*
- 2. The relevant sensitive receptors vis-à-vis the environmental parameter under consideration (e.g. residential communities, other users, natural ecosystems, specific populations of particular species, or individual physical features);*
- 3. The location of the reference points or stations (e.g. viewpoints, monitoring stations, or sampling points (including depth of multiple sampling points at a single sampling point in the case of water media and sediment, where applicable) to be used in the study; and*
- 4. Other methodological parameters of relevance, also noting that the assessment will normally require both desk-top studies and on-site investigations (including visual observations and sampling, as relevant).*

Note: It is recommended that these details are discussed in advance with the ERA prior to commencement of the relevant parts of the studies, in order to pre-empt (as much as possible) later-stage issues.

Wherever relevant to the environmental aspects under discussion, reference to legislation, policies, plans (including programmes and strategies) standards and targets, should also be made, such that the compatibility (or otherwise) of the proposal therewith is also factored into the assessment required by Section 4 below.

The discussion should cover the following aspects, in the appropriate level of detail:

- Supra-national (e.g. European Union; United Nations; or other international or regional) legislation, directives, policies, conventions, protocols, treaties, charters, plans and obligations;*
- National legislation, policies and plans (e.g. Structure Plan; National Environment Policy); and*
- Sub-national legislation, policies and plans (e.g. local plans, site-specific regulations, action plans, management plans, and protective designations such as scheduling or Natura 2000).*

Note: In addition to already in-force legislation, policies and plans, the discussion should also cover any foreseeable future updates (or new legislation, policies and plans) likely to be fulfilled, affected or compromised by the proposed project.

Furthermore, it should be noted that some cross-cutting legal/policy instruments (e.g. Water Framework Directive and Marine Strategy Framework Directive) may need to be factored into more than one aspect of the discussion.

3.4 Ecology (including terrestrial ecology, avifauna and marine ecology)

The assessment should include:

1. *A full bathymetric survey of the existing environment on and around the area likely to be affected, include:*
 - a. *Offshore bathymetric maps;*
 - b. *Aerial imagery of the area;*
 - c. *Details and maps of any services / utilities; and*
 - d. *Description of the sea-bed morphology and of the sediment characteristics of the site.*
2. *An investigation of the ecology of the site and its surroundings (including, as relevant: flora, fauna, avifauna, fish and other aquatic organisms, benthic, burrowing and pelagic organisms, and their habitats and ecosystems), duly covering the relevant seasons (e.g. wet and dry seasons, in the case of terrestrial ecology) to ensure adequate coverage of all relevant species and ecosystem components;*
3. *A reporting of the conservation status and ecological condition of the area and the state of health of its habitats, species and ecological features;*
4. *A reporting of all protected, endangered, rare, unique, endemic, high-quality, keystone, invasive/deleterious, or otherwise important species, habitats, ecological assemblages, and ecological conditions found in the area under study;*
5. *A prediction of the potential impacts of the proposed project on the ecology of the site and its surroundings, including loss, damage or alteration of habitats and species populations (including potential increases in ambient noise levels in the marine environment) including alteration in the habitats and species' condition/state of health as measured through indicators used/specified for assessment of status in relevant EU policy;*
6. *Identification of all relevant species and assemblages (e.g. protected species or habitats, key species relevant to habitat characterisation, and monitoring indicators), and assess their abundance and distribution & patterns as well as the species' ecological niches. The findings should be supported by adequate maps and photographs. Classification of habitat types and species should be conducted in accordance with recognised classification systems (e.g. EUNIS and Palaeartic), to ERA satisfaction;*
7. *A noise and vibration study providing sufficient detailed information on any impacts on sensitive receptors (fauna and avifauna, natural ecosystems) due to increase in pressure in the area, and the cumulation with other existing sources including maritime vessel traffic and with other predicted sources such as new developments;*
8. *The nature of the changes (whether temporary or permanent) and effects of such changes on the ecological features; and*
9. *Other relevant environmental features.*

In particular, the study should identify all relevant species and assemblages (e.g. protected species or habitats, key species relevant to habitat characterisation, and monitoring indicators), and assess their abundance and distribution patterns as well as the species' ecological niches. The findings should be supported by adequate maps and photographs. Classification of habitat types and species should be conducted in accordance with recognised classification systems (e.g. EUNIS and Palaeartic), to ERA's satisfaction.

Note 1: Separate Terms of Reference are being referred by ERA for the Appropriate Assessment required in terms of the Flora, Fauna and Natural Habitats Protection Regulations (S.L. 549.44).

Note 2: Where the area of influence encompasses both marine and terrestrial environments, one or more of the sections indicated in these specimen TORs may need to be restructured accordingly to reflect the specific circumstances (e.g. separate reports for marine and terrestrial ecology).

4.0 ASSESSMENT OF ENVIRONMENTAL IMPACTS AND ENVIRONMENTAL RISKS

All likely significant effects and risks posed by the proposed project on the environment during all relevant phases (including construction/excavation/demolition, operation and decommissioning) should be assessed in detail, taking into account the information emerging from Sections 1, 2 and 3 above. Apart from considering the project on its own merits (i.e. if taken in isolation), the assessment should also take into account the wider surrounding context and should consider the limitations and effects that the surrounding environmental constraints, features and dynamics may exert on the proposed development, thereby identifying any incompatibilities, conflicts, interferences or other relevant implications that may arise if the project is implemented.

In this regard, the assessment should address the following aspects, as applicable for any category of effects or for the overall evaluation of environmental impact, addressing the worst-case scenario wherever relevant:

- 1. An exhaustive identification and description of the envisaged impacts;*
- 2. The magnitude, severity and significance of the impacts;*
- 3. The geographical extent/range and physical distribution of the impacts, in relation to: site coverage; the features located in the site surroundings; whether the impacts are short-, medium- or long-range; and any transboundary impacts (i.e. impacts affecting other countries);*
- 4. The timing and duration of the impacts (whether the impact is temporary or permanent; short-, medium- or long-term; and reasonable quantification of timeframes);*
- 5. Whether the impacts are reversible or irreversible (including the degree of reversibility in practice and a clear identification of any conditions, assumptions and pre-requisites for reversibility);*

6. A comprehensive coverage of direct, indirect, secondary and cumulative impacts, including:

- interactions (e.g. summative, synergistic, antagonistic, and vicious-cycle effects) between impacts;*
- interactions or interference with natural or anthropogenic processes and dynamics;*
- cumulation of the project and its effects with other past, present or reasonably foreseeable developments, activities and land uses and with other relevant baseline situations; and*
- wider impacts and environmental implications arising from consequent demands, implications and commitments associated with the project (including: displacement of existing uses; new or increased pressures on the environment in the surroundings of the project, including pressures which may be exacerbated by the proposal but of which effects may go beyond the area of influence; and impacts of any additional interventions likely to be triggered or necessitated by situations created, induced or exacerbated by the project);*

7. Whether the impacts are adverse, neutral or beneficial;

8. The sensitivity and resilience of resources, environmental features and receptors vis-à-vis the impacts;

9. Implications and conflicts vis-à-vis environmentally-relevant plans, policies and regulations;

10. The probability of the impacts occurring; and

11. The techniques, methods, calculations and assumptions used in the analyses and predictions, and the confidence level/limits and uncertainties vis-à-vis impact prediction.

The impacts that need to be addressed are detailed further in the sub-sections below.

5.0 REQUIRED MEASURES, IDENTIFICATION OF RESIDUAL IMPACTS, AND MONITORING PROGRAMMES

5.1 Mitigation Measures

A clear identification and explanation of the measures envisaged to prevent, eliminate, reduce or offset (as relevant) the identified significant adverse effects of the project during all relevant phases including construction, operation and decommissioning [see Section 1.2.3 above].

As a general rule, mitigation measures for construction-phase impacts should be packaged as a holistic Construction Management Plan (CMP). Whilst the detailed workings of the CMP may need to be devised at a later stage (e.g. after the final design of the project has been approved and/or after a contractor has been appointed), the key parameters that the CMP must adhere to for proper mitigation need to be identified in the EIA. Broadly similar considerations also apply vis-à-vis operational-phase impacts [which may need to be mitigated through an operational permit] and decommissioning-phase impacts [see Section 5.4 below], where relevant.

Mitigation measures for accident/risk scenarios should be packaged as a holistic plan that includes the integration of failsafe systems into the project design as well as well-defined contingency measures.

The recommended measures should be feasible, realistically implementable to the required standards and in a timely manner, effective and reliable, and reasonably exhaustive. They should not be dependent on factors that are beyond the developer's and ERA's control or which would be difficult to monitor, implement or enforce. The actual scope for, and feasibility of, effective prevention or mitigation should also be clearly indicated, also identifying all potentially important pre-requisites, conditionalities and side-effects.

5.2 Residual Impacts

Any residual impacts [i.e. impacts that cannot be effectively mitigated, or can only be partly mitigated, or which are expected to remain or recur again following exhaustive implementation of mitigation measures] should also be clearly identified.

5.3 Additional Measures

Compensatory measures (i.e. measures intended to offset, in whole or in part, the residual impacts) should also be identified, as reasonably relevant. Such measures should be not considered as an acceptable substitute to impact avoidance or mitigation.

If the assessment also identifies beneficial impacts on the environment, measures to maximise the environmental benefit should also be identified.

In both instances, the same practical considerations as indicated vis-à-vis mitigation measures should also apply.

5.5 Monitoring Programme

A realistic and enforceable programme for effective monitoring of those works envisaged to have an adverse or uncertain impact. The monitoring programme should include:

- 1. Details regarding type and frequency of monitoring and reporting, including spot checks;*
- 2. The parameters that will be monitored, their units of measurement, the monitoring indicators to be used; and standard analytical methods in line with relevant EU policy;*
- 3. An effective indication of the required action to address any exceedances, risks, mitigation failures or non-compliances for each monitoring parameter;*
- 4. An evaluation of forecasts, predictions and measures identified in the EIA; and*
- 5. An indication of the nature and extent of any additional investigations (including EIAs or ad hoc detailed investigations, if relevant) that may be required in the event of any contingencies, unanticipated impacts, or impacts of larger magnitude or extent than predicted.*

The programme should address all relevant stages, as follows:

- (a) Where relevant, monitoring of preliminary on-site investigations that may entail significant disturbance or damage to site features (e.g. archaeological excavations, geological sampling, or any works that require prior site clearance or any significant destructive sampling); [Note: Official written consent from the competent authorities (e.g. Superintendence of Cultural Heritage) may also be required for such interventions.]*
- (b) Monitoring of the construction phase, including the situation before initiation of works (including site clearance), during appropriate stages of progress, and after completion of works;*
- (c) Monitoring of the operational phase, except where otherwise directed by ERA (e.g. where monitoring would be more appropriately integrated into an operating permit); and*
- (d) Where relevant, monitoring of the decommissioning phase, including the situation before initiation of works, during appropriate stages of progress, and after completion of works.*

5.6 Identification of required authorisations

The assessment should also identify all environmentally-relevant permits, licences, clearances and authorisations (other than the development permit to which this EIA is ancillary) which must be obtained by the applicant in order to effectively implement the project if development permission is granted. Any uncertainty, as to whether any of these pre-requisites is applicable to the project, should be clearly stated.

Note on Sections 5.1 to 5.6 above:

The expected effects, the proposed measures, the residual impacts, the proposed monitoring etc. should also be summarised in a user-friendly itemised table that enables the reader to easily relate the various aspects to each other. An indicative specimen table is attached in Appendix 3 – attached to Method Statement as Appendix 1.

APPENDIX 2

LARGE-SCALE FIGURE

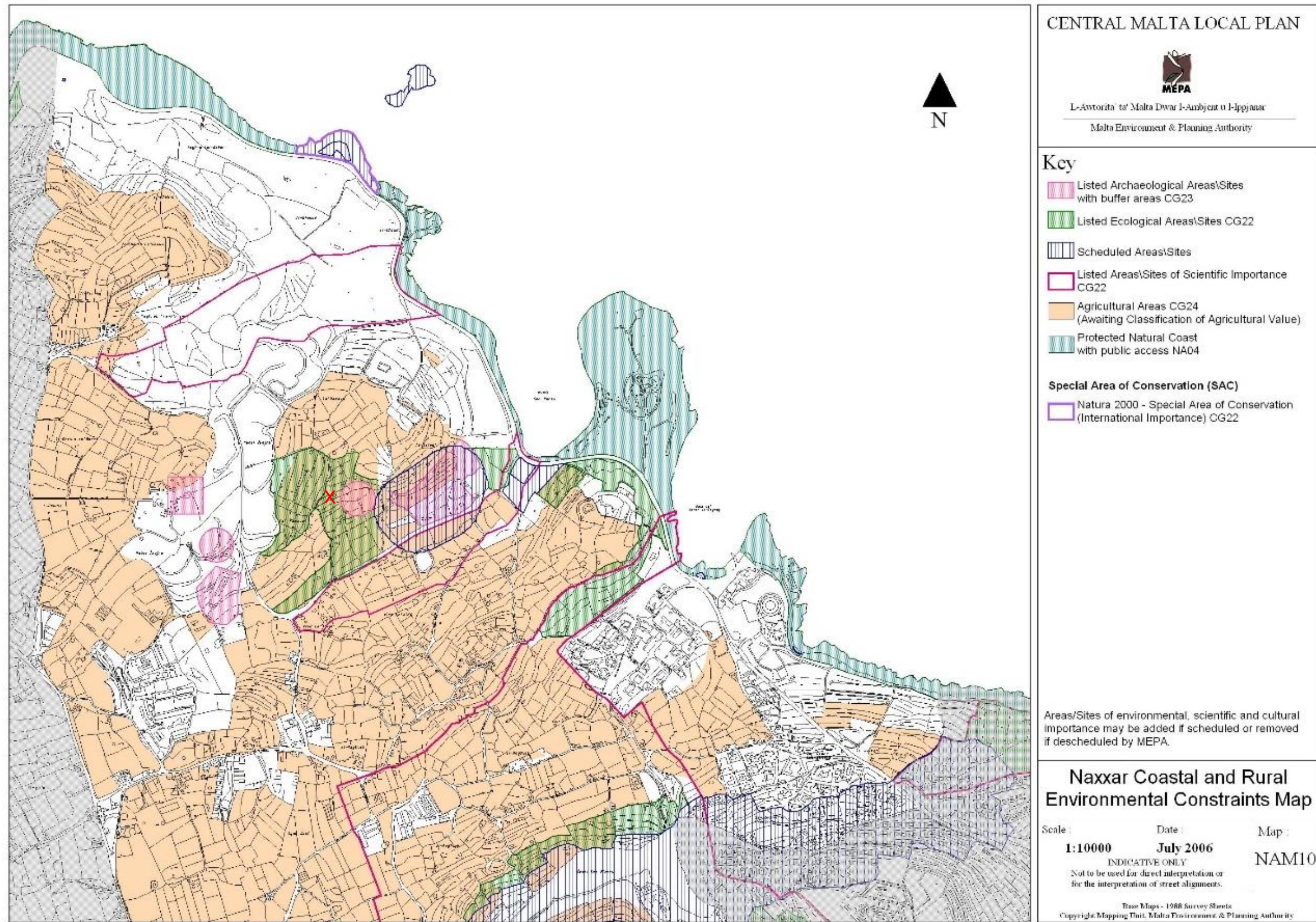


FIGURE 31: LARGE-SCALE NAXXAR COASTAL AND RURAL ENVIRONMENTAL CONSTRAINTS MAP (CENTRAL MALTA LOCAL PLAN, 2006)

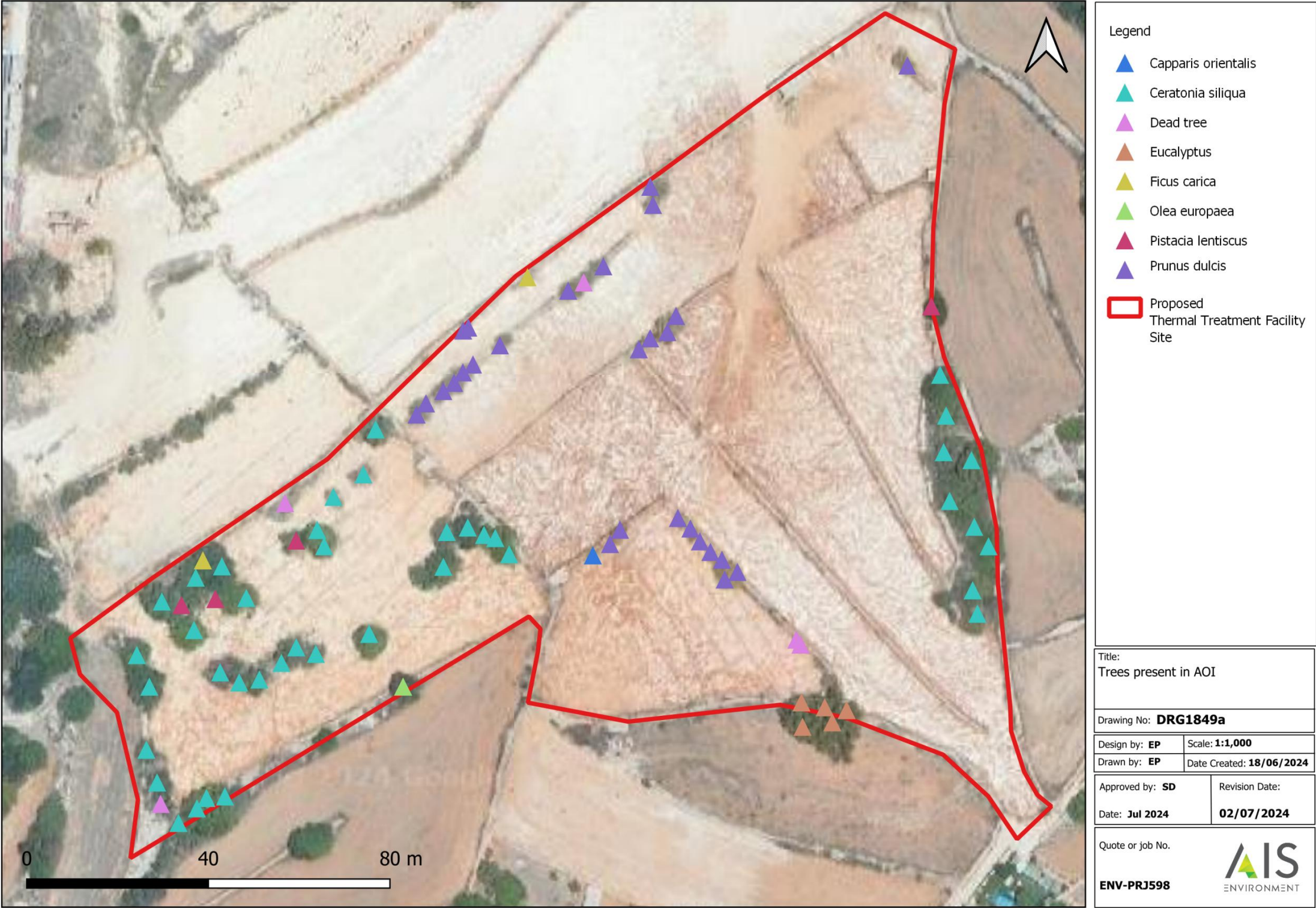


FIGURE 32: LARGE-SCALE TREES WITHIN PROPOSED SITE

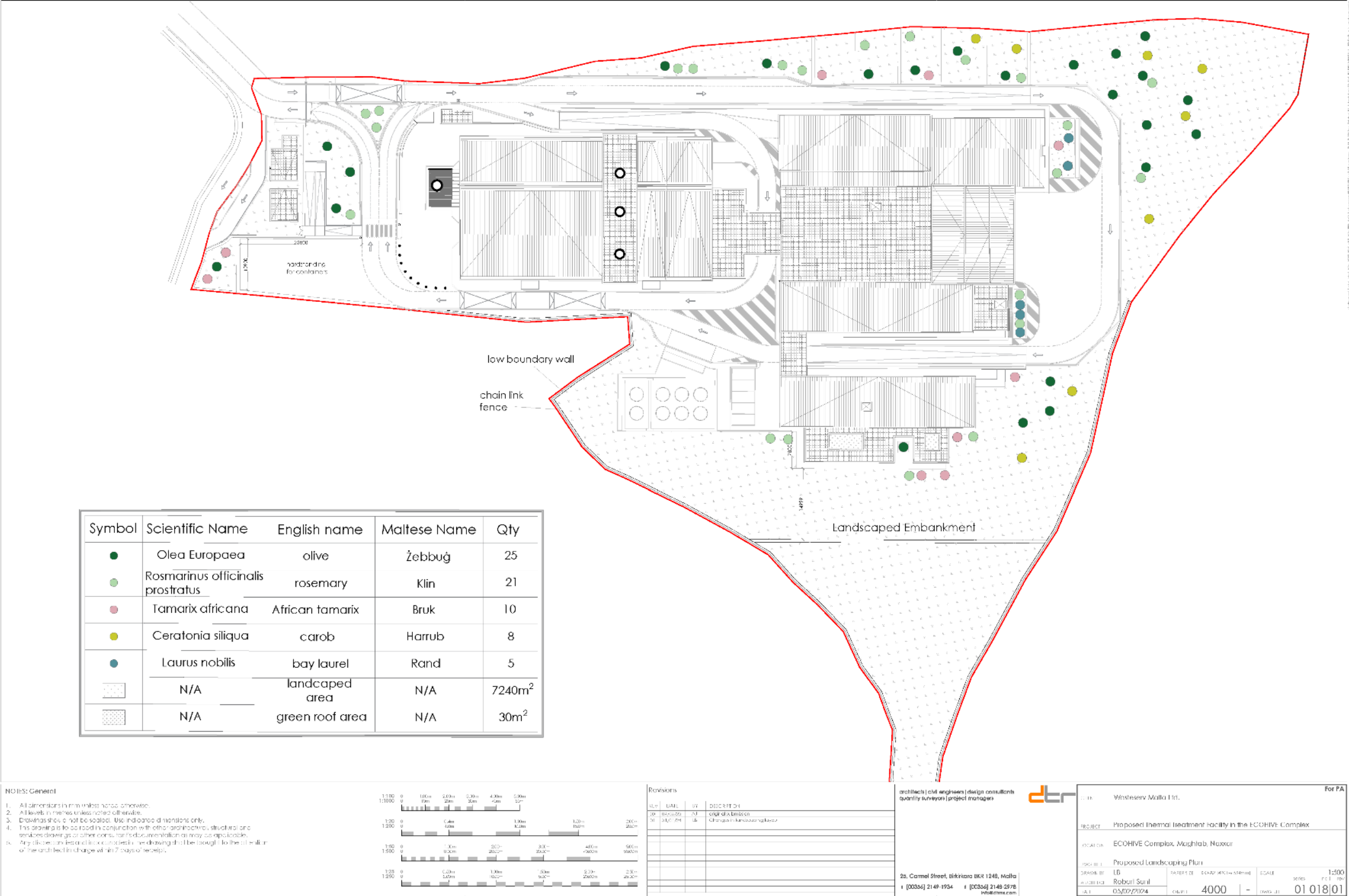


FIGURE 33: LARGE-SCALE PROPOSED LANDSCAPING PLAN

APPENDIX 3

TERRESTRIAL ECOLOGY BASELINE STUDY - DOUBLET AND ZAMMIT (2022)



Terrestrial Ecology Baseline Study and Impact Assessment in relation to the removal of soil in areas within the ECOHIVE Complex, limits of Naxxar, Malta

Joe Doublet, Mark Zammit

Version 1

20 October 2022

Project Title:

Terrestrial Ecology Baseline Study and Impact Assessment in relation to the removal of soil in areas within the ECOHIVE Complex, limits of Naxxar, Malta

Project Reference:

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Client/ Applicant:

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Contributors:

Joe Doublet - Birds

Mark Zammit - Terrestrial ecology (excluding birds)

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Terrestrial Ecology Baseline Study and Impact Assessment

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Contents

Contents.....	ii
List of Figures	iii
List of Tables	v
1. Introduction	1
2. Scheme Description	2
3. Site description	4
3.1. Location of scheme site	4
3.2. General land uses of the scheme site and surroundings	6
4. Methodology.....	9
4.1. Area of Study.....	9
4.2. Literature review.....	9
4.3. Field surveys and Assessment of data	10
4.3.1. Habitats, plant communities and flora	10
4.3.2. Specific flora surveys.....	11
4.3.3. Fauna.....	11
4.3.3.1. Vertebrates (excluding bats) and invertebrates	11
4.3.3.2. Bats.....	12
4.3.3.3. Birds	12
4.4. Evaluation of the legal protection and conservation status of the ecological resources.....	14
5. Ecological assessment.....	15
5.1. Habitats and vegetation.....	15
5.2. Summary of habitats.....	18
5.3. Fauna.....	34
5.3.1. Invertebrates.....	34
5.3.2. Vertebrates	34
5.3.2.1. Herpetofauna	34
5.3.2.2. Mammals	35
5.3.2.3. Avifauna	41
6. Ecological value and Level of Protection	52
7. References	75
Annex I: List of all vascular plant species recorded during the field surveys.....	77
Annex II: Past aerial/ satellite imagery of the scheme site.....	82

