



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/06096/23


Report



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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