List of Figures

Figure 1: Aerial photo showing areas (Areas A-D) where works are planned in relation to the existing Anaerobic Digestion Plant and the Waste to Energy development area (aerial image from Google Earth, 2022).....	3
Figure 2: General geographical location of the scheme site within the Maltese Islands (indicated with red point) (aerial image from Google Earth, 2022)	4
Figure 3: Geographical location of the scheme site (indicated with coloured outlines) in context with its surrounding landscape (aerial image from Google Earth, 2022)	5
Figure 4: Detailed location and extent of the scheme site (indicated with coloured outlines) (aerial image from Google Earth, 2022).....	5
Figure 5: Geological map showing the scheme site (indicated with red outline) (Map extracted from the geological map published by the Oil Exploration Directorate, 1993). Legend: Ox – LCL Xlendi Member, Oa – LCL Attard Member, Mlg – Lower Globigerina Limestone	6
Figure 6: AoS for terrestrial ecology	9
Figure 7: Habitats map of the AoS	20
Figure 8: Habitats map of the AoS	21
Figure 9: Habitats map of the AoS	22
Figure 10: Trees map of the AoS.....	23
Figure 11: Trees map of the AoS.....	24
Figure 12: Trees map of the AoS.....	25
Figure 13: Fields cultivated with cereal fodder crops within scheme site.....	26
Figure 14: Fields cultivated with vegetable crops within scheme site	26
Figure 15: Traditional rubble wall within scheme site.....	27
Figure 16: Exotic trees within scheme site	27
Figure 17: Carob thicket outside scheme site.....	28
Figure 18: Unidentified, possibly protected species of <i>Iris</i> sp. (<i>Iris</i>) outside the scheme site.....	28
Figure 19: Ruderal plant communities outside scheme site.....	29
Figure 20: Ermes and steppe community dominated by herbaceous plants outside scheme site	29
Figure 21: Labiate garrigue/ phrygana with Mediterranean thyme	30
Figure 22: Lentisk scrub invaded with <i>Agave</i> spp.....	30
Figure 23: Aerohaline communities along the rocky shore with endemic sea lavenders	31
Figure 24: <i>Elymus pycnanthus</i> (Sea couch), an endangered grass growing naturally on the rocky shore	31
Figure 25: Slopes of former landfill subjected to ecological reclamation through afforestation	32
Figure 26: Artificial pond with wetland vegetation	32
Figure 27: Area with exposed bedrock to be developed into a Waste-to-Energy Facility	33
Figure 28: Landscaped areas of the Anaerobic Digestion Plant	33
Figure 29: <i>Papilio machaon melitensis</i> (Maltese swallowtail) observed within the scheme site.....	36
Figure 30: <i>Lampyrus pallida</i> (Maltese glow worm) larva observed within the scheme site	36
Figure 31: <i>Orthetrum trinacria</i> (Long skimmer) observed within the AoS	37
Figure 32: <i>Tarentola mauritica</i> (Moorish gecko) observed within the scheme site.....	37
Figure 33: <i>Hierophis viridiflavus carbonarius</i> (Black whip snake) observed within the scheme site ...	38
Figure 34: <i>Telescopus fallax</i> (Cat snake) observed within the AoS.....	38
Figure 35: <i>Chamaeleo chamaeleon</i> (Mediterranean chameleon) observed within the AoS	39
Figure 36: <i>Atelerix algirus</i> (Algerian hedgehog) observed within the AoS	39

Figure 37: Bat echolocation sonogram with characteristics typical of <i>Pipistrellus pipistrellus</i> (Common pipistrelle) – File reference 20220520041120	40
Figure 38: Bat echolocation sonogram with characteristics typical of <i>Pipistrellus kuhli</i> (Kuhl's pipistrelle) – File reference 20220518203842	40
Figure 39: Bat echolocation sonogram with characteristics typical of <i>Hypsugo savii</i> (Savi's pipistrelle) – File reference 20220523202404	41
Figure 40: Bat echolocation sonogram with characteristics typical of <i>Plecotus gaisleri</i> (Gaisler's long-eared bat) – File reference 20220520222402	41
Figure 41: Żona fil-Baħar Madwar Ġhawdex Special Protection Area.....	42
Figure 42: Marine SPAs around the Maltese Islands (source BLM, 2015)	43
Figure 43: L-Ġħadira s-Safra u l-Iskoll tal-Ġħallis Special Area of Conservation	44
Figure 44: Is-Salini Special Area of Conservation.....	45
Figure 45: IUCN Red List Categories at a regional scale.....	47
Figure 46: Naxxar Coastal and Rural Environmental Constraints Map (MEPA, 2006).....	52
Figure 47: Aerial photograph of the scheme site dated 1967 provided for reference purposes to show the presence of trees of over 50 years of age (Source: Planning Authority)	83
Figure 48: Satellite image of the scheme site dated 2012 provided for reference purposes to show the presence of trees of over 10 years of age (Source: PA Map Server, accessed in October 2022)...	84

List of Tables

Table 1: Bat call parameters used in the determination of bat species	12
Table 2: Details of avian data collected from the area of Tas-Safra during 2020-2022	13
Table 3: Habitat types present at the AoS in accordance with established habitat classification systems	18
Table 4: Percentage of European species in each category in BiE1 (1994), BiE2 (2004) and BiE3 (2017)	46
Table 5: Titles of relevant regulations	54
Table 6: Definitions of relevant schedules in SL 549.44	54
Table 7: Definitions of relevant schedules in SL 549.123	54
Table 8: Definitions of relevant terms and symbols in RDB status.....	54
Table 9: Conservation status of relevant habitats listed in Schedule I of SL 549.44 present in the AoS (The sign '*' indicates priority habitat types).....	56
Table 10: Legal and conservation status of relevant plant species recorded during the field surveys	57
Table 11: Legal and conservation status of relevant plant species recorded in the area of study, which were not recorded in the present study but reported in previous studies (Zammit et al., 2021)	59
Table 12: Legal and conservation status of relevant invertebrate fauna species recorded during the field surveys	59
Table 13: Legal and conservation status of relevant vertebrate fauna species (excluding birds) recorded during the field surveys	60
Table 14: Conservation status of species listed in Schedule V of SL 549.44 recorded during the field surveys	61
Table 15: Trees recorded within the scheme site and determination of their age	63
Table 16: List of all birds recording from area and reviewed together with their local and conservation status (SPEC, European Threat Status and Birds Directive Annex I species)	65
Table 17: List of all vascular plant species recorded during the field surveys.....	78

1. Introduction

This report has been commissioned by WasteServ Malta Ltd (WSM) (hereinafter referred to as the 'Applicant') and represents a terrestrial ecology baseline study and impact assessment (EclA) in relation to the removal of soil in areas within the ECOHIVE Complex, limits of Naxxar, Malta (hereinafter referred to as the 'Scheme').

The Terms of Reference (ToRs) for this EclA were issued by the Environment and Resources Authority (ERA) in July 2022.

The scope of the EclA is to determine whether the scheme or any part thereof will have any impacts on protected sites and any relevant ecosystems, habitats and species. This document therefore describes the full details of the scheme together with an assessment of all relevant ecological receptors in the area under consideration, the potential impacts presented by the scheme and possible mitigation measures, residual impacts, compensatory measures and alternative solutions, in order to satisfy the requirements of the ToRs.

2. Scheme Description

In the forthcoming years, WSM plans to develop a number of areas within the confines of the ECOHIVE Complex at Magħtab. In order to accelerate the process, WSM has applied to remove vegetation, soil and existing material from a number of areas (Areas A-D) shown in Figure 1. Eventually, WSM plans to develop an Organic Waste Processing Plant (OPP), a Thermal Treatment Facility (TTF) and an access road. Another area has also been earmarked to be used for storage during the works. Details of these developments at this stage are not yet fully available so a generic approach will be adopted when assessing the impacts. The following assumptions are being adopted:

- Any emissions from the plants will be within the existing threshold established in local legislation,
- Filtration systems will be installed in both plants in order to control any emissions within established threshold levels,
- No emissions will be discharged into the marine environment,
- The buildings/ chimneys will be of a height comparable to or lower than those which are already approved for the adjacent Waste to Energy (WtE) facility.

More detailed information on the proposed scheme and its operational processes is provided in the Project Description Statement (JV Salfo & Associates – ADO Ltd, 2022). However, certain features of the scheme may change during the final design based on any relevant considerations, particularly in terms of environmental performance and operating costs.

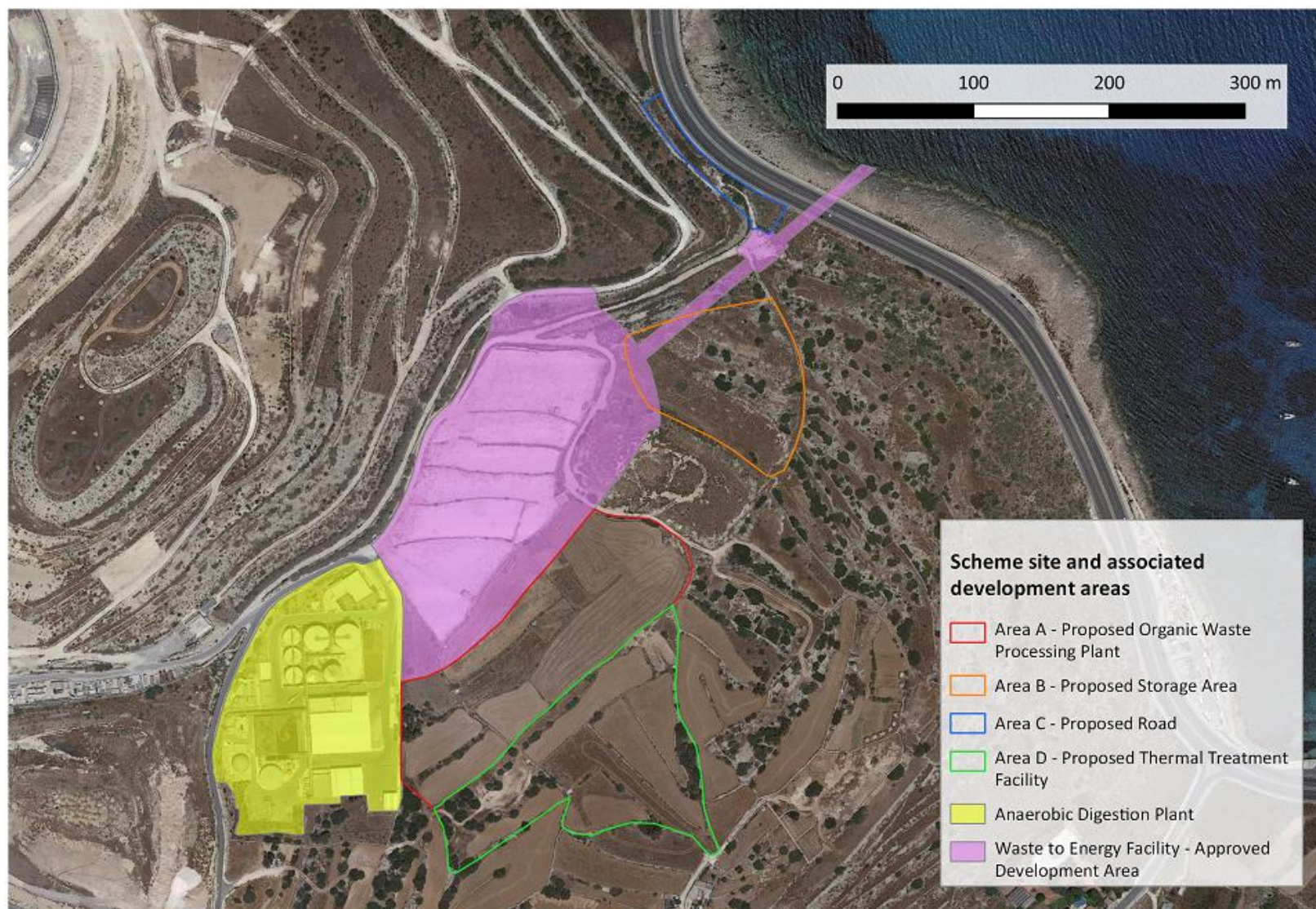


Figure 1: Aerial photo showing areas (Areas A-D) where works are planned in relation to the existing Anaerobic Digestion Plant and the Waste to Energy development area (aerial image from Google Earth, 2022)

3. Site description

3.1. Location of scheme site

The geographical location of the scheme with respect to the Maltese Islands is presented in Figure 2, and more detailed in Figure 2 and Figure 3. The area under consideration can be located at coordinates 35° 56.629'N, 14° 26.662'E at an altitude of about 40m above mean sea level.

The scheme site lies in a rural area close to the Northern coast of Malta, at the limits of Naxxar local council administrative area. It is located just outside the present boundaries of the ECOHIVE Complex, directly adjacent to the existing Anaerobic Digestion Plant, in the area known as Ta' Hammud.

The scheme site can be accessed from the two main entry points of the ECOHIVE Complex via a number of surfaced and unsurfaced roads.



Figure 2: General geographical location of the scheme site within the Maltese Islands (indicated with red point) (aerial image from Google Earth, 2022)



Figure 3: Geographical location of the scheme site (indicated with coloured outlines) in context with its surrounding landscape (aerial image from Google Earth, 2022)



Figure 4: Detailed location and extent of the scheme site (indicated with coloured outlines) (aerial image from Google Earth, 2022)

3.2. General land uses of the scheme site and surroundings

The site is located on the upland of Ta' Ħammud, which naturally developed between the drainage systems of Wied tal-Għallis to the North and Wied ta' Kieli to the South. Originally, these watercourses discharged within or in close proximity to the shallow embayment of Qalet Marku, but their hydromorphology has been extremely altered.

Wied tal-Għallis is nowadays entirely buried beneath the Għallis landfill, while Wied ta' Kieli has been predominantly modified for agricultural use. The water discharge of both valleys has also been further disrupted by the Coast road, an arterial road forming part of the TEN-T network.

A general presentation of the main geological strata and features in relation to the scheme site is illustrated in Figure 5.

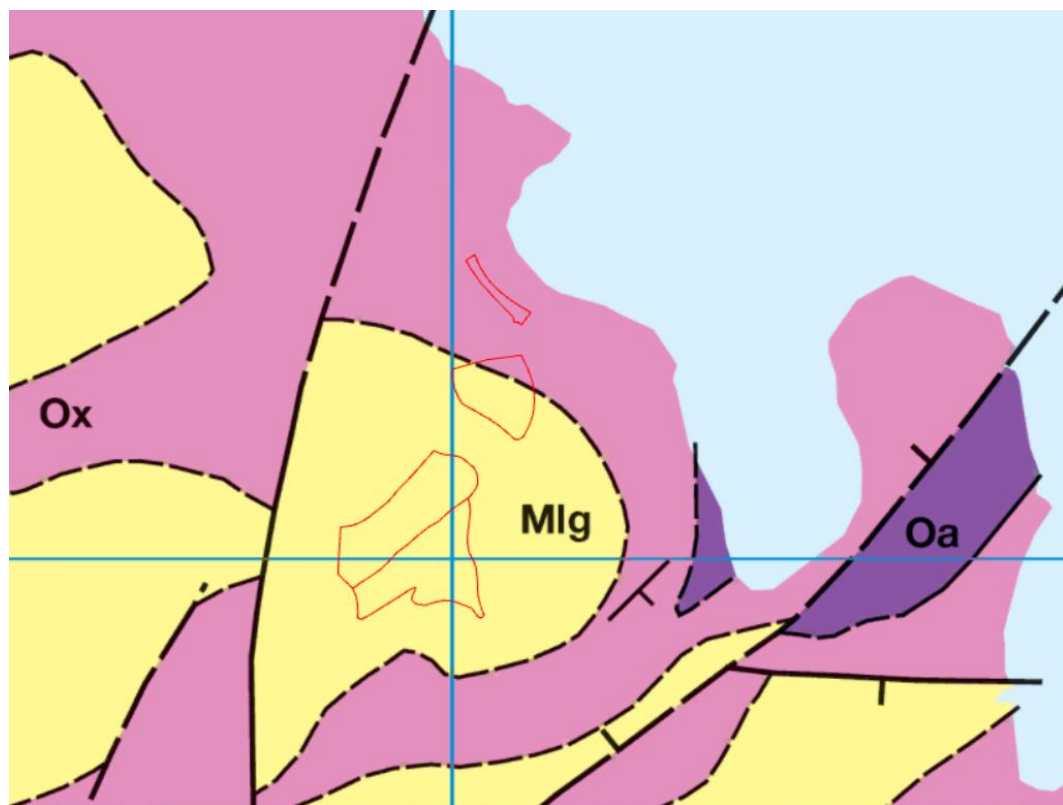


Figure 5: Geological map showing the scheme site (indicated with red outline) (Map extracted from the geological map published by the Oil Exploration Directorate, 1993). Legend: Ox – LCL Xlendi Member, Oa – LCL Attard Member, Mlg – Lower Globigerina Limestone

The slopes reaching the Għallis, Qalet Marku and Baħar iċ-Ċagħaq coastline are mainly based on the Xlendi member of the Lower Coralline Limestone (LCL), and to a lesser extent on the Attard member. These geological strata form a limestone pavement with surface karstic processes accumulating shallow pockets of soil within areas of bare rock. This type of soil is referred to as the Xagħra Soil Series.

Coastal areas exhibit a more rugged or serrated surface, which lead to the development of a rocky shore with minimal vegetation cover and a network of pools. One such coastal rock pool in the area is Ghadira s-Safra.

An overlaying layer of Lower Globigerina Limestone can be found in more inland areas with evident discontinuities caused by a number of minor fault lines. The soft Lower Globigerina Limestone usually yields a topsoil layer and for this reason the areas covered by this rock are largely occupied by agricultural land. The soil associated with such a geomorphological setting is the L-Inglin Complex Soil Series and is likely to be artificially supplemented with inorganic and organic materials that were transported from other sources.

Although not indicated in the geological map in Figure 5, the area also features the Il-Mara member of the LCL and Quaternary slope deposits (Scerri, 2020).

Agriculture in the area has led to the artificial modification of the land and original natural habitats. Agricultural land present includes fields used for extensive cultivation of seasonal crops, but others lie fallow or abandoned. Onsite observations indicate that the active fields are predominantly used for the cultivation of cereal fodder crops.

Boundary walls of varying heights delimit and separate different fields. These boundary walls are constructed of ashlar and/or traditional rubble stones, generally indicating land ownership subdivisions and also serving soil retention purposes. Various mature trees and shrubs are also found in clusters, in lines or singly along the boundary walls. These include trees and shrubs typical of the Maltese rural landscape generally associated with agriculture, such as stands of prickly pear, carobs, olives, figs and almonds.

The most prominent artificial landscape feature in the area is the decommissioned Magħtab landfill within the ECOHIVE Complex, which has been subjected to slope stabilisation measures and ecological reclamation through afforestation.

The ECOHIVE Complex also includes the engineered landfills of Żwejra and Għallis, a gas plant to treat gaseous emissions from the landfills, a Mechanical and Biological Treatment Plant, and an Anaerobic Digestion Plant. The development of an adjacent Waste-to-Energy facility (PA 03012/20 and EA 00057/18) has also been recently approved and is currently in the early phases of site clearance. Another prominent development in the area is the Magħtab Terminal of the Malta-Italy Interconnector. Other smaller buildings are considered to have an agricultural, residential, commercial or recreational use.

Small huts built of ashlar stone blocks or bricks are also present, and are generally associated with wild bird hunting and trapping activities. Planted trees generally associated with bird hunting and/ or for ornamental purposes are gum trees (*Eucalyptus*), wattles (*Acacia*), cypresses, oleander and yuccas.

Other signs of human disturbance around the scheme site include the sporadic deposition of mounds of inert debris as a means of land modification and irregular waste disposal, in particular excavation, construction and demolition waste.

The coastal area is also regularly used for various informal recreational activities including swimming, wind-surfing, jogging, fishing, barbecues, horse-bathing and as a hardstanding area for caravans.

In general terms, the terrestrial ecology of the area has been highly altered by human intervention. Remnants of natural scrubland (garrigue and phrygana) and grasslands (steppe) persist, but in most

areas are considered to represent degradation and recolonisation stages of the original natural environment. Ermes and ruderal communities typical of disturbed ground are very abundant.

Various ecological areas of conservation value are present in the vicinity of the scheme site, including:

- Terrestrial Special Area of Conservation (SAC) of International Importance of l-Għadira s-Safra u l-Iskoll tal-Għallis. L-Għadira s-Safra is also an Area of Ecological Importance Level 1 and 3, while Għallis Rocks is a Site of Scientific Importance Level 2.
- Wied ta' Kieli Listed Area/ Site of Scientific Importance and Scheduled Area/ Site.
- Wied tal-Għallis Listed Area/ Site of Scientific Importance, although it is nowadays entirely buried beneath the landfill.
- Protected Natural Coast.
- Listed (Terrestrial) Ecological Areas.
- Marine Special Area of Conservation (SAC) of International Importance of Żona fil-baħar bejn il-ponta ta' San Dimitri (Għawdex) u il-Qaliet.
- Marine Special Protection Area (SPA) of Żona fil-Baħar Madwar Għawdex.
- Other areas are also marked as agricultural areas and listed archaeological areas/ sites (MEPA, 2006).

At a distance of about 2km to the West is another agglomeration of sites of ecological conservation value at is-Salini and its surroundings. These include a terrestrial Special Area of Conservation (SAC) of International Importance, Area of Ecological Importance, Site of Scientific Importance, Bird Sanctuary, and Scheduled Trees.

4. Methodology

4.1. Area of Study

The area of study (AoS) comprised a coverage of about 100m radius around the scheme site, and modified to be delineated by existing physical features as indicated in Figure 6.



Figure 6: AoS for terrestrial ecology

4.2. Literature review

A literature review of existing and available information on the ecological resources in the AoS was carried out. The following data sources have been identified and consulted:

- Zammit M., Gatt M.C., Metzger B., Deidun A. (2021): *Ecological Impact Assessment in relation to PA 03012/20 and EA 00057/18: Development of a Waste to Energy Facility, to operate in conjunction with other waste management operations within the Magħtab Environmental Complex, Magħtab*. Version 2. April 2021.
- Zammit M. (2017): *Ecological study and impact assessment in relation to the proposed development of a 5 MW PV Farm overlying the Magħtab landfill including related surface culverts and four new Substations* (Tracking No. 175442). September 2017.
- Natura 2000 Standard Data Form for *Żona fil-Baħar Madwar Għawdex* Marine SPA (MT 0000112)

- Natura 2000 Standard Data Form for *Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u l-Qaliet* as a Marine SCI (MT0000105).
- Standard Data Form for *L-Għadira s-Safra u l-Iskoll tal-Għallis* as a Terrestrial SCI/ SAC (MT0000008).
- Standard Data Form for *Is-Salini* as a Terrestrial SAC (MT0000007).
- Data on birds from BirdLife Malta, their journal *Il-Merill* and other local ornithologists.
- The Breeding Birds of Malta (Sultana et al., 2011), Malta Breeding Bird Atlas (Raine et al., 2008) and Important Bird Areas of EU Importance in Malta (Borg & Sultana, 2004).
- European Birds of Conservation concern - populations, trends and national responsibilities (Birdlife International, 2017).
- Malta Breeding Bird atlas 2018 (Epsilon Malta Ltd Nature Conservation Consultants (2019).
- European Breeding Bird Atlas 2 Distribution, Abundance and Change (Keller, V., Herrando, S., Vorisek, P. et al. (2020)).
- Managing Land for Nature Reserves reports for 2018-2019 (Birdlife, 2021).
- European Red List of Birds 2021 (Birdlife International, 2021).

The Strategic Plan for the Environment and Development (SPED) (2015), the Central Malta Local Plan (CMLP) and Area Policy Maps (PA, 2006) and the Rural Policy and Design Guidance (RPDG) (MEPA, 2014) will be consulted to identify relevant policies and site conservation objectives.

4.3. Field surveys and Assessment of data

4.3.1. Habitats, plant communities and flora

Onsite ecological surveys carried out on the following dates:

- 24th, 27th April 2022,
- 2nd, 18th May 2022,
- 6th, 12th, 16th, 18th, 19th, 23rd August 2022,
- 19th, 27th, 30th September 2022,
- 2nd, 3rd October 2022.

In view of the above, this report describes the terrestrial ecology of the dry season. Surveys on vegetation was carried out through a broad-brush walkover survey by recording plant species. Most survey effort was directed towards observation of dominant and protected species.

The surveys included mapping of the habitats, which were characterised based upon the abundance and distribution of dominant and indicator plant species. Geomorphological features, substrate and influencing human-induced factors were also taken into consideration.

Classification of habitats was based on the Palaearctic Habitat Classification (Devillers and Devillers-Terschuren, 2001) and cross-referenced with EUNIS Habitat Classification (Moss and Davies, 2002a) and the habitats listed in Annex I of the EC Habitats Directive (92/43/EEC) (Moss and Davies, 2002b), which is transposed into Schedule I of the Flora, Fauna and Natural Habitats Protection Regulations

(SL 549.44). The latter was further supplemented by reference to the phytosociological units and habitats of Community interest indicated in Brullo et al. (2020).

A habitat distribution map was produced and photographs illustrating the AoS during the field surveys are included in Section 5.

The presence of all vascular plant species encountered in the AoS was recorded and a complete list is presented in Appendix I.

4.3.2. Specific flora surveys

A targeted survey was carried out to record the occurrence of all trees. The location of isolated trees in accessible areas was recorded using a GPS Garmin Oregon750t and spatially georeferenced on a map using QGIS version 3.16. In cases of high tree density and/ or inaccessible areas, the number and location of trees was inferred visually and recorded manually on a printed satellite image.

Regardless of their shape and size, for the scope of this report, a ‘tree’ has the same definition as in Trees and Woodlands Protection Regulations (SL 549.123), thus being a perennial plant, whether dead or alive, which in its adult form has a main woody trunk or trunks and woody branches and including representatives of the family Arecaceae (Palmae), but excludes plants cultivated in pots.

The age of tree specimens within the scheme site was also relevant due to the possible requirement of compensatory planting and is indicated in ranges specified in Section 3.3 of the ‘Guidelines on Works Involving Trees’ (ERA, 2019), being:

- Less than 10 years old;
- Between 10 and 50 years old; and
- Over 50 years old.

Since the age of trees is difficult to determine accurately without destructive methods, it was based on a visual assessment of past aerial and satellite imagery (refer to Appendix II), and the ecologist’s judgement.

4.3.3. Fauna

4.3.3.1. Vertebrates (excluding bats) and invertebrates

No systematic surveys were carried out for faunal species, but additional effort was made during the vegetation surveys to record animal species, both vertebrates and invertebrates.

Some faunal species were directly observed, while the presence of others was inferred from trace remains (e.g. dead specimens, nests, shells, droppings, etc...). Most survey effort was directed towards observation and recording of animal species of conservation value.

4.3.3.2. Bats

A single Anabat Swift passive bat detector was deployed at a fixed location directed at the scheme site for seven nights between 18th and 25th May 2022 and four nights between 6th and 9th October 2022. The recording schedule was set between 20:00-06:00hrs in May and 18:00-06:00hrs in October.

This instrument enables the recording of bat calls in both full spectrum and zero crossing. The data collected was used to determine bat species present within the AoS. All recordings were analysed using Anabat Insight software.

Background noise recordings were deleted from the dataset collected resulting in 1,211 bat sonograms throughout the whole survey period. A total of four different bat species were identified with confidence and attributed according to the call parameters as indicated in Table 1. A sample sonogram of each bat species is provided in Section 5.3.2.2.

Accessible buildings within the scheme site were also monitored to check for possible evidence of bat roosting activity (e.g. presence of guano). In addition, pre-dawn bat surveys were carried out on 22nd May and 24th May 2022 to check for any specific pre-dawn bat behavioural activities that could be helpful in the localisation of bat roosts.

Table 1: Bat call parameters used in the determination of bat species

Peak Frequency (kHz)	Call shape	Bat species
42-51	FM/QCF (Frequency Modulated/ Quasi-Constant Frequency)	<i>Pipistrellus pipistrellus</i> (Common pipistrelle) Note: It is not possible to separate <i>P. pipistrellus</i> (Common pipistrelle) and <i>Miniopterus schreibersii</i> (Common bent winged bat) from call parameters. However, the latter species has not been reported locally since the 1960s and is assumed to be extirpated from the Maltese Island. Bat calls within this range were therefore assigned exclusively to <i>P. pipistrellus</i> .
36-41	FM/QCF	<i>Pipistrellus kuhlii</i> (Kuhl's pipistrelle)
30-35	FM/QCF	<i>Hypsugo savii</i> (Savi's pipistrelle)
25-35	FM	<i>Plecotus gaisleri</i> (Gaisler's long-eared bat)

4.3.3.3. Birds

The data sources utilised for this report consisted of both that found in available reports as well as birdwatching data collected by individuals. Walk-through surveys within the AoS were carried out during August and September. These were supplemented with bird watching data from the coast at Tas-Safra covering the period 2020-2022. In all there were twenty-seven birdwatching events which were most concentrated during 2020 and 2021. The latter data covered different periods of the year and also times of the day, details of which are shown in Table 2. In the latter case, most of the effort was for birds flying out at sea or flying inland or migrating out. Furthermore, data obtained from the

Schematic List for the Salina Nature Reserve for the period 2018-2019 as presented in the Managing Land for Nature –Reserve reports for 2018-19 (Birdlife Malta, 2021) was used. Data found in the avian section compiled by Gatt M.C. and Metzger B. and reported in Zammit et al. (2021) in relation to the development of the WtE facility project was also utilised. The latter was mainly based on literature review and listed species which were recorded, expected to cross or be present within a six km radius from the WtE facility. The mix of data sources can be considered as representative for the purposes of this report since it covers different periods of the year and also different areas both within the AoS and also in the surrounding protected areas.

Table 2: Details of avian data collected from the area of Tas-Safra during 2020-2022

Date	Time of day
26/01/2020	am/ pm
02/02/2020	am
08/02/2020	pm
16/02/2020	pm
09/08/2020	am
13/08/2020	pm
24/10/2020	pm
11/12/2020	pm
19/12/2020	pm
20/12/2020	pm
11/01/2021	am
12/01/2021	am
16/01/2021	pm
17/01/2021	am/pm
23/01/2021	pm
24/01/2021	am
07/02/2021	am
20/03/2021	pm
14/07/2021	pm
17/07/2021	am/ pm
18/07/2021	pm
24/07/2021	pm
20/08/2021	am
28/12/2021	pm
30/12/2021	pm
23/01/2022	pm
30/01/2022	pm

4.4. Evaluation of the legal protection and conservation status of the ecological resources

The designation of habitats and species (excluding birds) shall be in accordance with the relevant schedules in the Flora, Fauna and Natural Habitats Protection Regulations (SL 549.44), Trees and Woodlands Protection Regulations (SL 549.123) and Rubble Walls and Rural Structures (Conservation and Maintenance) Regulations (SL 552.01).

The conservation status of the habitats listed in Schedule I, and species listed in Schedule V, of the Flora, Fauna and Natural Habitats Protection Regulations (SL 549.44) will be based on the Habitats Directive Article 17 reports for the year 2019, while that of other species will be indicated in accordance with the Red Data Book of the Maltese Islands (RDB) (Schembri and Sultana (eds.), 1989).

The designation of species will be indicated in accordance to the Birds Directive. The conservation status of birds has been assigned in accordance to the Species of European Conservation Concern (SPEC) system (Birdlife International, 2017) and IUCN Red List (Category Europe).

5. Ecological assessment

5.1. Habitats and vegetation

As described in Section 3.2, the main ecological landscape features within the AoS consist of agricultural areas, disturbed ground, afforested areas, karstland and a stretch of coastal rocky shore. These elements determine the basic abiotic environmental conditions for colonisation by natural vegetation, which in turn is affected by the combined effect of natural biotic and anthropogenic factors.

The distribution of habitats and tree species are presented in Figure 7-Figure 9 and Figure 10-Figure 12 respectively.

Areas A and D of the scheme are predominantly made up of agricultural land, consisting of a number of actively cultivated fields with cereal fodder crops and to a lesser extent vegetable crops (Figure 13-Figure 14). The fields are defined by traditional rubble walls (Figure 15) of varying height, with some stretches in a state of disrepair. Common wild plants growing among the crops include *Glebionis coronaria* (Crown daisy), *Papaver rhoeas* (Common poppy), *Avena sterilis* (Animated oat), *Lolium rigidum* (Stiff ryegrass), *Diplotaxis tenuifolia* (Perennial wall-rocket), *Brassica rapa* subsp. *sylvestris* (Bargeman's cabbage) and *Fumaria* sp. (Fumitory), while *Foeniculum vulgare* (Fennel) and *Piptatherum miliaceum* (Smilo grass) are generally restricted to the less disturbed field verges.

One field in Area A adjacent to the Anaerobic Digestion Plant includes a small cluster of mature *Eucalyptus gomphocephala* (Tuart tree) (Figure 16), *Acacia saligna* (Blue-leafed wattle) and *Cupressus sempervirens* (Cypress) trees, which are typically planted to attract avifauna for bird hunting activities. A number of naturally-occurring *Pistacia lentiscus* (Lentisk) shrubs are also present in the otherwise herbaceous undergrowth comprised of *Piptatherum miliaceum* (Smilo grass), *Arisarum vulgare* (Friar's cowl), *Mercurialis annua* (Annual mercury), *Asparagus aphyllus* (Spiny asparagus), *Oxalis pes-caprae* (Cape sorrel), *Chenopodium murale* (Nettleleaf goosefoot), *Glebionis coronaria* (Crown daisy) and *Galactites tomentosa* (Boar thistle).

Area D bears prominent but fragmented, linear clusters of mature *Ceratonia siliqua* (Carob) trees along the boundaries of agricultural fields, accompanied by a number of *Pistacia lentiscus* (Lentisk) and *Ficus carica* (Fig).

Both Areas A and D feature tree lines of *Prunus dulcis* (Almond), with the one in Area A being interspersed with a few *Pistacia lentiscus* (Lentisk) shrubs, a young *Olea oleaster* (Wild olive) and growths of *Vitis* sp. (Wild vine). A number of isolated specimens of *Nerium oleander* (Oleander), *Opuntia ficus-indica* (Prickly pear), *Ficus carica* (Fig), *Prunus dulcis* (Almond), *Ceratonia siliqua* (Carob) and *Olea europaea* (Olive) trees are also present along the boundaries of agricultural parcels within both Areas A and D.

Agricultural land outside the scheme site exhibits a similar vegetation composition and planted trees to the ones described above, with the exception of one agricultural holding at the southeast of the AoS, which was extensively disturbed by works during the surveys, but had a noticeable abundance of planted *Olea europaea* (Olive) trees.

Fragmented patches of evergreen arborescent and shrubby vegetation (Figure 17) are also present outside the scheme site and these represent a combination of long-standing trees and natural recolonisation by perennial shrubs. These habitats are largely based on *Ceratonia siliqua* (Carob) and *Pistacia lentiscus* (Lentisk). The presence of mature *Olea europaea* (Olive) is more localised and likely

planted for agricultural or ornamental purposes, while the presence of mature *Eucalyptus gomphocephala* (Tuart tree) are more likely planted for bird hunting purposes. Less abundant, naturally-occurring shrubs within these habitat patches include *Lonicera implexa* (Evergreen honeysuckle), *Prasium majus* (White hedge-nettle) and *Periploca angustifolia* (Wolfbane). Less abundant, planted trees within these habitat patches include *Acacia saligna* (Blue-leafed wattle), *Cupressus sempervirens* (Cypress), *Opuntia ficus-indica* (Prickly pear) and *Yucca gloriosa* (Spanish dagger).

A possibly protected species of *Iris* sp. (Iris) (Figure 18) was also recorded outside the scheme site within the carob thicket and lentisk scrub. It could not be identified at species level during the survey due to the absence of flowers.

Two areas, one at the northeast and one at the southwest of the AoS, are characterised by highly disturbed ground. Extensive deposits of excavation, construction and demolition waste are prominent in the former area. The natural vegetation in these areas is composed of opportunistic species typical of ruderal communities (Figure 19), namely *Glebionis coronaria* (Crown daisy), *Galactites tomentosa* (Boar thistle), *Sonchus oleraceus* (Sow Thistle), *Malva arborea* (Tree mallow), *Borago officinalis* (Borage), *Diploaxis tenuifolia* (Perennial wall rocket), *Piptatherum miliaceum* (Rice-grass), *Oxalis pes-caprae* (Cape sorrel), *Avena sterilis* (Animated oat), *Cynodon dactylon* (Bermuda grass), *Foeniculum vulgare* (Fennel), *Anthirrinum tortuosum* (Greater snapdragon) and *Mercurialis annua* (Annual mercury). A large extent of Areas B and C of the scheme are situated within this habitat type.

Remnants of natural scrubland and grasslands persist along the downslope part of the AoS towards the coast road. These fragmented patches and continuous mixed assemblages of different plant communities are considered to represent degradation and recolonisation stages of the original natural habitats conducive of the karst area. This habitat is made up of a heterogeneous complex of lentisk scrub, labiate garrigue/phrygana, ermes and steppe.

Stretches with mixed ermes and steppe communities (Figure 20) present within the AoS are characterised by the dominance of herbaceous plants, such as *Asphodelus aestivus* (Branched asphodel) and *Urginea pancration* (Seaside squill), the grasses *Hyparrhenia hirta* (Beard grass), *Stipa capensis* (Mediterranean steppe grass) and *Bromus* sp. (Brome), and the thistles *Galactites tomentosa* (Boar thistle), *Atractylis gummifera* (Ground thistle) and *Carlina involucreta* (Clustered carline thistle). This habitat introduces elements of a priority habitat of EU importance, referred to as Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* (Habitat 6220*) making it of potential high conservation value. However, whether it qualifies as such may be subject to interpretation when taking into consideration the landscape context and its condition. Parts of Areas B and C of the scheme are within this habitat type.

The characteristic species of labiate garrigue/phrygana present is the low-growing shrub *Thymra capitata* (Mediterranean thyme) (Figure 21) and such habitat is of conservation interest as it is considered to represent an impoverished formation of a habitat of EU importance, namely the West Mediterranean clifftop phryganas (*Astragalo-Plantaginietum subulatae*) (Habitat 5410). Parts of Area C of the scheme is within this habitat type.

Areas with larger shrubs of *Pistacia lentiscus* (Lentisk) and to a lesser extent *Lonicera implexa* (Evergreen honeysuckle) form an open lentisk scrub. However, this habitat type is highly degraded by the prominence of the invasive, alien *Agave* spp. (Century plant) (Figure 22).

Withered remains of *Anacamptis* sp. (Pyramidal orchid) and other orchids were also noted in the scrub areas during the surveys but could not be identified at species level. A previous study carried out in

the wet season (Zammit et al., 2021) reported the presence of *Neotinea lactea* (Milky orchid). In addition, Lanfranco (2011) reported that the karst terrain between Għadira s-Safra and Qalet Marku supports populations of *Anacamptis pyramidalis* subsp. *pyramidalis* (Pyramidal orchid), *Anacamptis coriophora* subsp. *fragrans* (Fragrant orchid) and other species in the genera *Serapias* and/or *Ophrys*. Orchid populations within the area of study are however expected to be more limited as the specified karst terrain extends much further. According to the orchid distribution maps published in Mifsud (2018), the karst area may also host *Anacamptis collina* (Fan-lipped orchid), *Ophrys bombyliflora* (Bumble bee orchid), *Ophrys iricolor* subsp. *vallesiana* (Valles' rainbow bee orchid), *Ophrys melitensis* (Maltese spider orchid) and *Serapias parviflora* (Small-lipped ploughshare orchid).

The AoS also encompasses a narrow stretch of coastal rocky shore on the opposite side of the coast road. The supralittoral zone is typically bare and devoid of any vegetation. Closer to the road, the rocky shore supports aerohaline communities made up of a combination of salt steppes, maritime scrubs and associated annuals (Figure 23). This community consists of *Arthrocnemum macrostachyum* (Glaucous glasswort), *Limbarda crithmoides* (Golden samphire), *Crithmum maritimum* (Sea samphire), *Limonium zeraphae* (Zerafa's sea lavender), *Silene sedoides* (Hairy catchfly), *Anthemis urvilleana* (Maltese sea chamomile) and *Desmazeria pignatti* (Pignatti's fern grass). Small patches of *Mesembryanthemum nodiflorum* (Lesser crystal ice plant), *Cakile maritima* (Sea rocket) and *Salsola soda* (Smooth-leaved saltwort) were also present. Previous studies carried out in the wet season (Zammit et al., 2021) also reported the presence of *Senecio pygmaeus* (Pygmy ragwort), *Frankenia hirsuta* (Hairy sea heath) and *Spergularia* sp. (Sea-spurrey) within the area.

The presence of endemic sea lavender within the aerohaline community introduces elements of a habitat of EU importance, namely the Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* spp. (Habitat 1240), and is therefore of high conservation value. Furthermore, this coastal stretch bears a few trees of *Tamarix* sp. (Tamarisk) and a natural remnant population of the endangered grass *Elymus pycnanthus* (Sea couch) (Figure 24).

The northern part of the AoS is within the precincts of the Magħtab Environmental complex and comprise the former Għallis landfill which was subjected to slope stabilisation measures and ecological reclamation through afforestation (Figure 25). Among the varied trees and shrubs planted within the AoS are *Tamarix* sp. (Tamarisk), *Atriplex halimus* (Shrubby orache), *Pinus halepensis* (Aleppo pine), *Tetraclinis articulata* (Sandarac gum tree), *Nerium oleander* (Oleander) and *Acacia saligna* (Blue-leaved wattle), while the undergrowth is predominantly composed of ermes and ruderal communities. The invasive alien species *Nicotiana glauca* (Shrub tobacco) and *Ricinus communis* (Castor oil tree) have also established populations within the afforested area.

An artificial pond (Figure 26) created between the afforested former landfill and the coast road is predominantly colonised by *Typha domingensis*, (Southern cattail), with more localised stands of *Arundo donax* (Great reed), *Phragmites australis* (Lesse reed) and *Tamarix* sp. (Tamarisk) trees.

The remaining parts of the AoS are occupied by the Anaerobic Digestion Plant and the development site of a Waste-to-Energy facility, which at the time of survey featured exposed bedrock and rubble walls prior to their dismantling (Figure 27). The landscaped areas of the Anaerobic Digestion Plant (Figure 28) were largely planted with *Ceratonia siliqua* (Carob), *Olea europaea* (Olive) and *Prunus dulcis* (Almond). Other trees and shrubs present included *Myoporum laetum* (Ngaio), *Laurus nobilis* (Bay laurel), *Citrus* sp. (Citrus tree), *Punica granatum* (Pomegranate) and *Hibiscus rosa-sinensis* (Rose of China).

5.2. Summary of habitats

The described ecological communities can be classified by a combination of the habitats units listed in Table 3.

Table 3: Habitat types present at the AoS in accordance with established habitat classification systems

Palaeartic Habitats Classification	EUNIS Habitat Classification	Schedule I of SL 549.44
11.296. Supralittoral rocks	B3.1 Supralittoral rock (lichen or splash zone)	N/A
18.22174. Hyblaeo-Maltese sea-cliff communities	B3.3/P-18.22 Tethyan sea-cliff communities	Habitat 1240 - Vegetated sea cliffs of the Mediterranean coasts with endemic <i>Limonium</i> spp.
32.122. Carob arborescent matorral	F5.122 Carob arborescent matorral	N/A
32.214. Lentisc brush	F5.514 Lentisc brush	N/A
32.471. Thyme, sage, small germander and other labiate garrigues	F6.1/P-32.47 Western [Teucrium] and other labiate garrigues	[Impoverished formation of] Habitat 5410 - West Mediterranean clifftop phryganas (<i>Astragalo-Plantaginetum subulatae</i>)
32.91. Asphodel fields	E1.C1 Asphodelus fields	N/A
32.92. Thistle fields	E1.C2 Thistle fields	N/A
32.94. Ferula stands	E1.C4 Ferula stands	N/A
34.513. Mediterranean annual communities of shallow soils	E1.3/P-34.51 West Mediterranean xeric grassland	*6220 Pseudo-steppe with grasses and annuals of the Mediterranean xeric grassland <i>Thero-Brachypodietea</i>
34.6343. Central Mediterranean andropogonid grass steppes	E1.4343 Central Mediterranean andropogonid grass steppes	*6220 Pseudo-steppe with grasses and annuals of the Mediterranean xeric grassland <i>Thero-Brachypodietea</i>
53.134. Southern reedmace beds	C3.2/P-53.13(p) [<i>Typha</i>] beds	N/A
84.4. Rural mosaics - Reticulated landscapes of tree-lines, hedgerows, plantations, woodlots, pastures and crops.	X10 Mosaic landscapes with a woodland element	N/A
86.32. Active industrial constructions	J2.32 Rural industrial sites	N/A
86.5. Rural scattered constructions	J2.4 Agricultural constructions	N/A

Palaeartic Habitats Classification	EUNIS Habitat Classification	Schedule I of SL 549.44
87.1. Fallow fields	I1.53 Fallow un-inundated fields with annual and perennial weed communities	N/A
87.2. Ruderal communities	E5.13 Weed communities	N/A

Habitats map (1 of 3)

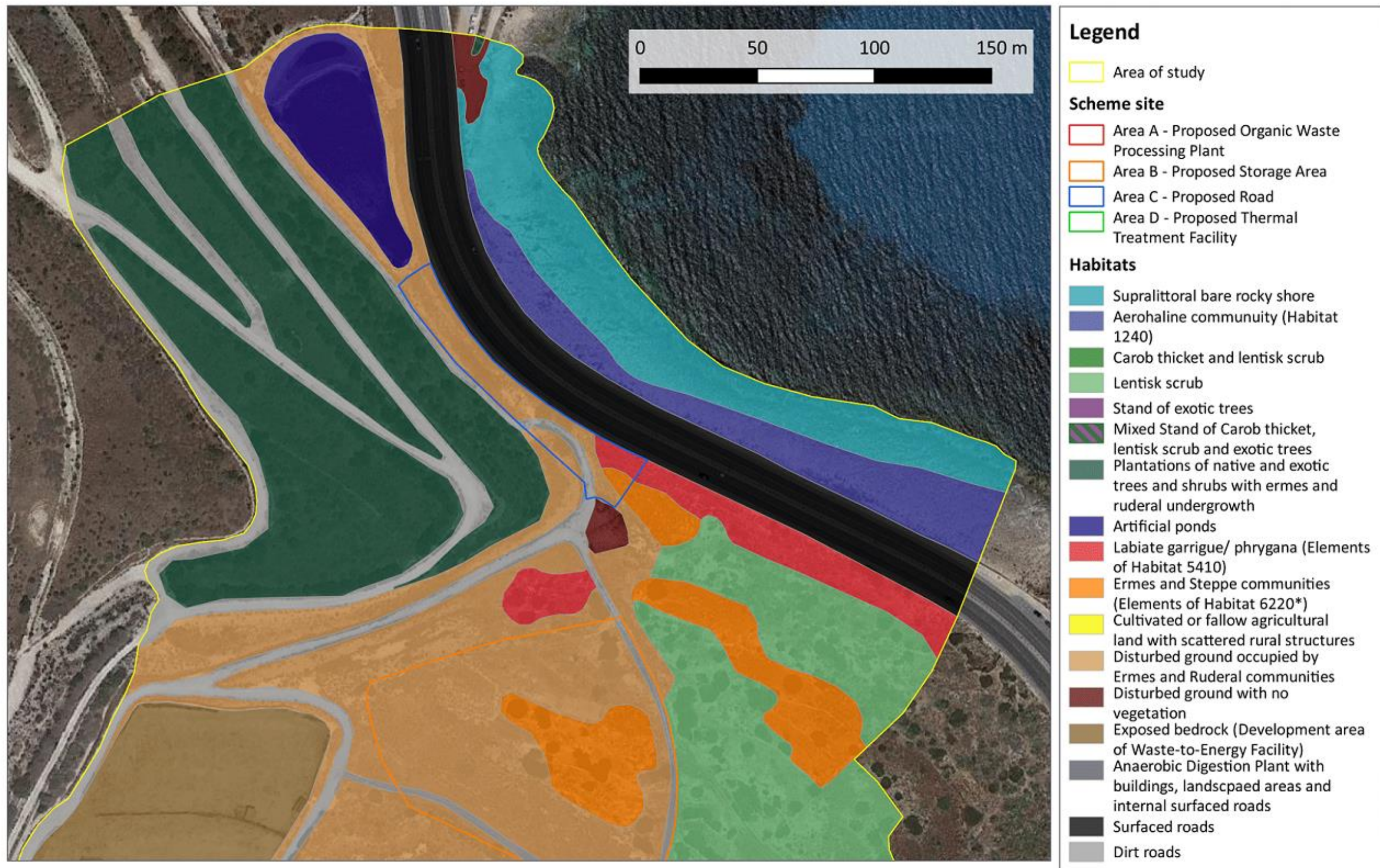


Figure 7: Habitats map of the AoS

Habitats map (2 of 3)

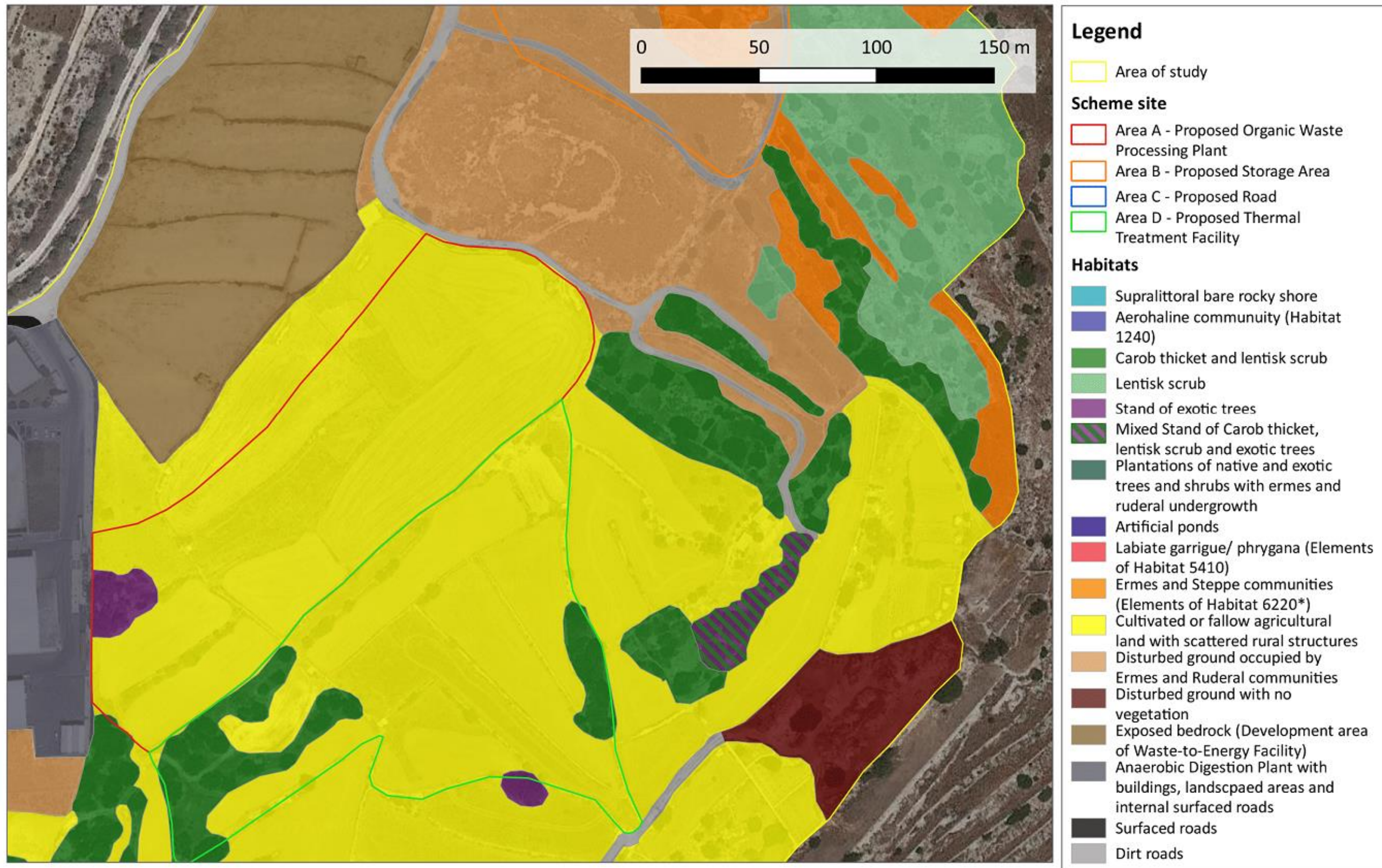


Figure 8: Habitats map of the AoS

Habitats map (3 of 3)

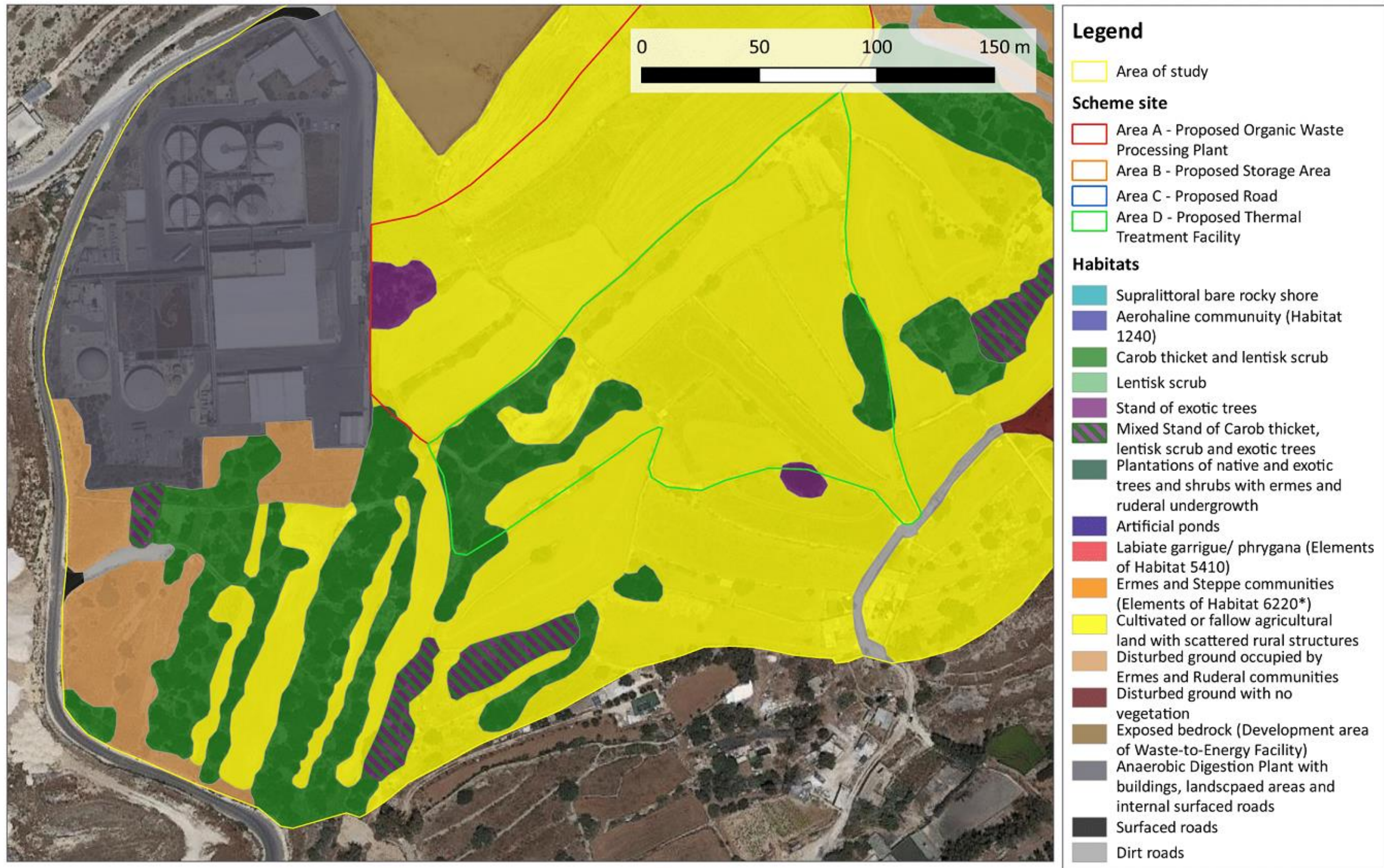


Figure 9: Habitats map of the AoS

Trees map (1 of 3)

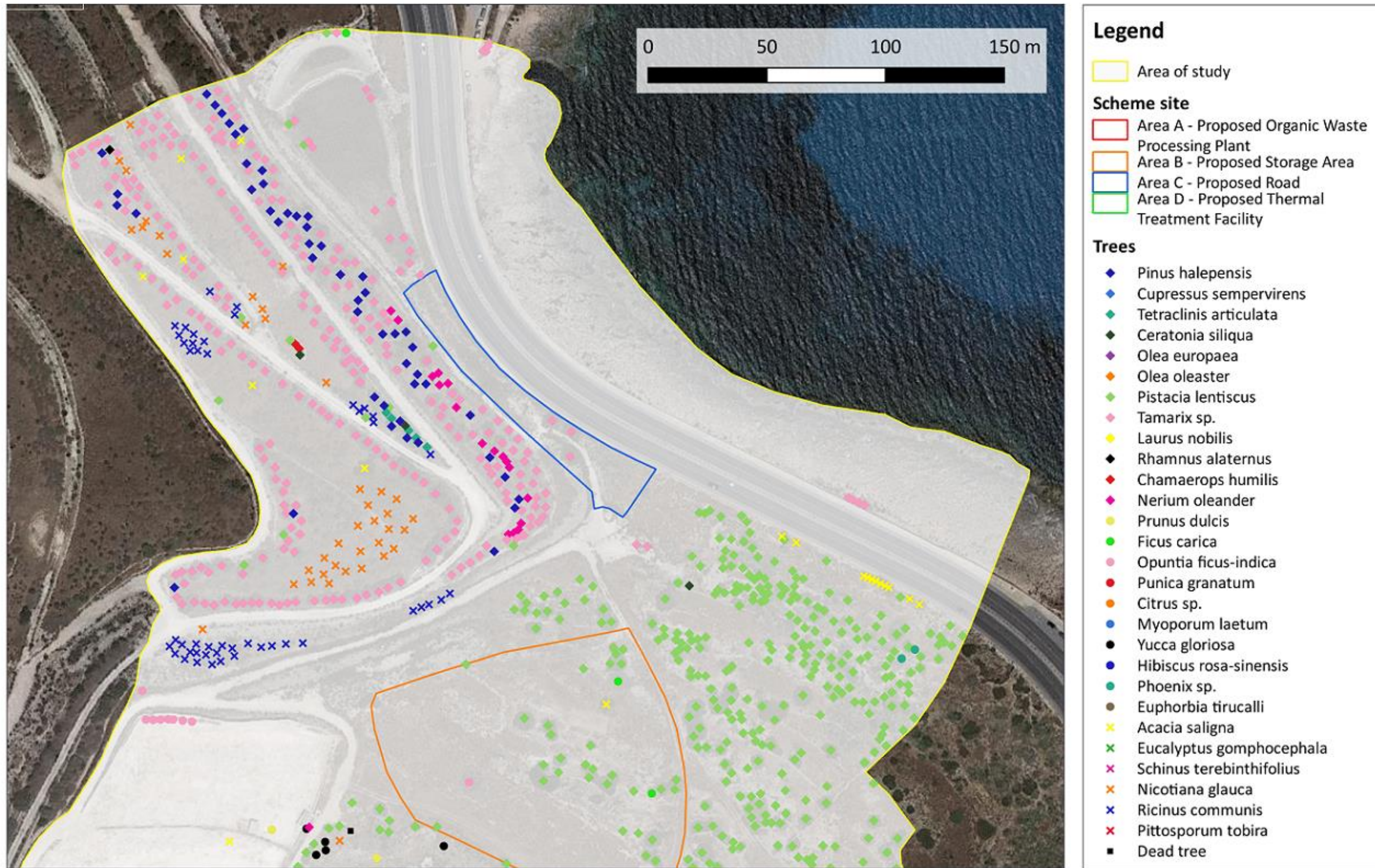


Figure 10: Trees map of the AoS

Trees map (2 of 3)

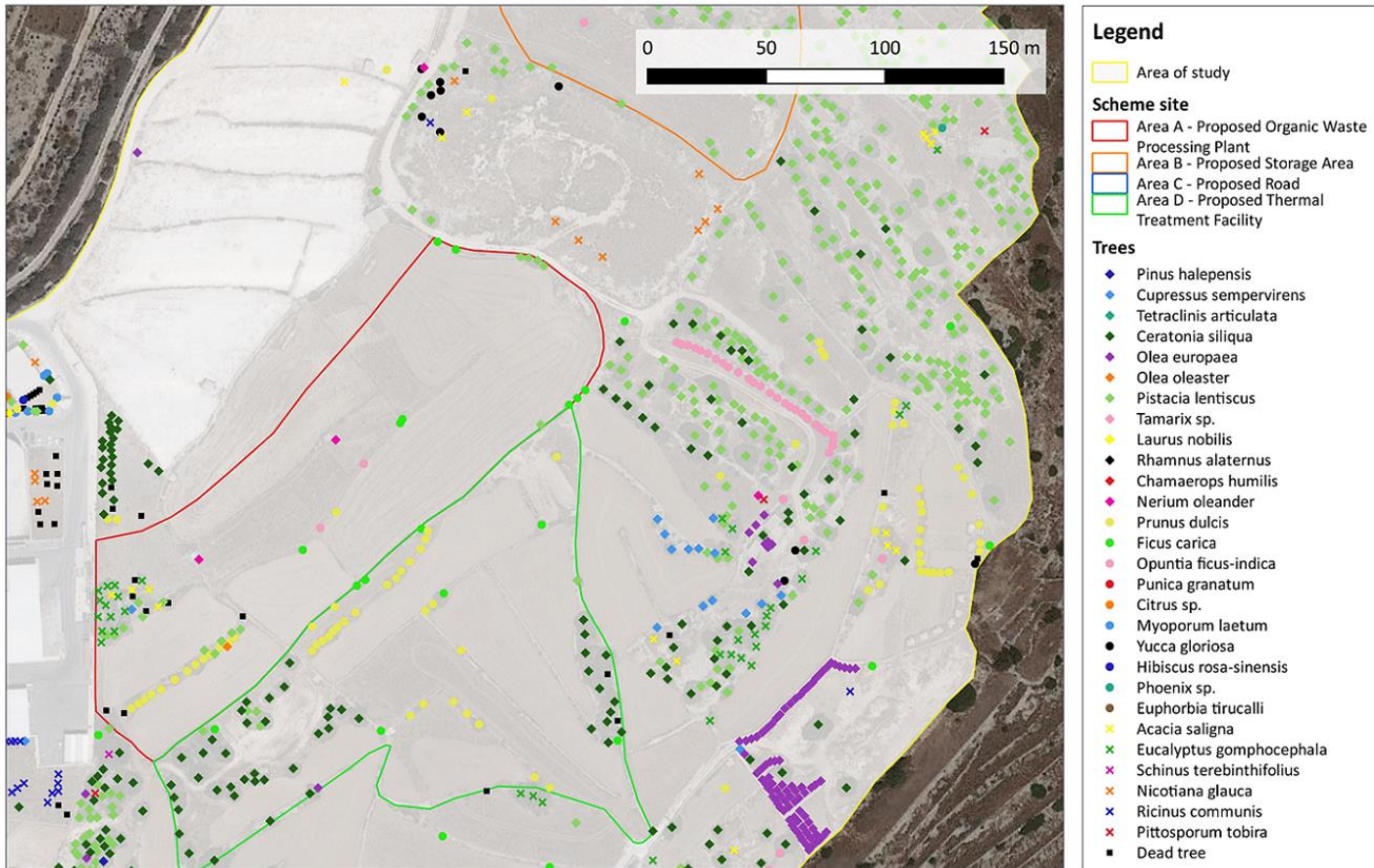


Figure 11: Trees map of the AoS

Trees map (3 of 3)

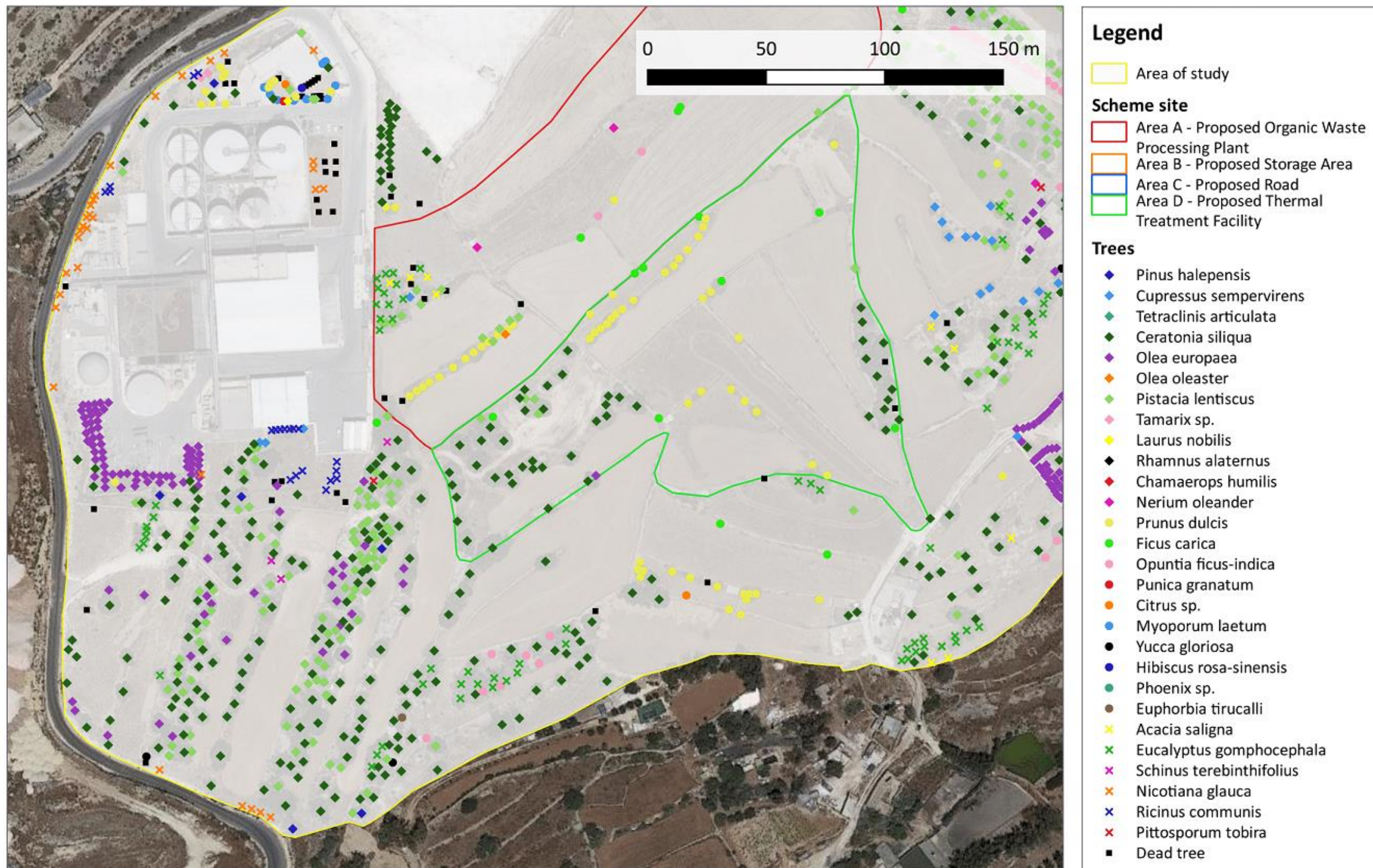


Figure 12: Trees map of the AoS



Figure 13: Fields cultivated with cereal fodder crops within scheme site



Figure 14: Fields cultivated with vegetable crops within scheme site



Figure 15: Traditional rubble wall within scheme site



Figure 16: Exotic trees within scheme site



Figure 17: Carob thicket outside scheme site



Figure 18: Unidentified, possibly protected species of *Iris* sp. (Iris) outside the scheme site



Figure 19: Ruderal plant communities outside scheme site



Figure 20: Ermes and steppe community dominated by herbaceous plants outside scheme site



Figure 21: Labiate garrigue/ phrygana with Mediterranean thyme



Figure 22: Lentisk scrub invaded with *Agave* spp.



Figure 23: Aerohaline communities along the rocky shore with endemic sea lavenders



Figure 24: *Elymus pycnanthus* (Sea couch), an endangered grass growing naturally on the rocky shore



Figure 25: Slopes of former landfill subjected to ecological reclamation through afforestation



Figure 26: Artificial pond with wetland vegetation



Figure 27: Area with exposed bedrock to be developed into a Waste-to-Energy Facility



Figure 28: Landscaped areas of the Anaerobic Digestion Plant

5.3. Fauna

Even though the AoS has been subjected to artificial modification, the rural environment present provides a variety of potential habitats and resources to fauna.

5.3.1. Invertebrates

The most common invertebrate fauna observed in the AoS are plant-associated arthropods.

The hymenoptera were the most common. The most frequent during early summer was the pollinator *Apis mellifera* (Honeybee), while *Xylocopa violacea* (Large carpenter bee) was observed twice. The number of *Polistes* sp. (Paper wasp) and their nests was noticeably higher during late summer.

Of more importance for the scope of the present report because of their legal protection are *Colias croceus* (Clouded yellow), and the endemics *Papilio machaon melitensis* (Maltese swallowtail) (Figure 29) and *Lampyrus pallida* (Maltese glow worm) (Figure 30), all of which were recorded in April.

Other non-protected lepidopterans observed in the early dry season were adult *Pieris brassicae* (Cabbage white) and *Pieris rapae* (Small white), and a larva of *Lasiocampa trifolii* (Grass eggar). Adult *Vanessa cardui* (Painted lady) were observed in September.

One abundant coleopteran encountered during the early summer surveys was *Labidostomis taxicornis* (Leaf beetle), which was largely associated with lentisk shrubs. In late summer, lentisk shrubs exhibited reddish leaf galls typical of the aphid *Aploneura lentisci* (Mealy grass root aphid).

Specimens of *Coccinella septempunctata* (Seven-spot ladybird) and *Graphosoma lineatum* (Striped shield bug) were observed in September. Previous studies carried out in February 2021 also reported the presence of the phytophagous beetle *Oxythyrea funesta* (White-spotted barbary beetle) on flowers, and *Chnootriba elaterii* (Gourd ladybird) on squirting cucumber plants (Zammit et al., 2021).

A rain episode in the second week of August 2022 led to the occurrence of water puddles, which contained larvae of Stratiomyidae (Soldier flies) and *Culex* sp. (Mosquito). The presence of water in the same period also attracted a number of dragonflies, including *Crocothemis erythraea* (Broad scarlet) and *Orthetrum trinacria* (Long skimmer), with the latter being of conservation value.

The presence of *Cicada barbara* (Cicada) was inferred by the its sound during late summer.

Terrestrial molluscs observed comprised *Cornu aspersum* (Edible snail), *Eobania vermiculata* (Red-banded snail), *Rumina decollata* (Decollate snail), *Theba pisana* (White garden snail) and the endemic *Tudorella melitense* (Maltese round-mouthed snail).

5.3.2. Vertebrates

5.3.2.1. Herpetofauna

The reptiles encountered within the scheme site include six specimens of *Tarentola mauritanica* (Moorish gecko) (Figure 32) basking on the walls of rural structures and one specimen of *Hierophis viridiflavus carbonarius* (Black whip snake) (Figure 33), which was trapped in a small water reservoir.

Within the AoS but outside the scheme site, *Hierophis viridiflavus carbonarius* (Black whip snake) was observed on another occasion in the landscaped area of the Anaerobic Digestion Plant. A dead specimen of *Telescopus fallax* (Cat snake) (Figure 34) was also recorded.

At least four specimens of *Chalcides ocellatus* (Ocellated Skink) were observed partly exposed from rubble walls and one *Chamaeleo chamaeleon* (Mediterranean chameleon) (Figure 35) was present in disturbed ground with nearby lentisk scrub. The occurrence of *Podarcis filfolensis maltensis* (Maltese wall lizard) was more evident along the rocky shore due to the lower vegetation cover and were observed regularly on multiple days during visits.

The presence of *Chalcides ocellatus* (Ocellated Skink) and *Podarcis filfolensis maltensis* (Maltese wall lizard) was also reported in the area in previous studies (Zammit 2017; Zammit et al., 2021).

5.3.2.2. Mammals

Previous studies reported that the area is frequented by *Atelerix algirus* (Algerian hedgehog) and *Rattus* sp. (Rat) (Zammit et al., 2021). During the present study, one live specimen of *Atelerix algirus* (Algerian hedgehog) was encountered (Figure 36) and the regular observation of droppings along dirt roads and exposed bedrock (Waste-to Energy development site) could be an indication that the species is relatively abundant in the area. Droppings typical of *Oryctolagus cuniculus* (Wild rabbit) were also encountered once on tilled soil within the agricultural land.

The highest proportion of mammals is represented by bats which use the area for commuting and foraging. The surveys using the passive bat detector have shown that the area is mostly frequented by pipistrelles, namely *Pipistrellus kuhli* (Kuhl's pipistrelle), *Pipistrellus pipistrellus* (Common pipistrelle) and *Hypsugo savii* (Savi's pipistrelle). Another less frequently recorded bat species is *Plecotus gaisleri* (Gaisler's long-eared bat). Sample sonograms which aided in the identification of these species are illustrated in Figure 37-Figure 40.

Some built structures have the potential to be used by bats as roosting sites. Accessible buildings within the scheme site were investigated for potential bat roosting activity but no evidence was found. The pre-dawn surveys did not yield any indications of bat roosts either.



Figure 29: *Papilio machaon melitensis* (Maltese swallowtail) observed within the scheme site



Figure 30: *Lampyris pallida* (Maltese glow worm) larva observed within the scheme site



Figure 31: *Orthetrum trinacria* (Long skimmer) observed within the AoS



Figure 32: *Tarentola mauritanica* (Moorish gecko) observed within the scheme site

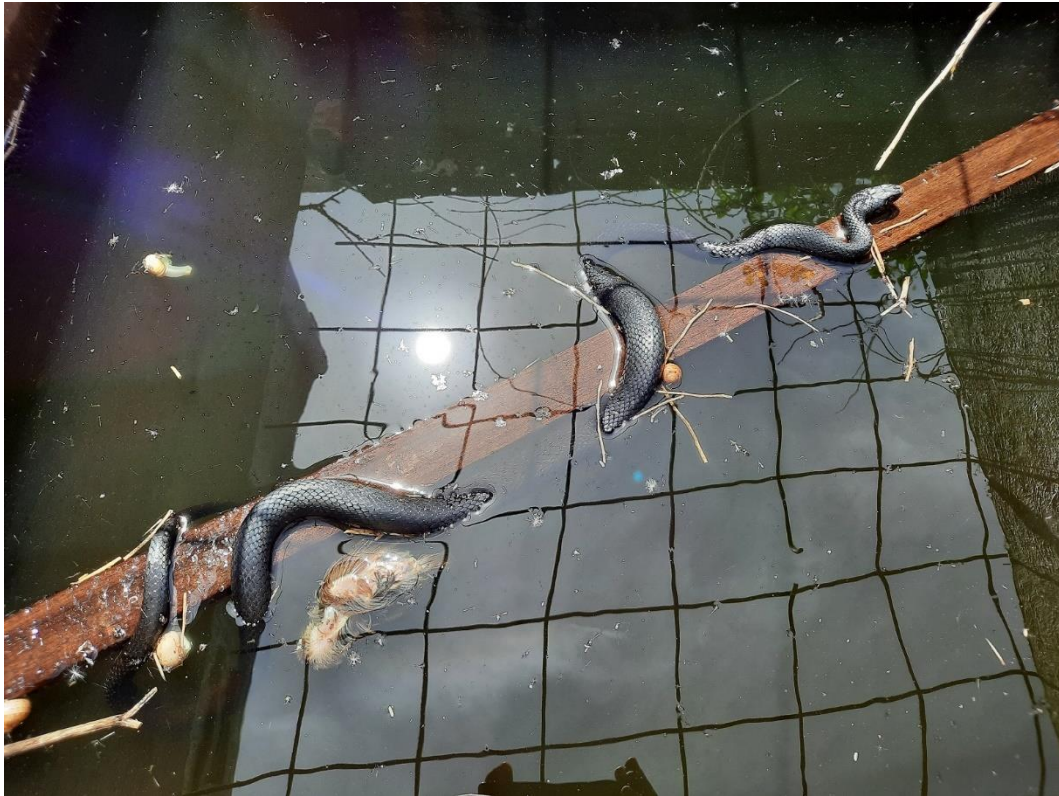


Figure 33: *Hierophis viridiflavus carbonarius* (Black whip snake) observed within the scheme site



Figure 34: *Telescopus fallax* (Cat snake) observed within the AoS



Figure 35: *Chamaeleo chamaeleon* (Mediterranean chameleon) observed within the AoS



Figure 36: *Atelerix algirus* (Algerian hedgehog) observed within the AoS

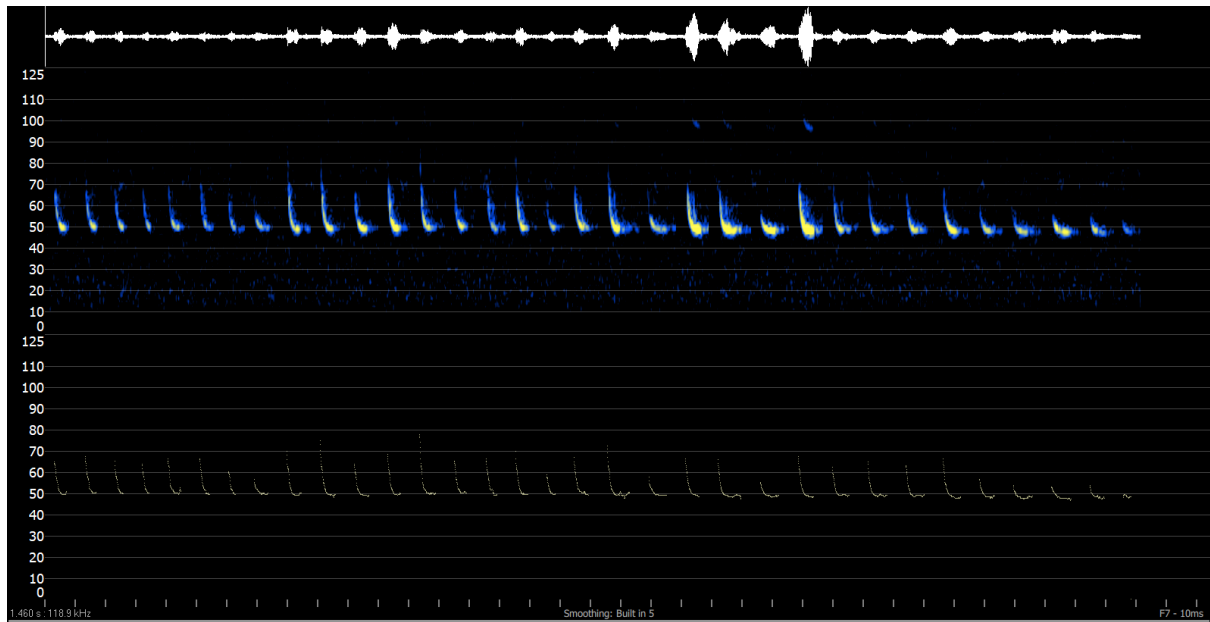


Figure 37: Bat echolocation sonogram with characteristics typical of *Pipistrellus pipistrellus* (Common pipistrelle) – File reference 20220520041120

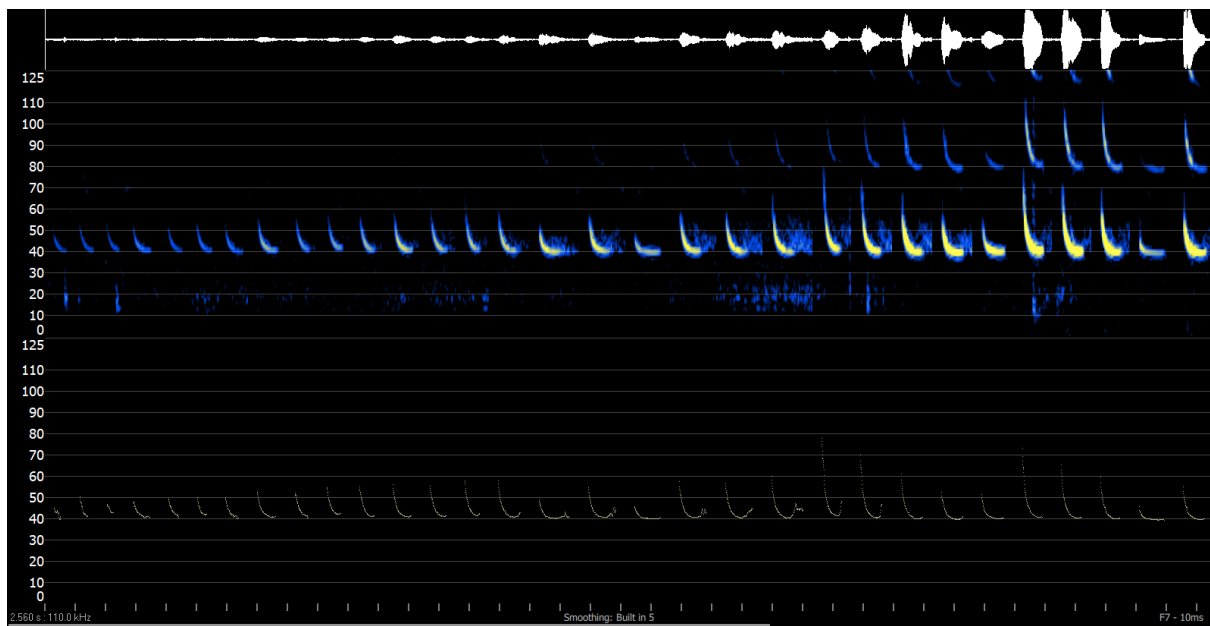


Figure 38: Bat echolocation sonogram with characteristics typical of *Pipistrellus kuhli* (Kuhl's pipistrelle) – File reference 20220518203842

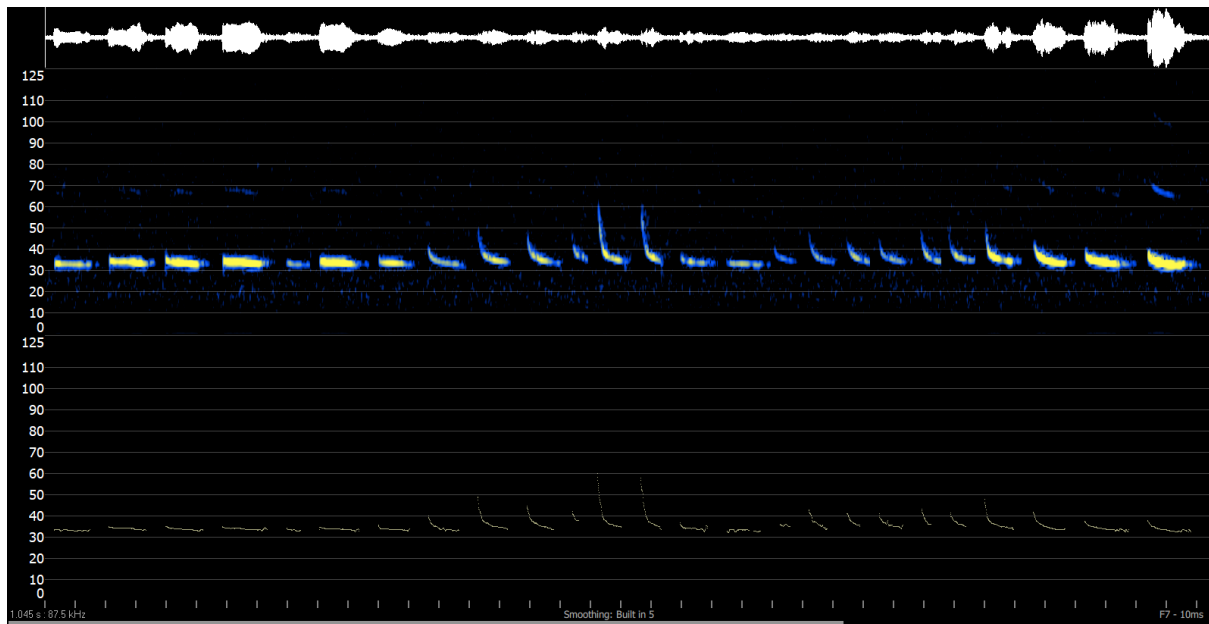


Figure 39: Bat echolocation sonogram with characteristics typical of *Hypsugo savii* (Savi's pipistrelle) – File reference 20220523202404

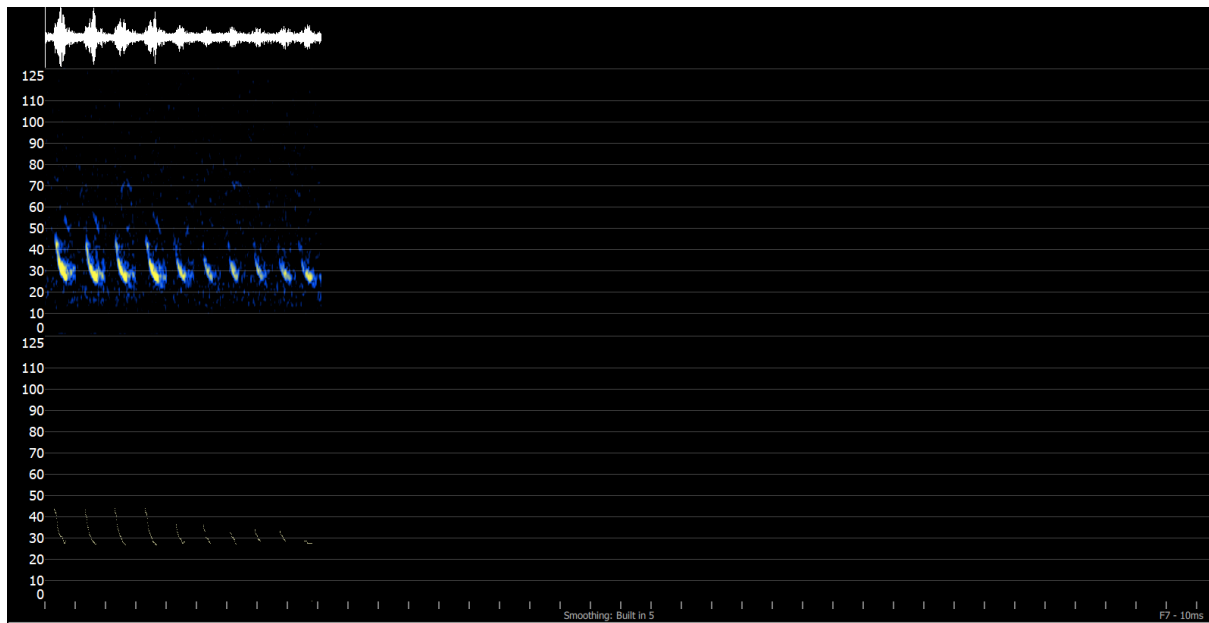


Figure 40: Bat echolocation sonogram with characteristics typical of *Plecotus gaisleri* (Gaisler's long-eared bat) – File reference 20220520222402

5.3.2.3. Avifauna

The AoS is not a protected area for birds, however there are a number of protected areas in the immediate proximity which are of both local and international importance. Hence, any development within the AoS could have an effect on the resources found here. The author (JD) is unaware that any development to be built within the AoS will have any structures such as pipelines etc. which cross any

of the protected areas. This doesn't imply that avian receptors found in or flying across the protected areas will not be impacted by the proposed development hence this assessment.

The closest protected area touches the edge of the AoS whereas the further ones are around 1.5 km away. Since most of the avian receptors in the area are migratory, such distances are considered as very small and so such receptors could easily be impacted by any development. This is mainly for those which are affected by light, noise or atmospheric discharges.

Żona fil-Baħar Madwar Għawdex

The Żona fil-Baħar Madwar Għawdex is a large marine Special Protection Area stretching from Qalet Marku in Malta extending several kilometres off the coast around Malta and Gozo and ending at Ras il-Waħx in the limits of Mellieħa. The site was identified in the Maltese marine IBA inventory as result of the EU LIFE+ Malta Seabird Project (LIFE10NAT/MT090) due to its importance for Scopoli's Shearwater (*Calonectris diomedea*), and Yelkouan Shearwater (*Puffinus yelkouan*) during the breeding season.

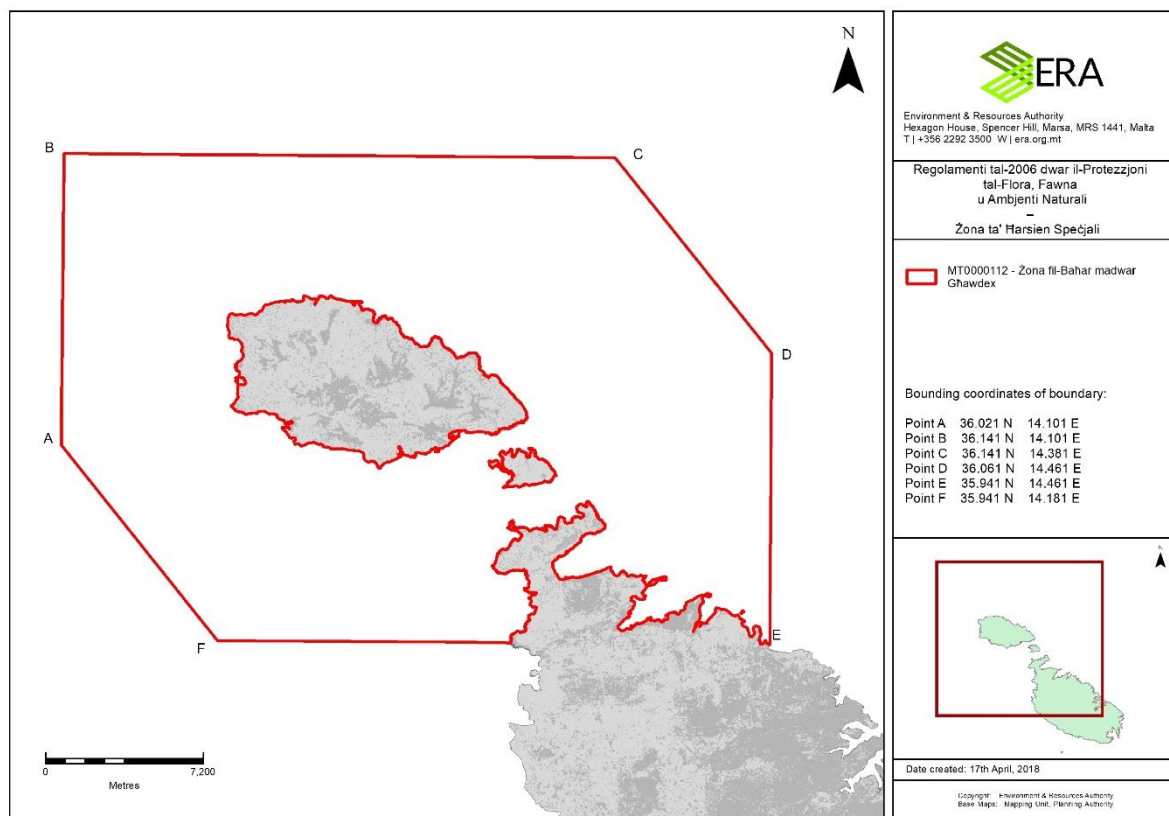


Figure 41: Żona fil-Baħar Madwar Għawdex Special Protection Area

EU LIFE+ Malta Seabird Project (LIFE10 NAT/MT090)

The LIFE+ Malta Seabird Project was led by Birdlife Malta in collaboration with the Ministry of Sustainable Development, The Environment and Climate Change, the RSPB and SPEA (Birdlife in Portugal). The project ran between September 2011 and June 2016.

The project utilised high-end technology to gather results about the lives of the three species of tubenoses breeding in Malta. These results showed that these species utilise various parts of the areas around the Maltese islands for rafting prior to moving into their nests and also for feeding.

One of the major concerns for these species is disturbance from light sources which tend to keep adults at bay refraining from flying back into their nests and also disorients the offspring when they fly out of their nests hence light has a significant impact on the lives of these species.

The final outcome from this project was the declaration by the Maltese Government of a number of Marine Protected Areas around the islands, three of which are relevant to this project (Figure 42).

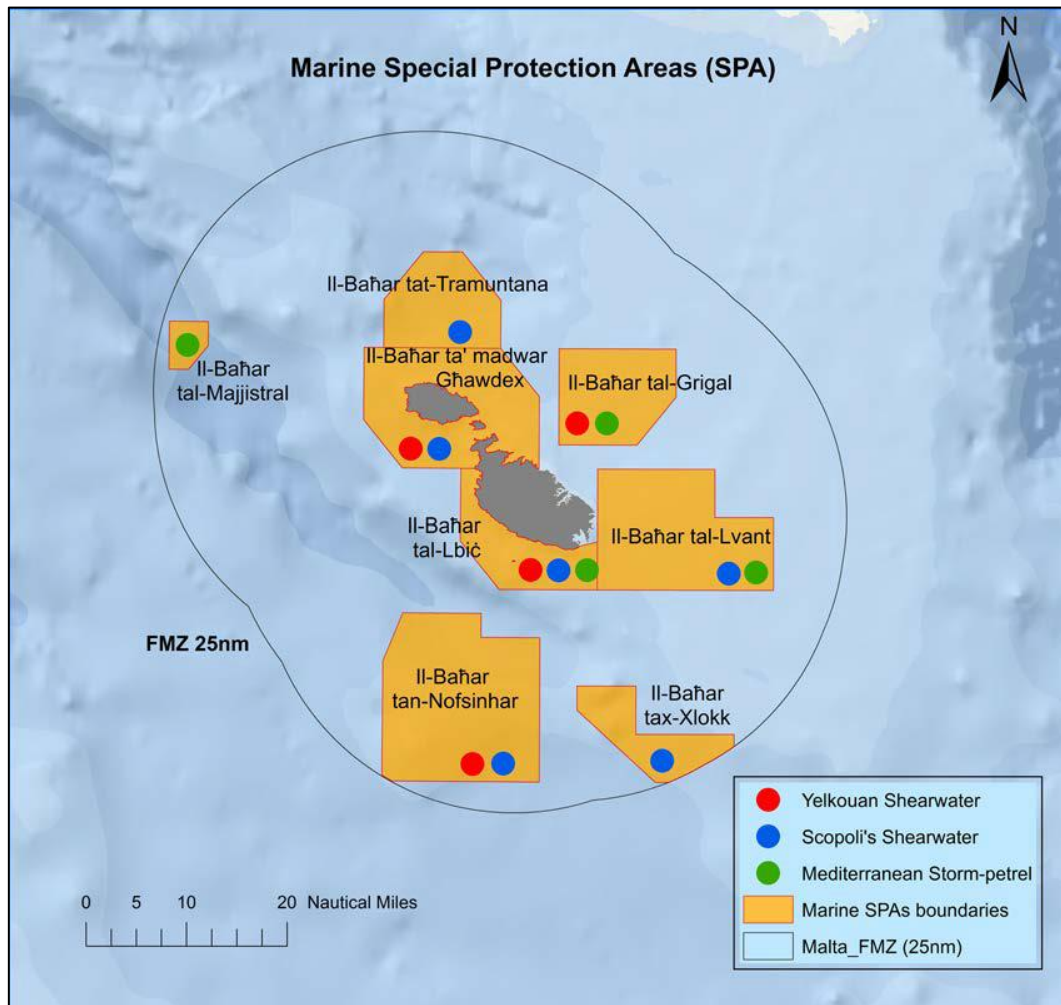


Figure 42: Marine SPAs around the Maltese Islands (source BLM, 2015)

L-Għadira s-Safra u l-Iskoll tal-Għallis

L-Għadira s-Safra u l-Iskoll tal-Għallis is a Special Area of Conservation of International Importance between Għallis and Qalet Marku. It consists of a temporary rainwater body in a bed of Lower Coralline Limestone less than a metre above sea level. The temporary pool supports biotic assemblages that are typical of freshwater habitats during the wet period and halophytic species colonise the area around the pool.

L-Iskoll tal-Għallis have characteristics of rocky shoals as the sea inundates them for a significant part of the year and consequently they neither support terrestrial vegetation nor a real supralittoral zone. However, this shoal is a significant resident, resting and foraging site for avifauna and also important for migratory birds.

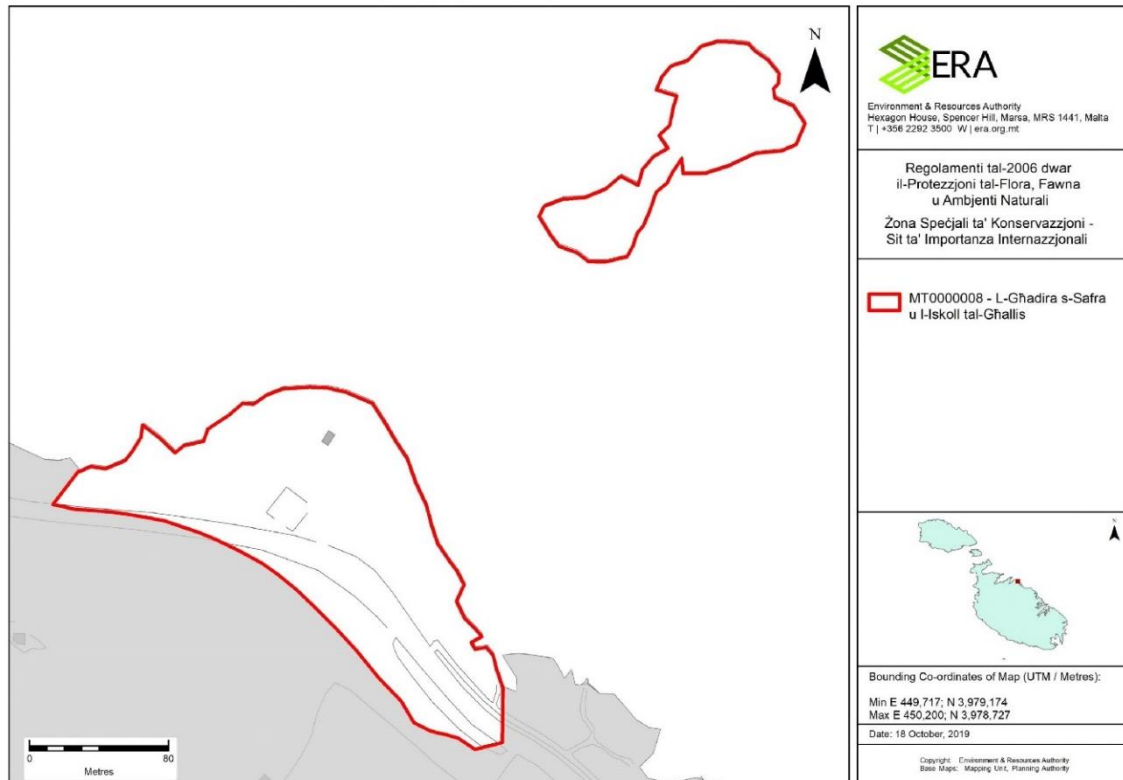


Figure 43: L-Għadira s-Safra u l-Iskoll tal-Għallis Special Area of Conservation

Is-Salini

This site is a Special Area of Conservation of International Importance and one of the last remaining salt marshes in the Maltese Islands. It supports a number of endemic flora and fauna, as well as a considerably large number of rare, endangered and/or locally threatened species. Is-Salini, following the dredging and reclamation of the Marsa marsh system in the 19th century, is the largest extant marshland in the Maltese Islands. In the past, it used to be more extensive but was reduced due to reclamation of the upper stream area of Burmarrad for health and agricultural aspects. Other parts were later developed (Ta' Mattew area) or afforested and turned into a recreational area (Kennedy Grove). The latter has been planted by trees such as pines, olives and tamarisks. A canal runs on the left and to the right of the salt pans. This canal, known as Tas-Sokkorsu, provides freshwater to the marsh. Maritime shrubs and reeds are common along the sides of the canal, which are mostly composed of wrack, mainly seagrass debris. The inner parts of the canal are characterised by reeds and these are important in particular to reed-associating birds. The estuary of Is-Salini is very dynamic and dependent on the accretion and deposition caused by dead sea grass foliage. Pockets of garrigue remnants are found on the border of the saltmarsh.

The area is characterised by a bay in which sea water intermixes with rain water originating from a complex of valley systems leading to Is-Salini. This forms an estuary with salt marsh and freshwater vegetation. The salt marsh is very species diverse and the species composition at Is-Salini is different

from the other salt marshes in the Maltese Islands, since it is a mixture of freshwater elements and marsh species.

The salt pans and salt marsh area is an important ornithological site for migratory birds. It is also an important habitat for salt marsh and brackish water species.

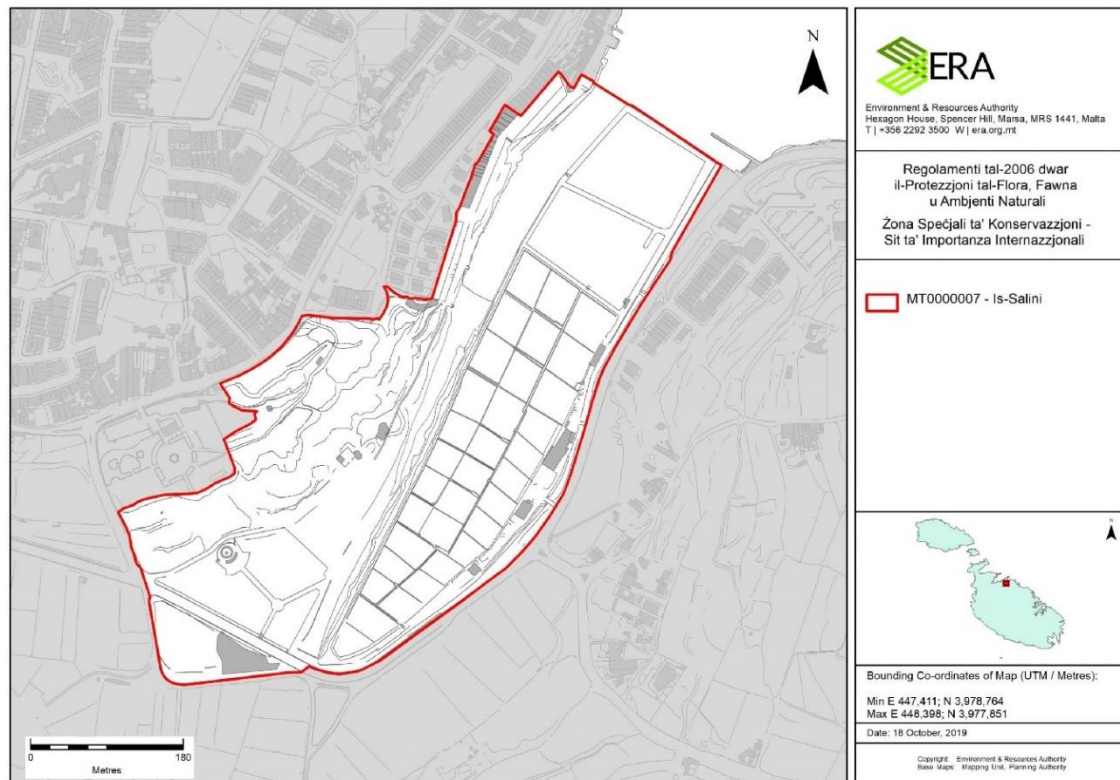


Figure 44: Is-Salini Special Area of Conservation

International Conservation Status

The best source of data currently available to understand the status of wild birds is that provided by Birdlife International through its publication European Birds of Conservation Concern (EBCC), which is in its third review of the conservation status of all wild birds in Europe. The aim of the publication was to identify priority species (Species of European Conservation Concern, or SPECs) in order that conservation action can be undertaken to improve their status.

The geographical range for the data collection extends from Greenland to the Urals and from Macaronesia in the southwest to the Caucasus in the southeast. Data was collected through a network of national coordinators who sought input from experts, organizations, and an army of field workers.

The methodology used in previous assessments was also used in the third version thus maintaining consistency.

The following five categories were developed in order to classify each species:

Category	Description
SPEC 1	European species of global conservation concern i.e. Critically Endangered, Vulnerable or Near Threatened at global level (Birdlife International 2016 a)
SPEC 2	Species whose global population is concentrated in Europe, and which is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Declining, Depleted or rare at European level (Birdlife International 2015, Butterfield <i>et al</i>)
SPEC 3	Species whose global population is not concentrated in Europe and which, but which is classified as Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near threatened, Declining, Depleted or rare at European level (Birdlife International 2015, Butterfield <i>et al</i>)
Non-SPEC ^E	Species whose global population is concentrated in Europe, but whose population status is currently considered to be Secure (Butterfield <i>et al</i>)
Non-SPEC	Species whose global population is not concentrated in Europe and whose European population Status is currently considered to be Secure (Butterfield <i>et al</i>)

A species is considered as concentrated in Europe if more than 50% of its global breeding or wintering population or range occurs in Europe.

Table 4: Percentage of European species in each category in BiE1 (1994), BiE2 (2004) and BiE3 (2017)

Status	Birds in Europe 1994 (BiE1)	Birds in Europe 2004 (BiE2)	European Birds of Conservation Concern 2017 (EBCC)
SPEC 1	5	8	13
SPEC 2	8	9	7
SPEC 3	25	27	19
Non-SPEC ^E	16	18	60
Non-SPEC	46	39	

Table 4 shows that during the last fifteen years or so, birds in Europe continued to be threatened by widespread environmental change and many populations are in greater trouble than they were in the previous decade.

European Red List Assessment

The European Red List of Birds assessment follows the IUCN Red List Categories and Criteria (version 3.1, second edition)¹ as well as the Guidelines for Using the IUCN Red List categories and Criteria (version 14, August 2019)². The extinction risk of a species can be assessed at global, regional or national levels. It is quite common for a species to be listed in different Red List categories on the Global IUCN Red List and a Regional Red List. Figure 45 shows the IUCN Red List Categories used at a regional scale. To avoid under or overestimating a particular species, the Guidelines for Application of IUCN Red List Criteria at Regional and National Levels (version 4.0)³ are applied.

¹ <https://portals.iucn.org/library/node/10315>

² <https://www.iucnredlist.org/resources/redlistguidelines>

³ <https://www.iucn.org/content/guidelines-application-iucn-red-list-criteria-regional-and-national-levels-version-40>

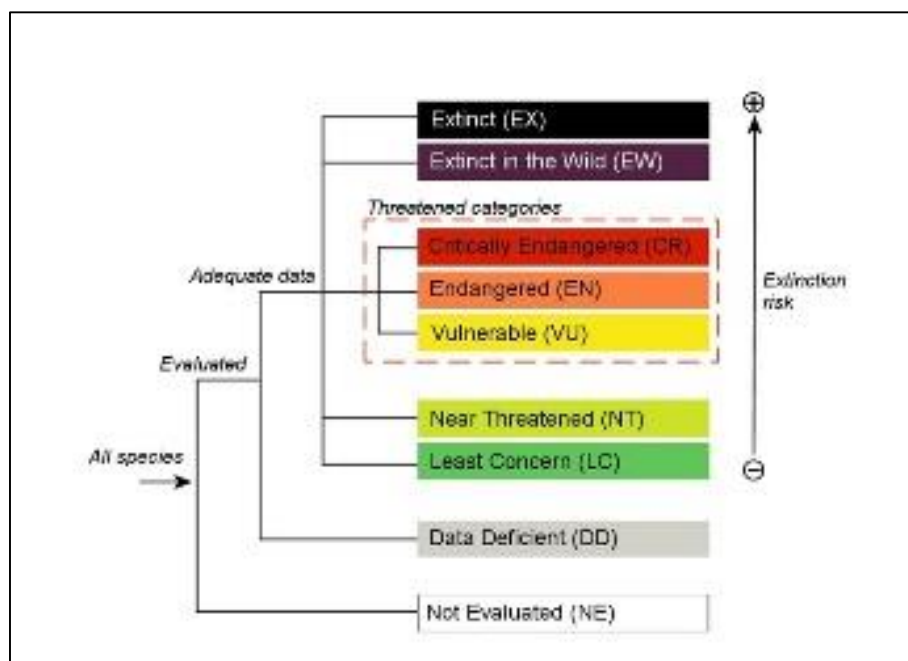


Figure 45: IUCN Red List Categories at a regional scale

The assessment of the European Threat Status is based on the minimum European population size and the percentage of the total European population which is in countries where populations have declined. These criteria have therefore had to take into consideration the quality and availability of information on European bird populations, and calculations are thus based on categories of population trend rather than precise figures.

The assessment used in this report is based on data reported by the 28 Member States of the European Union (EU)⁴ under Article 12 of the EU Birds Directive, as described in the State of Nature in the EU Methodological paper⁵, as well as national reports from 22 countries and territories in Europe which are not part of the EU.

The latter were collated by BirdLife International through national experts, coordinators of bird monitoring programmes and organisations, including BirdLife International Partners and many others. The reports were submitted in 2019-2020 and included information on the size and trend of populations and distributions of individual bird species. Additional sources such as scientific reports, national atlases and Red Data Books, as well as peer-reviewed literature were also used to make sure the most recent data available were considered.

These assessments are made on the basis of breeding season data unless a species qualifies on winter data. Assessment of overall population trends based solely on the basis of the quantitative data which are available would introduce regional biases and therefore be invalid.

The criteria used in establishing the threat status was as follows:

- **Extinct [EX]** No reasonable doubt that last individual has died.

⁴ As it stood in 2019, and therefore at the time, still comprising the UK (hereafter referred to as "the EU28 or just "EU", a level for which regional Red List assessments have also been previously undertaken in 2020 for native species that regularly occur within the region).

⁵ Roschel, L., Noebel, R., Stein, U., Naumann, S., Romao, C., Tryfon, E., Gaudillat, Z., Roscher, S., Moser, D., Ellmauer, T., Lohnertz, M., Halada, L., Staneva, A. and Rutherford, C. A. (2020). State of Nature in the EU - Methodological paper. Methodologies under the Nature Directives reporting 2013-2018 and analysis for the State of Nature 2000. ETC/BD report to the EEA.

- **Regionally Extinct [RE]** Where no reasonable doubt that the last individual in Europe has died. (If it is possible that the species survives, then it is CR (PE), i.e. Possibly Extinct).
- **Critically Endangered [CR]** if the European population meets any of the IUCN Red List Criteria for Critically Endangered species. Such species have an Unfavourable conservation status in Europe because they are considered to be facing an extremely high risk of extinction in the wild (IUCN, 2001).
- **Endangered [EN]** if the European population meets any of the IUCN Red List Criteria for endangered species. Such species have an Unfavourable conservation status in Europe because they are considered to be facing an extremely high risk of extinction in the wild (IUCN, 2001).
- **Vulnerable [VU]** if the European population meets any of the IUCN Red List Criteria for vulnerable species. Such species have an Unfavourable conservation status in Europe because they are considered to be facing an extremely high risk of extinction in the wild (IUCN, 2001).
- **Least Concern [LC]** if its European population does not meet any of the criteria listed above.

European Birds Directive

The EU Birds Directive (transposed into LN 79 of 2006 [S.L.549.42]) provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. The main provisions of the Directive include, amongst others:

- The maintenance of the populations of all wild bird species across their natural range with the encouragement of various activities to that end.
- The identification and classification of Special Protected Areas (SPAs) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance. Together with Special Areas of Conservation (SAC) designated under the Habitats Directive, SPAs form a network of European protected areas known as Natura 2000 sites.
- The establishment of a general scheme of protection for all wild birds including specification of conditions under which hunting and falconry can be undertaken. Huntable species are listed on Annex II of the Directive.

The Birds Directive is a primary tool for delivery against EU obligations under global Conventions, including the Convention on Biological Diversity, the Ramsar and Bonn Conventions and the Plan of implementation of the World Summit on Sustainable Development. The EU had also committed itself to halting biodiversity decline by the year 2010. The full and proper implementation of both the Birds and Habitats Directives including the proper designation and adequate management of Natura 2000 sites should have been crucial to achieving this target.

EU member states are obliged under the above-mentioned Directives to:

- Take measures to conserve all naturally occurring bird species across the EU;
- Classify as Special Protected Areas (SPAs) the most suitable territories for species listed on Annex I of the Directive and migratory species;

- Maintain SPAs in Favourable conservation status;
- Prepare and implement management plans, setting clear conservation objectives for all SPAs in the EU 28;
- Provide co-financing of the management of these SPAs;
- Regulate hunting of certain species of birds listed in Annex II of the Birds Directive;
- Follow the procedure outlined in Article 6 of the Habitats Directive for carrying out appropriate assessments of environmental impacts on SPAs.

Review of potential breeding species within the AoS and its proximity

A review of bird species which have been recorded breeding within the AoS and in its proximity was undertaken using the Malta Breeding Bird Atlas 2018 as a source of information. The following species were recorded breeding:

Species	Within AoS/ Outside AoS
Sardinian Warbler (<i>Sylvia melanocephala</i>)	within AoS
Zitting Cisticola (<i>Cisticola juncidis</i>)	within AoS
Spanish Sparrow (<i>Passer hispaniolensis</i>)	within AoS
Blue rock Thrush (<i>Monticola solitarius</i>)	within AoS
Spectacled Warbler (<i>Sylvia conspicillata</i>)	outside AoS
Cetti's Warbler (<i>Cetta cetti</i>)	outside AoS
Greater Short-toed Lark (<i>Calandrella brachydactyla</i>)	outside AoS
Cattle Egret (<i>Bubulcus ibis</i>)	outside AoS ⁶
Little Egret (<i>Egretta garzetta</i>)	outside AoS ⁶

The only species which are listed in Annex I of the Birds Directive are the Little Egret and the Greater Short-toed Lark. Whereas the Little Egret is a Non-SPEC species the Greater Short-toed Lark is a SPEC 3 species.

Avian data together with their local and conservation status (SPEC and European Threat Status) and whether they are Birds Directive Annex I species were collated from the following sources and shown in Table 16. The sources used were:

- A list of birds recorded during surveys during period 2018-19 at the Salina Nature Reserve, together with those recorded during field surveys (2020-22) within the AoS and in the proximity.
- Birds listed by Gatt M.C. and Metzger B. (Zammit et al., 2021) as recorded, expected to cross or be present within six kilometres of the WtE plant.

⁶ Breed on cages of Bird Park

There are various species which are shown on Table 16 which were recorded or reviewed as either SPEC 1 or Annex I species. These can be split between those which could occur or be recorded within the AoS and those which could be recorded within the protected areas found just outside the AoS. In the latter case, those which are of main concern are the seabirds, namely the Scopoli's (Annex I and Non-SPEC) and Yelkouan Shearwater (Annex I and SPEC 1) and the Storm Petrel (Annex I and Non-SPEC).

The closest colonies of the Shearwaters are found along the I-Aħrax tal-Mellieħa cliffs and on Comino. Higher numbers of Yelkouan Shearwater are found breeding here when compared to the Scopoli's. A small number of Storm Petrel have also been recorded breeding along the Aħrax cliffs. The designation of the Marine SPA Żona fil-Baħar Madwar Għawdex was mainly due to the presence of these three species.

Shearwaters are usually seen flying a few centimetres above the water level several hundreds of metres away from the shore, albeit sometimes one can also witness some pretty close. Occasionally, one can witness birds rafting. Storm Petrels are harder to see from the shore since they are very small birds. The presence of fish farms offshore has also changed the dynamics of these birds which are occasionally seen flying close by these structures. Borg J.J. (2013) reports the presence of double and treble figures of Storm Petrels around fish farms.

The main concern with regards to the Shearwaters is light during the night. This is mainly due to the fact that these species tend to fly back to their nests during the night and can easily get disoriented by light. Several fledglings are recovered annually from land as a result of this. In the case of adults, the issue mainly concerns that adults do not return to their nests if there is light in the proximity.

Other Annex I species which could potentially be recorded in the proximity of the AoS or within it are the several gull species which feed within the ECOHIVE complex or bathe in the artificial ponds of the same complex. These are the Mediterranean gull, Little gull, Slender-billed gull and Audouin's gull. None of these breeds in Malta and are only recorded here mainly between late summer and early spring. They are usually recorded rafting at sea just off I-Għadira s-Safra and flying inland to feed at the landfill at the Ecohive complex, then they bathe in the artificial ponds or at sea. They are also regularly recorded at the Salina Reserve. Out of these species, the Mediterranean gull is considered as a Non-SPEC species which has a status of Least Concern in Europe. The Little gull has a similar European threat status but falls within a SPEC 3 category. Both the Slender-billed Gull and the Audouin's gull both are in the Non-SPEC category but are listed as Vulnerable on a European threat status list mainly due to their decreasing populations. Whereas locally, the Mediterranean gull is recorded in high numbers especially during winter, the other species are only recorded in very low numbers, reaching single or double digits.

The tern species which are Annex I species are mainly found or possibly found along the coast or at sea albeit some (Common gull-billed tern, Caspian tern and Sandwich tern) have also been recorded at the Salina Reserve. They are mainly recorded locally in low single or double figures and are mainly migrants. They all have a threat status of Least Concern in Europe whereas their SPEC category varies between SPEC 3 and Non-SPEC.

The only other Annex I species which could potentially breed in the AoS is the Greater short-toed lark which had been recorded as possible breeding in the vicinity of the AoS.

All the other Annex I species can only be recorded flying across the AoS or feeding during migration or in some cases wintering. With the exception of three species of birds of prey which are mainly recorded during migration and have a European Threat Status of Vulnerable, the rest all have a threat status of Least Concern.

The impacts which could result from the development on the proposed sites within the AoS are mainly those associated with the loss of habitat and food availability for avian receptors, mainly migrants, wintering and resident species. Illumination of the various parts of the facilities could also impact species which are impacted by light such as nocturnal migrant species and also Shearwaters, much depending on the level and height of illumination and hence visibility from the sea. This must be seen in the context that the level of illumination and land uptake will increase over time thanks to the fact that the WtE facility has already been greenlighted and that there is already the AD plant within the AoS. Hence the impacts are more of a cumulative nature rather than individual one.

6. Ecological value and Level of Protection

The scheme site and AoS comprises a number of features of ecological interest that have been designated and/ or protected by a number of legal and policy instruments for their environmental qualities, as follows:

- Listed Ecological Area subject to Central Malta Local Plan (CMLP) Policy CG22 as indicated in Figure 46.
- Agricultural areas (awaiting classification of Agricultural Value) in accordance with CMLP Policy CG24 as indicated in Figure 46.

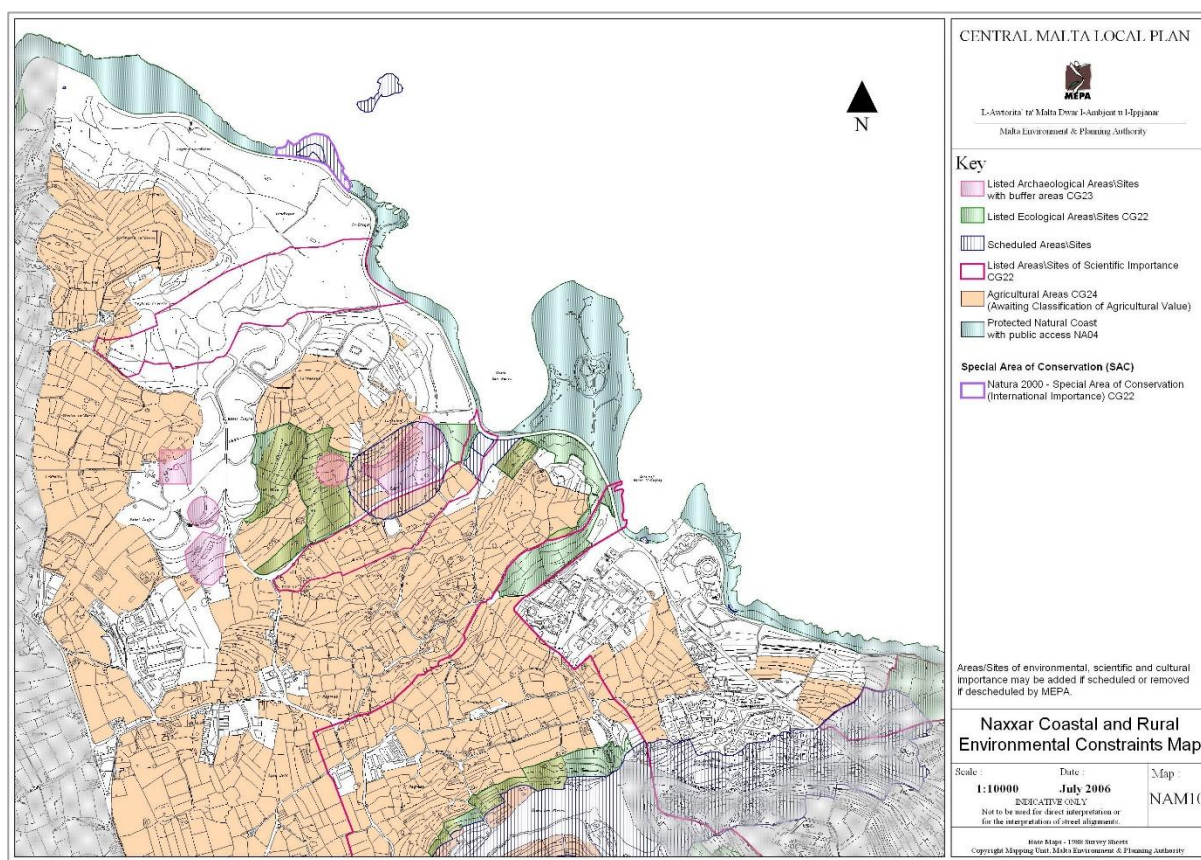


Figure 46: Naxxar Coastal and Rural Environmental Constraints Map (MEPA, 2006)

- Rubble walls and non-habitable rural structures are protected by virtue of SL 552.01 due to their affording of a habitat for flora and fauna.
- The habitats listed in Table 9 are listed in Schedule I of SL 549.44 and therefore subject to the relevant legal provisions. The indicated conservation status is based on the Habitats Directive Article 17 report for the year 2019.
- The species listed in Table 10-Table 14 are subject to the legal provisions as indicated in accordance with their listing in the relevant schedules. The conservation status of species listed in Schedule V of SL 549.44 and in the RDB of the Maltese Islands is also provided. It is important to point out that all endemic species are protected by Regulation 26 of SL 549.44,

except for those species listed in Schedule X of the same legal notice. The definitions of the relevant regulations, and the terms and symbols associated with the legal and conservation status are provided in Table 5-Table 8.

- All trees that are visible on the 1967 aerial photos or are more than fifty (50) years of age, are protected if located within protected areas and ODZ as per SL 549.123 Schedule I Part B. Table 15 provides detailed information on the trees present within the scheme site including species, quantities and age.
- The species listed in SL 549.44 Schedule VIII are considered to be of national interest whose taking in the wild and exploitation may be subject to management measures. However, there are no established management measures for the recorded species and therefore their occurrence does not present any constraints.
- The bird species listed in Table 16 are subject to the legal provisions as indicated in accordance with their listing in the Birds Directive. The International Conservation and Threat Status are also provided.

Table 5: Titles of relevant regulations

Code	Title
SL 10.10	Wild Thyme (Protection) Regulations
SL 10.22	Conifer Trees (Preservation) Regulations
SL 549.02	Reptiles (Protection) Regulations
SL 549.44	Flora, Fauna and Natural Habitats Protection Regulations
SL 549.90	Protection Of Wild Rabbit Regulations
SL 549.119	Control of Invasive Alien Species of European Union Concern Regulations
SL 549.120	Species Protection (Designation of National Species) Regulations
SL 549.123	Trees and Woodlands Protection Regulations

Table 6: Definitions of relevant schedules in SL 549.44

Schedule	Definition
Schedule V	Animal and plant species of Community Interest in need of strict protection
Schedule VI	Animal and plant species of national interest in need of strict protection
Schedule VIII	Animal and plant species of national interest whose taking in the wild and exploitation may be subject to management measures
Schedule X	Endemic species not covered by Regulation 26
Reg 26	Protected endemic species

Table 7: Definitions of relevant schedules in SL 549.123

Schedule	Definition
Schedule I, Part A, Table 2	Trees protected within protected areas, in ODZ, in green areas, and in natural or rural/ green enclaves in an urban area (development zone), or in urban public open spaces
Schedule I, Part A, Table 2 (*)	As per Schedule I, Part A, Table 2, but are not protected if planted for agricultural purposes for fruit or oil production in a field registered for agricultural use with the Agriculture Directorate and used by a registered farmer
Schedule I, Part A, Table 2 (*)	As per Schedule I, Part A, Table 2, but are not protected if horticulturally grown
Schedule II	Invasive, alien or environmentally-incompatible species
Schedule II (†)	As per Schedule II, but are protected in urban public open spaces

Table 8: Definitions of relevant terms and symbols in RDB status

Symbol/ Term	Definition
Endemic	Taxon is endemic to the Maltese Islands
V	Taxon is vulnerable locally
R	Taxon is rare locally

Symbol/ Term	Definition
Rest (MI)	Taxon has a restricted distribution in the Maltese Islands
Rest (MED)	Taxon has a restricted distribution in the Mediterranean region
I	Taxon's status in the Maltese Islands is not known
(?)	following any other symbol signifies uncertainty in the information given

Table 9: Conservation status of relevant habitats listed in Schedule I of SL 549.44 present in the AoS (The sign '*' indicates priority habitat types)

Habitat	Habitats Directive Article 17 Report (Year)	Habitat Range and Area in Malta				Conclusion of Assessments				
		Surface area of range (km ²)	Trend of range	Surface area coverage (km ²)	Trend of surface area coverage	Range	Area	Specific structure & function	Future Prospects	Overall Conservation status
1240 - Vegetated sea cliffs of the Mediterranean coasts with endemic <i>Limonium</i> spp.	2019	146	Stable	3.16	Stable	Favourable	Favourable	Unfavourable - Bad	Unfavourable - Bad	Unfavourable – Bad
5410 - West Mediterranean clifftop phrygas (<i>Astragalo-Plantaginetum subulatae</i>)	2019	185	Stable	13.88	Stable	Favourable	Favourable	Unfavourable - Bad	Unfavourable - Bad	Unfavourable – Bad
6220 *Pseudo-steppe with grasses and annuals of the <i>Thero-Brachypodietea</i>	2019	205	Stable	9.56	Stable	Favourable	Favourable	Unfavourable - Bad	Unfavourable - Bad	Unfavourable – Bad

Table 10: Legal and conservation status of relevant plant species recorded during the field surveys

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
PINACEAE	<i>Pinus halepensis</i>	Aleppo pine		Schedule I Part A Table 2	SL 10.22	
CUPRESSACEAE	<i>Cupressus sempervirens</i>	Cypress			SL 10.22	
	<i>Tetraclinis articulata</i>	Alerce/ Sandarac Gum tree	Schedule III, Schedule VI	Schedule I, Part A, Table 1	S.L.549.1 20	E, Rest (MED+MI)
LAURACEAE	<i>Laurus nobilis</i>	Bay laurel		Schedule I Part A Table 2		R, Rest (MI)
PLUMBAGINACEAE	<i>Limonium zeraphae</i>	Zerafa's sea-lavender	Schedule III, Reg 26			Endemic, R, Rest (MI)
TAMARICACEAE	<i>Tamarix</i> sp.	Tamarisk		Schedule I Part A Table 2		R, Rest (MED+MI) [if <i>T. africana</i>]
CAPPARACEAE	<i>Capparis orientalis</i>	Caper	Schedule VIII			
EUPHORBIACEAE	<i>Ricinus communis</i>	Castor oil tree		Schedule II		
ROSACEAE	<i>Prunus dulcis</i> (= <i>Amygdalus communis</i>)	Almond		Schedule I Part A Table 2 (*)		
RHAMNACEAE	<i>Rhamnus alaternus</i>	Mediterranean buckthorn		Schedule I Part A Table 2		
FABACEAE	<i>Acacia saligna</i> (= <i>A. cyanophylla</i>)	Blue-leaved wattle		Schedule II	SL 549.119	
	<i>Ceratonia siliqua</i>	Carob		Schedule I Part A Table 2		
LYTHRACEAE	<i>Punica granatum</i>	Pomegranate		Schedule I Part A Table 2 (*)		
MYRTACEAE	<i>Eucalyptus gomphocephala</i>	Tuart tree		Schedule II (†)		
ANACARDIACEAE	<i>Pistacia lentiscus</i>	Lentisk		Schedule I Part A Table 2		

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
	<i>Schinus terebinthifolius</i>	Brazilian pepper tree		Schedule II		
APIACEAE	<i>Ferula melitensis</i>	Maltese ferule	Reg 26			
PITTOSPORACEAE	<i>Pittosporum tobira</i>	Japanese mock orange		Schedule II		
APOCYNACEAE	<i>Nerium oleander</i>	Oleander		Schedule I Part A Table 2 (*)		
	<i>Periploca angustifolia</i>	Wolfbane				Rest (MED)
SOLANACEAE	<i>Nicotiana glauca</i>	Shrub tobacco		Schedule II		
OLEACEAE	<i>Olea europaea</i>	Olive		Schedule I Part A Table 2 (*)		Rest (MI) (?)
	<i>Olea oleaster</i>	Wild olive		Schedule I Part A Table 2		Rest (MI) (?)
LAMIACEAE	<i>Micromeria microphylla</i>	Maltese savory	Schedule VIII			Rest (MED)
	<i>Thymbra capitata</i>	Mediterranean thyme	Schedule III		SL 10.10	No Specific category
OROBANCHACEAE	<i>Phelipanche nana</i> subsp. <i>melitensis</i>	Maltese dwarf sorrel broomrape	Schedule X			Endemic
ASTERACEAE	<i>Anthemis urvilleana</i>	Maltese sea chamomile	Schedule X			Endemic
	<i>Carlina involucrata</i>	Clustered carline thistle				Rest (MED)
	<i>Jacobaea maritima</i> subsp. <i>sicula</i> (= <i>Senecio bicolor</i>)	Silvery ragwort	Reg 26			
	<i>Phagnalon rupestre</i> subsp. <i>graecum</i>	Eastern phagnalon				Rest (MED)
ARECACEAE	<i>Chamaerops humilis</i>	Dwarf fan palm		Schedule I Part A Table 2		X (?), Rest (MED)
	<i>Phoenix</i> sp.	Date palm species		Schedule I Part A Table 2 [if <i>P. dactylifera</i>]		
POACEAE	<i>Desmazeria pignattii</i>	Pignatti's fern grass	Reg 26			Rest (MED)

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
	<i>Elymus pycnanthus</i>	Sea Couch				E, Rest (MI)
IRIDACEAE	<i>Iris</i> sp.	Iris	<i>Depends on species</i>			<i>Depends on species</i>
AMARYLLIDACEAE	<i>Allium polyanthum</i> (=A. <i>melitense</i>)	Many flowered garlic	Schedule X			
ASPARAGACEAE	<i>Urginea pancration</i>	Seaside squill	Schedule VIII, Schedule X			Rest (MED)
	<i>Ornithogalum narbonense</i>	Southern star-of-Bethlehem	Schedule VIII			

Table 11: Legal and conservation status of relevant plant species recorded in the area of study, which were not recorded in the present study but reported in previous studies (Zammit et al., 2021)

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
ASTERACEAE	<i>Senecio pygmaeus</i>	Pygmy groundsel	Schedule VI			RR, Rest (Med + MI)
ORCHIDACEAE	<i>Neotinea lactea</i>	Milky orchid	Schedule VI			

Table 12: Legal and conservation status of relevant invertebrate fauna species recorded during the field surveys

Class	Order	Family	Scientific Name	Vernacular Name	Legal Status	Malta RDB Status
					SL 549.44	
INSECTA	COLEOPTERA	LAMPYRIDAE	<i>Lampyrus pallida</i>	Maltese glow worm	Reg 26	V
	LEPIDOPTERA	PAPILIONIDAE	<i>Papilio machoan melitensis</i>	Maltese Swallowtail	Reg 26	Endemic (?)
		PIERIDAE	<i>Colias croceus</i>	Clouded Yellow	Schedule VI	
	ODONATA	LIBELLULIDAE	<i>Orthetrum trinacria</i>	Long Skimmer	Schedule VI	
GASTROPODA	LITTORINIMORPHA	POMATIIDAE	<i>Tudorella melitense</i>	Maltese round-mouthed snail	Reg 26	Endemic (?)

Table 13: Legal and conservation status of relevant vertebrate fauna species (excluding birds) recorded during the field surveys

Class	Order	Family	Scientific Name	Vernacular Name	Legal Status		Malta RDB status
					SL 549.44	Other	
REPTILIA	SQUAMATA	CHAMAELEONIDAE	<i>Chamaeleo chamaeleon</i>	Mediterranean chameleon		SL 549.02	
		SCINCIDAE	<i>Chalcides ocellatus</i>	Ocellated skink	Schedule V	SL 549.02	V, Rest (MED)
		LACERTIDAE	<i>Podarcis filfolensis maltensis</i>	Maltese wall lizard	Schedule V	SL 549.02	
		COLUBRIDAE	<i>Telescopus fallax fallax</i>	Cat Snake	Schedule V	SL 549.02	V, Rest (MED + MI)
			<i>Hierophis viridiflavus carbonarius</i>	Black whip snake	Schedule V	SL 549.02	V
		GEKKONIDAE	<i>Tarentola mauritica</i>	Moorish gecko	Schedule VI	SL 549.02	V
MAMMALIA	EULIPOTYPHLA	ERINACEIDAE	<i>Atelerix algirus</i>	Algerian hedgehog	Schedule V		
	LAGOMORPHA	LEPORIDAE	<i>Oryctolagus cuniculus</i>	Wild rabbit		SL 549.90	
	CHIROPTERA	VESPERTILIONIDAE	<i>Hypsugo savii</i>	Savi's pipistrelle	Schedule V		
			<i>Pipistrellus kuhlii</i>	Kuhl's pipistrelle	Schedule V		
			<i>Pipistrellus pipistrellus</i>	Common pipistrelle	Schedule V		
			<i>Plecotus gaisleri</i>	Gaisler's long-eared bat	Schedule V		

Table 14: Conservation status of species listed in Schedule V of SL 549.44 recorded during the field surveys

Species	Habitats Directive Article 17 Report (Year)	Conclusion of Assessments				
		Range	Population	Habitat for the species	Future Prospects	Overall Conservation status
1274 <i>Chalcides ocellatus</i> (Ocellated skink)	2019	Unknown	Unknown	Favourable	Unknown	Unknown
1237 <i>Podarcis filfolensis maltensis</i> (Maltese wall lizard)	2019	Favourable	Favourable	Favourable	Favourable	Favourable
1289 <i>Telescopus fallax fallax</i> (Cat snake)	2019	Unknown	Unknown	Favourable	Unknown	Unknown
5670 <i>Hierophis viridiflavus</i> (Black whip snake)	2019	Unknown	Unknown	Favourable	Unknown	Unknown
5978 <i>Atelerix algirus</i> (Algerian hedgehog)	2019	Favourable	Favourable	Favourable	Favourable	Favourable
5365 <i>Hypsugo savii</i> (Savi's pipistrelle)	2019	Favourable	Favourable	Favourable	Favourable	Favourable
2016 <i>Pipistrellus kuhlii</i> (Kuhl's pipistrelle)	2019	Favourable	Favourable	Favourable	Favourable	Favourable
1309 <i>Pipistrellus pipistrellus</i> (Common pipistrelle)	2019	Favourable	Favourable	Favourable	Favourable	Favourable

Species	Habitats Directive Article 17 Report (Year)	Conclusion of Assessments				
		Range	Population	Habitat for the species	Future Prospects	Overall Conservation status
6936 <i>Plecotus gaisleri</i> (Gaisler's long-eared bat)	2019	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate	Unfavourable - Inadequate

Table 15: Trees recorded within the scheme site and determination of their age

Scientific name	Vernacular name	Number of specimens	Age Range Estimation	
			Age Range	Inference
<i>Eucalyptus gomphocephala</i>	Tuart tree	Area A = 12	Between 10 and 50 years old	- Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph. - Ecologist's judgement due to specimens' size.
		Area A = 1	Less than 10 years old	Ecologist's judgement due to specimen's size.
<i>Acacia saligna</i>	Blue-leaved wattle	Area A = 4	Between 10 and 50 years old	- Presumed planted with other trees visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph. - Ecologist's judgement due to specimens' size.
		Area B = 1	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
<i>Cupressus sempervirens</i>	Cypress	Area A = 1	Between 10 and 50 years old	- Presumed planted with other trees visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph. - Ecologist's judgement due to specimens' size.
<i>Tamarix</i> sp.	Tamarisk	Area C = 3	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
<i>Ceratonia siliqua</i>	Carob	Area D = 36	Over 50 years old	Visible in 1967 Aerial Photograph.
<i>Prunus dulcis</i>	Almond	Area A = 14 Area D = 28	Between 10 and 50 years old	- Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph. - Ecologist's judgement due to specimens' size.
<i>Olea europaea</i>	Olive	Area D = 1	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
<i>Olea oleaster</i>	Wild olive	Area A = 1	Less than 10 years old	Ecologist's judgement due to specimens' size.
<i>Pistacia lentiscus</i>	Lentisk	Area A = 17 Area B = 32 Area D = 4	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph or associated with other trees visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.

Scientific name	Vernacular name	Number of specimens	Age Range Estimation	
			Age Range	Inference
				Ecologist's judgement due to specimens' size.
		Area D = 1	Less than 10 years old	Not visible in 2012 Orthophoto
<i>Opuntia ficus-indica</i>	Prickly pear	Area A = 2	Less than 10 years old	Ecologist's judgement due to specimens' size.
		Area B = 1	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
<i>Ficus carica</i>	Fig	Area A = 5	Less than 10 years old	Ecologist's judgement due to specimens' size.
		Area B = 2	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
		Area D = 8	Between 10 and 50 years old	Visible in 2012 Orthophoto but not visible in 1967 Aerial Photograph.
<i>Nerium oleander</i>	Oleander	Area A = 2	Less than 10 years old	Ecologist's judgement due to specimens' size.
Dead trees	N/A	Area A = 6 Area D = 1	N/A	N/A

Table 16: List of all birds recording from area and reviewed together with their local and conservation status (SPEC, European Threat Status and Birds Directive Annex I species)

Common name	Latin name	Status in Malta				International Protection Status			WtE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Common Shelduck	<i>Tadorna tadorna</i>		x	x		Non-SPEC	LC		x	x	x			
Eurasian Wigeon	<i>Mareca penelope</i>		x	x		Non-SPEC	LC		x		x			
Common Teal	<i>Anas crecca</i>		x	x		Non-SPEC	LC		x	x	x			
Mallard	<i>Anas platyrhynchos</i>		x	x		Non-SPEC	LC		x					
Northern Pintail	<i>Anas acuta</i>		x	x		SPEC 3	VU		x	x	x			
Garganey	<i>Spatula querquedula</i>		x			SPEC 3	LC		x	x	x			
Northern Shoveler	<i>Spatula clypeata</i>		x	x		Non-SPEC	LC		x	x	x			
Common Pochard	<i>Aythya ferina</i>		x	x		SPEC 1	VU		x		x			
Ferruginous Duck	<i>Aythya nyroca</i>		x			SPEC 1	LC	I	x	x				
Red-breasted Merganser	<i>Mergus serrator</i>		x	x		SPEC 3	NT		x		x			
Common Quail	<i>Coturnix coturnix</i>	VR	x			SPEC 3	NT		x		x			
Little Grebe	<i>Tachybaptus ruficollis</i>	VR		x		Non-SPEC	LC		x					
Great Crested Grebe	<i>Podiceps cristatus</i>		x	x		Non-SPEC	LC		x	x	x			
Black-necked Grebe	<i>Podiceps nigricollis</i>			x		Non-SPEC	VU		x	x	x			
Scopoli's Shearwater	<i>Calonectris diomedea</i>	x (SV)				Non-SPEC	LC	I	x			x	x	
Yelkouan Shearwater	<i>Puffinus yelkouan</i>	x (PR)				SPEC 1	VU	I	x					x
European Storm-petrel	<i>Hydrobates pelagicus</i>	x (SV)				Non-SPEC	LC	I	x					
Northern Gannet	<i>Morus bassanus</i>			x		Non-SPEC	LC		x		x			x
Great Cormorant	<i>Phalacrocorax carbo</i>			x		Non-SPEC	LC		x	x	x		x	x
Little Bittern	<i>Ixobrychus minutus</i>	VR	x			SPEC 3	LC	I	x	x				
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>		x			SPEC 3	LC	I	x	x	x			

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Squacco Heron	<i>Ardeola ralloides</i>		x			SPEC 3	LC	I	x		x			
Cattle Egret	<i>Bubulcus ibis</i>	x			x	Non-SPEC	LC			x	x	x	x	
Little Egret	<i>Egretta garzetta</i>		x	x		Non-SPEC	LC	I	x			x	x	
Great White Egret	<i>Ardea alba</i>		x			Non-SPEC	LC	I	x	x	x			
Grey Heron	<i>Ardea cinerea</i>		x	x		Non-SPEC	LC		x	x	x		x	
Purple Heron	<i>Ardea purpurea</i>		x			SPEC 3	LC	I	x	x	x		x	
Black Stork	<i>Ciconia nigra</i>				x	Non-SPEC	LC	I	x					
White Stork	<i>Ciconia ciconia</i>		x			Non-SPEC	LC	I	x	x				
Glossy Ibis	<i>Plegadis falcinellus</i>		x			Non-SPEC	LC	I	x	x	x			
Eurasian Spoonbill	<i>Platalea leucorodia</i>		x			Non-SPEC	LC	I	x	x	x			
Greater Flamingo	<i>Phoenicopterus roseus</i>		x			Non-SPEC	LC	I	x	x	x			
Egyptian Vulture	<i>Neophron percnopterus</i>					SPEC 1	VU	I	x					
European Honey-buzzard	<i>Pernis apivorus</i>		x			Non-SPEC	LC	I	x	x	x			
Black Kite	<i>Milvus migrans</i>		x			SPEC 3	LC	I	x					
Lesser Spotted Eagle	<i>Clanga pomarina</i>		x			Non-SPEC	LC	I	x					
Short-Toed Snake-Eagle	<i>Circaetus gallicus</i>		x			Non-SPEC	LC	I	x					
Western Marsh Harrier	<i>Circus aeruginosus</i>		x			Non-SPEC	LC	I	x	x	x			
Hen Harrier	<i>Circus cyaneus</i>		x			SPEC 3	LC	I		x	x			
Montagu's Harrier	<i>Circus pygargus</i>		x			Non-SPEC	LC	I	x					
Eurasian Sparrowhawk	<i>Accipiter nisus</i>		x			Non-SPEC	LC	I* (A. n. granti)	x		x			
Booted Eagle	<i>Hieraaetus pennatus</i>		x			Non-SPEC	LC	I	x					
Osprey	<i>Pandion halieetus</i>		x			Non-SPEC	LC	I	x					

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Lesser Kestrel	<i>Falco naumanni</i>		x			SPEC 3	LC	I	x					
Common Kestrel	<i>Falco tinnunculus</i>	VR	x	x		SPEC 3	LC		x	x	x	x		
Red-footed Falcon	<i>Falco vespertinus</i>		x			SPEC 1	VU	I	x					
Merlin	<i>Falco columbarius</i>		x			Non-SPEC	VU	I	x					
Eurasian Hobby	<i>Falco subbuteo</i>		x			Non-SPEC	LC		x		x			
Eleonora's Falcon	<i>Falco eleonora</i>		x			Non-SPEC	LC	I	x	x	x			
Peregrine Falcon	<i>Falco peregrinus</i>	E	x			Non-SPEC	LC	I	x	x	x			
Western Water Rail	<i>Rallus aquaticus</i>		x	x		Non-SPEC	LC		x					
Spotted Crake	<i>Porzana porzana</i>		x	x		Non-SPEC	LC	I	x					
Common Moorhen	<i>Gallinula chloropus</i>	x	x			Non-SPEC	LC		x	x	x			
Common Coot	<i>Fulica atra</i>		x	x		SPEC 3	NT		x		x			
Common Crane	<i>Grus grus</i>		x			Non-SPEC	LC	I	x					
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>		x			SPEC 1	VU		x		x		x	
Black-winged Stilt	<i>Himantopus himantopus</i>		x			Non-SPEC	LC	I	x	x	x			
Pied Avocet	<i>Recurvirostra avosetta</i>		x			Non-SPEC	LC	I	x	x	x			
Eurasian Thick-knee	<i>Burhinus oedicnemus</i>		x			SPEC 3	LC	I	x					
Collared Pratincole	<i>Glareola pratincola</i>				x	SPEC 3	LC	I	x		x			
Little Ringed Plover	<i>Charadrius dubius</i>	x	x			Non-SPEC	LC		x	x	x			
Common Ringed Plover	<i>Charadrius hiaticula</i>		x			Non-SPEC	LC		x	x	x			
Kentish Plover	<i>Charadrius alexandrinus</i>		x			SPEC 3	LC	I	x		x			
Eurasian Dotterel	<i>Eudromias morinellus</i>		x			Non-SPEC	LC	I	x					
Eurasian Golden Plover	<i>Pluvialis apricaria</i>		x	x		Non-SPEC	LC	I	x	x	x			

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Grey Plover	<i>Pluvialis squatarola</i>		x			Non-SPEC	LC		x	x	x			
Northern Lapwing	<i>Vanellus vanellus</i>		x	x		SPEC 1	VU		x		x			
Sanderling	<i>Calidris alba</i>		x			Non-SPEC	LC		x					
Little Stint	<i>Calidris minuta</i>		x	x		Non-SPEC	LC		x	x	x		x	
Temminck's Stint	<i>Calidris temminckii</i>		x			Non-SPEC	LC		x		x			
Curlew Sandpiper	<i>Calidris ferruginea</i>		x			SPEC 1	VU		x	x	x			
Dunlin	<i>Calidris alpina</i>		x	x		SPEC 3	LC	I* (C. a. schinzii)	x	x	x			
Ruff	<i>Calidris pugnax</i>		x			SPEC 2	NT	I	x	x	x			
Jack Snipe	<i>Limnospiza minima</i>		x			Non-SPEC	LC		x					
Common Snipe	<i>Gallinago gallinago</i>		x	x		SPEC 3	VU		x	x				
Great Snipe	<i>Gallinago media</i>		x			SPEC 1	LC	I	x					
Eurasian Woodcock	<i>Scolopax rusticola</i>		x	x		Non-SPEC	LC		x					
Black-tailed Godwit	<i>Limosa limosa</i>		x			SPEC 1	NT		x					
Whimbrel	<i>Numenius phaeopus</i>		x			Non-SPEC	LC		x					
Eurasian Curlew	<i>Numenius arquata</i>		x			SPEC 1	NT		x		x			
Spotted Redshank	<i>Tringa erythropus</i>		x			SPEC 3	LC		x	x				
Common Redshank	<i>Tringa totanus</i>		x	x		SPEC 2	VU		x	x	x			
Marsh Sandpiper	<i>Tringa stagnatilis</i>		x			Non-SPEC	LC		x					
Greenshank	<i>Tringa nebularia</i>		x			Non-SPEC	LC		x		x			
Green Sandpiper	<i>Tringa ochropus</i>		x			Non-SPEC	LC		x	x	x			
Wood Sandpiper	<i>Tringa glareola</i>		x			SPEC 3	LC	I	x	x	x			
Common Sandpiper	<i>Actitis hypoleucos</i>		x	x		SPEC 3	LC		x	x	x	x	x	

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Red Knot	<i>Calidris canutus</i>				x	SPEC 1	LC		x					
Ruddy Turnstone	<i>Arenaria interpres</i>		x			Non-SPEC	LC		x					
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>				x	Non-SPEC	LC		x					
Pomarine Jaeger	<i>Stercorarius pomarinus</i>		x			Non-SPEC	LC		x					
Arctic Jaeger	<i>Stercorarius parasiticus</i>				x	Non-SPEC	EN		x					
Great Skua	<i>Catharacta skua</i>		x			Non-SPEC	LC		x					
Mediterranean Gull	<i>Larus melanocephalus</i>		x	x		Non-SPEC	LC	I	x	x	x	x	x	x
Little Gull	<i>Hydrocoloeus minutus</i>			x		SPEC 3	LC	I	x	x	x			
Black-headed Gull	<i>Larus ridibundus</i>		x	x		Non-SPEC	LC		x	x	x	x	x	x
Slender-billed Gull	<i>Larus genei</i>		x			Non-SPEC	VU	I	x	x	x	x		
Audouin's Gull	<i>Larus audouinii</i>			x		Non-SPEC	VU	I	x	x	x	x	x	
Mew Gull	<i>Larus canus</i>				x	Non-SPEC	LC					x		
Lesser Black-backed Gull	<i>Larus fuscus</i>		x	x		Non-SPEC	LC		x	x	x	x	x	x
Yellow-legged Gull	<i>Larus michahellis (CACHINNANS)</i>	x	x	x		Non-SPEC	LC			x	x	x	x	x
Black-legged Kittiwake	<i>Rissa tridactyla</i>				x	SPEC 3	VU			x			x	
Caspian gull	<i>Larus cachinnans</i>		x			Non-SPEC	LC			x	x	x		
Little Tern	<i>Sternula albifrons</i>		x			SPEC 3	LC	I	x					
Common Gull-billed Tern	<i>Gelochelidon nilotica</i>		x			SPEC 3	LC	I	x	x	x			
Caspian Tern	<i>Hydroprogne caspia</i>		x			Non-SPEC	LC	I	x	x	x			
Whiskered Tern	<i>Chlidonias hybrida</i>		x			Non-SPEC	LC	I						
Black Tern	<i>Chlidonias niger</i>		x			SPEC 3	LC	I	x					
Sandwich Tern	<i>Thalasseus sandvicensis</i>		x	x		Non-SPEC	LC	I	x	x	x	x	x	

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Common Wood Pigeon	<i>Columba palumbus</i>		x	x		Non-SPEC	LC	I* (C. p. azorica)						
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	x				Non-SPEC	LC		x	x	x			
European Turtle Dove	<i>Streptopelia turtur</i>	VR	x			SPEC 1	VU		x	x	x			
Common Cuckoo	<i>Cuculus canorus</i>	VR	x			Non-SPEC	LC		x					
Eurasian Scops Owl	<i>Otus scops</i>		x	x		SPEC 2	LC		x					
Short-eared Owl	<i>Asio flammeus</i>	VR	x	x		SPEC 3	LC	I	x					
European Nightjar	<i>Caprimulgus europaeus</i>		x			SPEC 3	LC	I	x					
Alpine Swift	<i>Tachymarptis melba</i>		x			Non-SPEC	LC		x					
Common Swift	<i>Apus apus</i>	VR	x			SPEC 3	NT		x	x	x			
Pallid Swift	<i>Apus pallidus</i>		x			Non-SPEC	LC		x	x	x			
Common Kingfisher	<i>Alcedo atthis</i>		x	x		SPEC 3	LC	I	x	x	x			
European Bee-eater	<i>Merops apiaster</i>		x			Non-SPEC	LC		x	x	x			
European Roller	<i>Coracias garrulus</i>		x			SPEC 2	LC	I	x					
Common Hoopoe	<i>Upupa epops</i>		x			Non-SPEC	LC		x		x			
Eurasian Wryneck	<i>Jynx torquilla</i>		x	x		SPEC 3	LC		x	x	x			
Greater Short-toed Lark	<i>Calandrella brachydactyla</i>	x (SV)	x			SPEC 3	LC	I	x		x			
Eurasian Sky Lark	<i>Alauda arvensis</i>		x	x		SPEC 3	LC		x	x	x			
Woodlark	<i>Lullula arborea</i>					SPEC 2	LC	I	x					
Collared Sand Martin	<i>Riparia riparia</i>		x			SPEC 3	LC		x	x	x			
Barn Swallow	<i>Hirundo rustica</i>	VR	x	x		SPEC 3	LC		x	x	x			
Northern House Martin	<i>Delichon urbicum</i>	VR	x			SPEC 2	LC		x	x	x			
Red-rumped Swallow	<i>Cecropis daurica</i>		x			Non-SPEC	LC		x					

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Tawny Pipit	<i>Anthus campestris</i>	VR	x			SPEC 3	LC	I	x					
Tree Pipit	<i>Anthus trivialis</i>		x			SPEC 3	LC		x					
Meadow Pipit	<i>Anthus pratensis</i>		x	x		SPEC 1	LC		x	x	x	x	x	x
Red-throated Pipit	<i>Anthus cervinus</i>		x	x		Non-SPEC	LC		x					
Water Pipit	<i>Anthus spinoletta</i>		x	x		Non-SPEC	LC		x					
Western Yellow Wagtail	<i>Motacilla flava</i>		x			SPEC 3	LC		x	x	x			
Grey Wagtail	<i>Motacilla cinerea</i>		x	x		Non-SPEC	LC		x	x	x	x	x	
White Wagtail	<i>Motacilla alba</i>		x	x		Non-SPEC	LC		x	x	x	x	x	x
Dunnock	<i>Prunella modularis</i>		x	x		Non-SPEC	LC		x	x				
European Robin	<i>Erithacus rubecula</i>	VR	x	x		Non-SPEC	LC		x	x	x	x	x	x
Common Nightingale	<i>Luscinia megarhynchos</i>	VR	x			Non-SPEC	LC		x		x			
Bluethroat	<i>Cyanecula svecina</i>		x	x		Non-SPEC	LC	I	x					
Black Redstart	<i>Phoenicurus ochruros</i>		x	x		Non-SPEC	LC		x	x	x	x	x	x
Common Redstart	<i>Phoenicurus phoenicurus</i>		x			Non-SPEC	LC		x					
Whinchat	<i>Saxicola rubetra</i>		x			SPEC 2	LC		x	x				
Common Stonechat	<i>Saxicola torquatus</i>		x	x		Non-SPEC	LC		x	x	x	x	x	x
Isabelline Wheatear	<i>Oenanthe isabellina</i>					Non-SPEC	LC		x					
Northern Wheatear	<i>Oenanthe oenanthe</i>		x	x		SPEC 3	LC		x	x	x			
Black-eared Wheatear	<i>Oenanthe hispanica</i>	VR	x			Non-SPEC	LC		x					
Rufous-tailed Rock Thrush	<i>Monticola saxatilis</i>		x			SPEC 3	LC		x					
Blue Rock Thrush	<i>Monticola solitarius</i>	x				Non-SPEC	LC		x	x	x			
Eurasian Blackbird	<i>Turdus merula</i>		x	x		Non-SPEC	LC		x		x			

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Song Thrush	<i>Turdus philomelos</i>		x	x		Non-SPEC	LC		x	x	x			
Redwing	<i>Turdus iliacus</i>		x	x		SPEC 1	LC		x					
Mistle Thrush	<i>Turdus viscivorus</i>		x			Non-SPEC	LC		x					
Fieldfare	<i>Turdus pilaris</i>		x			Non-SPEC	LC		x					
Rudous-tailed Scrub-robin	<i>Cercotrichas galactotes</i>				x	SPEC 3	LC		x					
Cetti's Warbler	<i>Cettia cetti</i>	x				Non-SPEC	LC		x	x	x			
Zitting Cisticola	<i>Cisticola juncidis</i>	x				Non-SPEC	LC		x	x	x	x	x	x
Savi's Warbler	<i>Locustella lusciniodes</i>		x			Non-SPEC	LC		x					
Moustached Warbler	<i>Acrocephalus melanopogon</i>			x		Non-SPEC	LC	I	x					
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>		x			Non-SPEC	LC		x	x				
Common Reed Warbler	<i>Acrocephalus scirpaceus</i>	x	x			Non-SPEC	LC		x	x	x			
Great Reed Warbler	<i>Acrocephalus arundinaceus</i>		x			Non-SPEC	LC		x	x				
Isabelline Warbler	<i>Iduna opaca</i>		x			SPEC 3	LC		x					
Eastern Olivaceous Warbler	<i>Iduna pallida</i>				x	Non-SPEC	LC		x					
Icterine Warbler	<i>Hippolais icterina</i>		x			Non-SPEC	LC		x					
Eurasian Blackcap	<i>Sylvia atricapilla</i>		x	x		Non-SPEC	LC		x	x	x			
Garden Warbler	<i>Sylvia borin</i>		x			Non-SPEC	LC		x	x	x			
Lesser Whitethroat	<i>Sylvia curruca</i>		x			Non-SPEC	LC		x					
Common Whitethroat	<i>Sylvia communis</i>		x			Non-SPEC	LC		x					
Spectacled Warbler	<i>Sylvia conspicillata</i>	x				Non-SPEC	LC		x					
Subalpine Warbler	<i>Sylvia cantillans</i>		x			Non-SPEC	LC		x		x			
Sardinian Warbler	<i>Sylvia melanocephala</i>	x	x			Non-SPEC	LC		x	x	x	x	x	x

Common name	Latin name	Status in Malta				International Protection Status			WfE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>				x	SPEC 3	LC		x					
Western Bonelli's Warbler	<i>Phylloscopus bonelli</i>		x			Non-SPEC	LC		x					
Eastern Bonelli's Warbler	<i>Phylloscopus orientalis</i>		x			Non-SPEC	LC		x					
Wood Warbler	<i>Phylloscopus sibilatrix</i>		x			Non-SPEC	LC		x	x	x			
Iberian Chiffchaff	<i>Phylloscopus ibericus</i>				x	Non-SPEC	LC				x			
Siberian Chiffchaff	<i>Phylloscopus tristis</i>				x	Non-SPEC	LC				x			
Common Chiffchaff	<i>Phylloscopus collybita</i>		x	x		Non-SPEC	LC		x	x	x	x	x	
Willow Warbler	<i>Phylloscopus trochilus</i>		x			SPEC 3	LC		x	x	x			
Goldcrest	<i>Regulus regulus</i>		x	x		SPEC 2	LC		x					
Common Firecrest	<i>Regulus ignicapilla</i>		x	x		Non-SPEC	LC		x					
Spotted Flycatcher	<i>Muscicapa striata</i>	x	x			SPEC 2	LC		x	x	x			
Red-breasted Flycatcher	<i>Ficedula parva</i>		x			Non-SPEC	LC	I		x				
Semi-collared Flycatcher	<i>Ficedula semitorquata</i>				x	SPEC 2	LC	I	x					
Collared Flycatcher	<i>Ficedula albicollis</i>		x			Non-SPEC	LC	I	x					
European Pied Flycatcher	<i>Ficedula hypoleuca</i>		x			Non-SPEC	LC		x	x	x			
Eurasian Penduline Tit	<i>Remiz pendulinus</i>				x	Non-SPEC	LC		x					
Eurasian Golden Oriole	<i>Oriolus oriolus</i>		x			Non-SPEC	LC		x		x			
Red-backed Shrike	<i>Lanius collurio</i>		x			SPEC 2	LC	I	x					
Woodchat Shrike	<i>Lanius senator</i>	x	x			SPEC 2	NT		x					
Common Starling	<i>Sturnus vulgaris</i>	x	x	x		SPEC 3	LC		x	x	x			
Spanish Sparrow	<i>Passer hispaniolensis</i>	x				Non-SPEC	LC		x	x	x	x	x	x
Eurasian Tree Sparrow	<i>Passer montanus</i>	x	x			SPEC 3	LC		x	x	x			

Common name	Latin name	Status in Malta				International Protection Status			WtE	Salina 2018	Salina 2019	Tas-Safra BW 2020	Tas-Safra BW 2021	Tas-Safra BW 2022
		Breeding	Migrant	Winter visitor	Rare & Irregular	SPEC Category	European Threat Status	Birds Directive						
Common Chaffinch	<i>Fringilla coelebs</i>	x	x	x		Non-SPEC	LC	I* (F. c. ambrosia)	x	x	x			
European Serin	<i>Serinus serinus</i>	VR	x	x		SPEC 2	LC		x					
European Greenfinch	<i>Chloris chloris</i>	VR	x	x		Non-SPEC	LC		x	x				
European Goldfinch	<i>Carduelis carduelis</i>		x			Non-SPEC	LC		x					
Eurasian Siskin	<i>Spinus spinus</i>		x			Non-SPEC	LC		x					
Common Linnet	<i>Linaria cannabina</i>	VR	x	x		SPEC 2	LC		x					
Hawfinch	<i>Coccothraustes coccothraustes</i>		x			Non-SPEC	LC		x					
Reed Bunting	<i>Emberiza schoeniclus</i>			x		Non-SPEC	LC		x		x			
Corn Bunting	<i>Emberiza calandra</i>	x	x			SPEC 2	LC		x					
Ortolan Bunting	<i>Emberiza hortulana</i>					SPEC 2	LC	I	x					

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Annex I: List of all vascular plant species recorded during the field surveys

Table 17: List of all vascular plant species recorded during the field surveys

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
PINACEAE	<i>Pinus halepensis</i>	Aleppo pine		Schedule I Part A Table 2	SL 10.22	
CUPRESSACEAE	<i>Cupressus sempervirens</i>	Cypress			SL 10.22	
	<i>Tetraclinis articulata</i>	Sandarac gum tree	Schedule III, Schedule VI	Schedule I Part A Table 1	SL 549.120	E, Rest (MED+MI)
LAURACEAE	<i>Laurus nobilis</i>	Bay laurel		Schedule I Part A Table 2		R, Rest (MI)
PAPAVERACEAE	<i>Fumaria</i> sp.	Fumitory				
	<i>Papaver hybridum</i>	Bristly poppy				
	<i>Papaver rhoeas</i>	Common poppy				
AIZOOACEAE	<i>Mesembryanthemum nodiflorum</i>	Lesser crystal plant				
CACTACEAE	<i>Opuntia dillenii</i>	Erect Prickly Pear				
	<i>Opuntia ficus-indica</i>	Prickly pear				
AMARANTHACEAE	<i>Arthrocnemum macrostachyum</i>	Glaucous glasswort				
	<i>Atriplex prostrata</i>	Spear-leaved orache				
	<i>Beta maritima</i>	Sea beet				
	<i>Chenopodium murale</i>	Nettleleaf goosefoot				
	<i>Salsola soda</i>	Smooth-leaved saltwort				
CARYOPHYLLACEAE	<i>Silene colorata</i>	Red campion				
	<i>Silene sedoides</i>	Hairy catchfly				
POLYGONACEAE	<i>Polygonum aviculare</i>	Prostrate knotweed				
PLUMBAGINACEAE	<i>Limonium zeraphae</i>	Zerapha's sea lavender	Schedule III, Reg 26			Endemic, R, Rest (MI)
TAMARICACEAE	<i>Tamarix</i> sp.	Tamarisk		Schedule I Part A Table 2		R, Rest (MED+MI) [if <i>T. africana</i>]
CUCURBITACEAE	<i>Ecballium elaterium</i>	Squirting cucumber				
CAPPARACEAE	<i>Capparis orientalis</i>	Caper	Schedule VIII			
BRASSICACEAE	<i>Brassica rapa</i> subsp. <i>slyvestris</i>	Bargeman's cabbage				
	<i>Cakile maritima</i>	Sea rocket				
	<i>Diplotaxis tenuifolia</i>	Perennial wall-rocket				
	<i>Lobularia maritima</i>	Sweet alison				
	<i>Raphanus raphanistrum</i>	Wild radish				
	<i>Sinapis alba</i>	White mustard				
RESEDACEAE	<i>Reseda alba</i>	White mignonette				
MALVACEAE	<i>Hibiscus rosa-sinensis</i>	Rose of China				
	<i>Malva</i> (=Lavatera) <i>arborea</i>	Tree mallow				
	<i>Malva multiflora</i> (=Lavatera <i>cretica</i>)	Cretan mallow				
	<i>Malva parviflora</i>	Lesser mallow				
HYPERICACEAE	<i>Hypericum triquetrifolium</i>	Crisped St. John's wort				
EUPHORBIACEAE	<i>Euphorbia helioscopia</i>	Sun spurge				
	<i>Euphorbia pinea</i>	Pine spurge				
	<i>Euphorbia tirucalli</i>	African milkbush				
	<i>Mercurialis annua</i>	Annual mercury				
	<i>Ricinus communis</i>	Castor oil tree		Schedule II		
LINACEAE	<i>Linum strictum</i>	Upright yellow flax				
MORACEAE	<i>Ficus carica</i>	Fig				
URTICACEAE	<i>Parietaria judaica</i>	Pellitory-of-the-wall				

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
ROSACEAE	<i>Prunus dulcis</i> (=Amygladus communis)	Almond		Schedule I Part A Table 2 (*)		
RHAMNACEAE	<i>Rhamnus alaternus</i>	Mediterranean buckthorn		Schedule I Part A Table 2		
FABACEAE	<i>Acacia saligna</i> (=A. cyanophylla)	Blue-leaved wattle		Schedule II	SL 549.119	
	<i>Bituminaria bituminosa</i>	Pitch clover				
	<i>Ceratonia siliqua</i>	Carob		Schedule I Part A Table 2		
	<i>Hedysarum coronarium</i>	Sulla				
	<i>Hippocrepis multisiliquosa</i>	Common Horseshoe vetch				
	<i>Lathyrus clymenum</i>	Crimson pea				
	<i>Lotus ornithopodioides</i>	Common birdsfoot trefoil				
	<i>Medicago minima</i>	Burr medick				
	<i>Medicago orbicularis</i>	Disk medick				
	<i>Medicago polymorpha</i>	Toothed medick				
	<i>Melilotus indicus</i>	Small melilot				
	<i>Ononis sieberi</i>	Sieber's restharrow				
LYTHRACEAE	<i>Punica granatum</i>	Pomegranate		Schedule I Part A Table 2 (*)		
MYRTACEAE	<i>Eucalyptus gomphocephala</i>	Tuart tree		Schedule II (†)		
RUTACEAE	<i>Citrus</i> sp.	Citrus tree				
ANACARDIACEAE	<i>Pistacia lentiscus</i>	Lentisk		Schedule I Part A Table 2		
	<i>Schinus terebinthifolius</i>	Brazilian pepper tree		Schedule II		
OXALIDACEAE	<i>Oxalis pes-caprae</i>	Capesorrel				
GERANIACEAE	<i>Erodium moschatum</i>	Musk storksbill				
VITACEAE	<i>Vitis</i> sp.	Wild vine				
PRIMULACEAE	<i>Anagallis arvensis</i>	Pimpernel				
APIACEAE	<i>Crithmum maritimum</i>	Sea samphire				
	<i>Daucus carota</i>	Wild carrot				
	<i>Ferula melitensis</i>	Maltese ferule	Reg 26			
	<i>Foeniculum vulgare</i>	Fennel				
	<i>Smyrniolum olusatrum</i>	Alexanders				
PITTOSPORACEAE	<i>Pittosporum tobira</i>	Japanese mock orange		Schedule II		
RUBIACEAE	<i>Galium aparine</i>	Cleavers				
	<i>Galium verrucosum</i>	Southern cleavers				
	<i>Rubia peregrina</i>	Wild madder				
APOCYNACEAE	<i>Nerium oleander</i>	Oleander		Schedule I Part A Table 2 (*)		
	<i>Periploca angustifolia</i>	Wolfbane				Rest (MED)
GENTIANACEAE	<i>Centaurium pulchellum</i>	Lesser centaury				
CAPRIFOLIACEAE	<i>Lonicera implexa</i>	Evergreen honeysuckle				
SOLANACEAE	<i>Nicotiana glauca</i>	Shrub tobacco		Schedule II		
CONVOLVULACEAE	<i>Convolvulus althaeoides</i> subsp. <i>althaeoides</i>	Mallow-leaved bindweed				
	<i>Convolvulus althaeoides</i> subsp. <i>tenuissimus</i> (=C. elegantissimus)	Silvery mallow-leaved bindweed				
	<i>Convolvulus arvensis</i>	Field bindweed				
BORAGINACEAE	<i>Borago officinalis</i>	Borage				
	<i>Lithospermum arvense</i> (=Buglossoides arvensis)	Field gromwell				
OLEACEAE	<i>Olea europaea</i>	Olive		Schedule I Part A Table 2 (*)		Rest (MI) (?)

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
	<i>Olea oleaster</i>	Wild olive		Schedule I Part A Table 2		Rest (MI) (?)
LAMIACEAE	<i>Ajuga iva</i>	Southern bugle				
	<i>Satureja</i> (=Micromeria) <i>microphylla</i>	Maltese savory	Schedule VIII			Rest (MED)
	<i>Prasium majus</i>	White hedge-nettle				
	<i>Thymbra capitata</i>	Mediterranean thyme	Schedule III		SL 10.10	No specific category
SCROPHULARIACEAE	<i>Myoporum laetum</i>	Ngaio				
OROBANCHACEAE	<i>Bellardia</i> (=Bartsia) <i>trixago</i>	Bellardia				
	<i>Phelipanche nana</i> subsp. <i>melitensis</i>	Maltese dwarf sorrel broomrape	Schedule X			Endemic
	<i>Phelipanche nana</i> subsp. <i>nana</i>	Dwarf sorrel broomrape				
	<i>Orobanche crenata</i>	Bean broomrape				
	<i>Orobanche pubescens</i>	Hairy broomrape				
PLANTAGINACEAE	<i>Antirrhinum siculum</i>	Sicilian snapdragon				
	<i>Antirrhinum tortuosum</i>	Greater snapdragon				
	<i>Misopates orontium</i>	Lesser snapdragon				
	<i>Plantago coronopus</i>	Buck's horn plantain				
	<i>Plantago lagopus</i>	Hare's foot plantain				
ASTERACEAE	<i>Anthemis urvilleana</i>	Maltese sea chamomile	Schedule X			Endemic
	<i>Atractylis gummifera</i>	Ground thistle				
	<i>Aster squamatus</i>	Narrow-leaved aster				
	<i>Carlina involucrata</i>	Clustered carline thistle				Rest (MED)
	<i>Centaurea nicaeensis</i>	Southern star thistle				
	<i>Cichorium spinosum</i>	Spiny chicory				
	<i>Cynara cardunculus</i>	Wild artichoke				
	<i>Evax pygmaea</i>	Pygmy cudweed				
	<i>Filago pyramidata</i>	Broad-leaved cudweed				
	<i>Galactites tomentosa</i>	Boar thistle				
	<i>Glebionis coronaria</i>	Crown daisy				
	<i>Hypochaeris achyrophorus</i>	Mediterranean catsear				
	<i>Jacobaea maritima</i> subsp. <i>sicula</i> (=Senecio <i>bicolor</i>)	Silvery ragwort	Reg 26			
	<i>Limbarda crithmoides</i>	Golden samphire				
	<i>Pallenis spinosa</i>	Spiny ox-eye daisy				
	<i>Phagnalon rupestre</i> subsp. <i>graecum</i>	Eastern phagnalon				Rest (MED)
	<i>Reichardia picroides</i>	Common reichardia				
	<i>Sonchus oleraceus</i>	Smooth sow-thistle				
ARECACEAE	<i>Chamaerops humilis</i>	Dwarf fan palm		Schedule I Part A Table 2		X (?), Rest (MED)
	<i>Phoenix</i> sp.	Date palm species		Schedule I Part A Table 2 (if <i>P. dactylifera</i>)		
POACEAE	<i>Arundo donax</i>	Great reed				
	<i>Avena sterilis</i>	Animated oat				
	<i>Brachypodium distachyon</i> (=Trachynia <i>distachya</i>)	False brome				
	<i>Brachypodium retusum</i>	Mediterranean false-brome				
	<i>Bromus diandrus</i>	Great brome				
	<i>Bromus hordaceus</i>	Soft brome				
	<i>Bromus madritensis</i>	Compact brome				

Family	Species Name	Vernacular Name	Legal Status			Malta RDB status
			SL 549.44	SL 549.123	Other	
	<i>Catapodium rigidum</i>	Fern grass				
	<i>Dactylis hispanica</i>	Cock's foot				
	<i>Desmazeria pignattii</i>	Pignatti's fern grass	Reg 26			Rest (MED)
	<i>Elymus pycnanhtus</i>	Sea couch				E, Rest (MI)
	<i>Hordeum leporinum</i>	Hare's tail barley				
	<i>Hyparrhenia hirta</i>	Hispid beard grass				
	<i>Lagurus ovatus</i>	Hare's tail grass				
	<i>Lolium rigidum</i>	Stiff ryegrass				
	<i>Phalaris minor</i>	Lesser canary grass				
	<i>Piptatherum miliaceum</i>	Smilo grass				
	<i>Rostraria cristata</i>	Mediterranean hair grass				
	<i>Stipa capensis</i>	Mediterranean steppe grass				
	<i>Trisetaria aurea</i>	Golden oat grass				
	<i>Vulpia ciliata</i>	Fringed fescue				
ARACEAE	<i>Arisarum vulgare</i>	Friar's cowl				
SMILACACEAE	<i>Smilax aspera</i>	Mediterranean smilax				
IRIDACEAE	<i>Gladiolus communis</i>	Eastern gladiolus				
	<i>Gynandriris sisyrinchium</i>	Barbary nut iris				
	<i>Iris</i> sp.	Iris	<i>Depends on species</i>			<i>Depends on species</i>
	<i>Romulea</i> sp.	Sand crocus				
XANTHORRHOEACEAE	<i>Asphodelus aestivus</i>	Branched asphodel				
AMARYLLIDACEAE	<i>Allium polyanthum</i> (=A. <i>melitense</i>)	Many flowered garlic	Schedule X			
ASPARAGACEAE	<i>Agave americana</i>	Century plant				
	<i>Agave sislana</i>	Sisal hemp				
	<i>Asparagus aphyllus</i>	Spiny asparagus				
	<i>Urginea pancration</i>	Seaside squill	Schedule VIII, Schedule X			Rest (MED)
	<i>Muscari comosum</i>	Tassel hyacinth				
	<i>Ornithogalum narbonense</i>	Southern star-of-Bethlehem	Schedule VIII			
	<i>Yucca gloriosa</i>	Spanish dagger				

Annex II: Past aerial/ satellite imagery of the scheme site



Figure 47: Aerial photograph of the scheme site dated 1967 provided for reference purposes to show the presence of trees of over 50 years of age (Source: Planning Authority)



Figure 48: Satellite image of the scheme site dated 2012 provided for reference purposes to show the presence of trees of over 10 years of age (Source: PA Map Server, accessed in October 2022)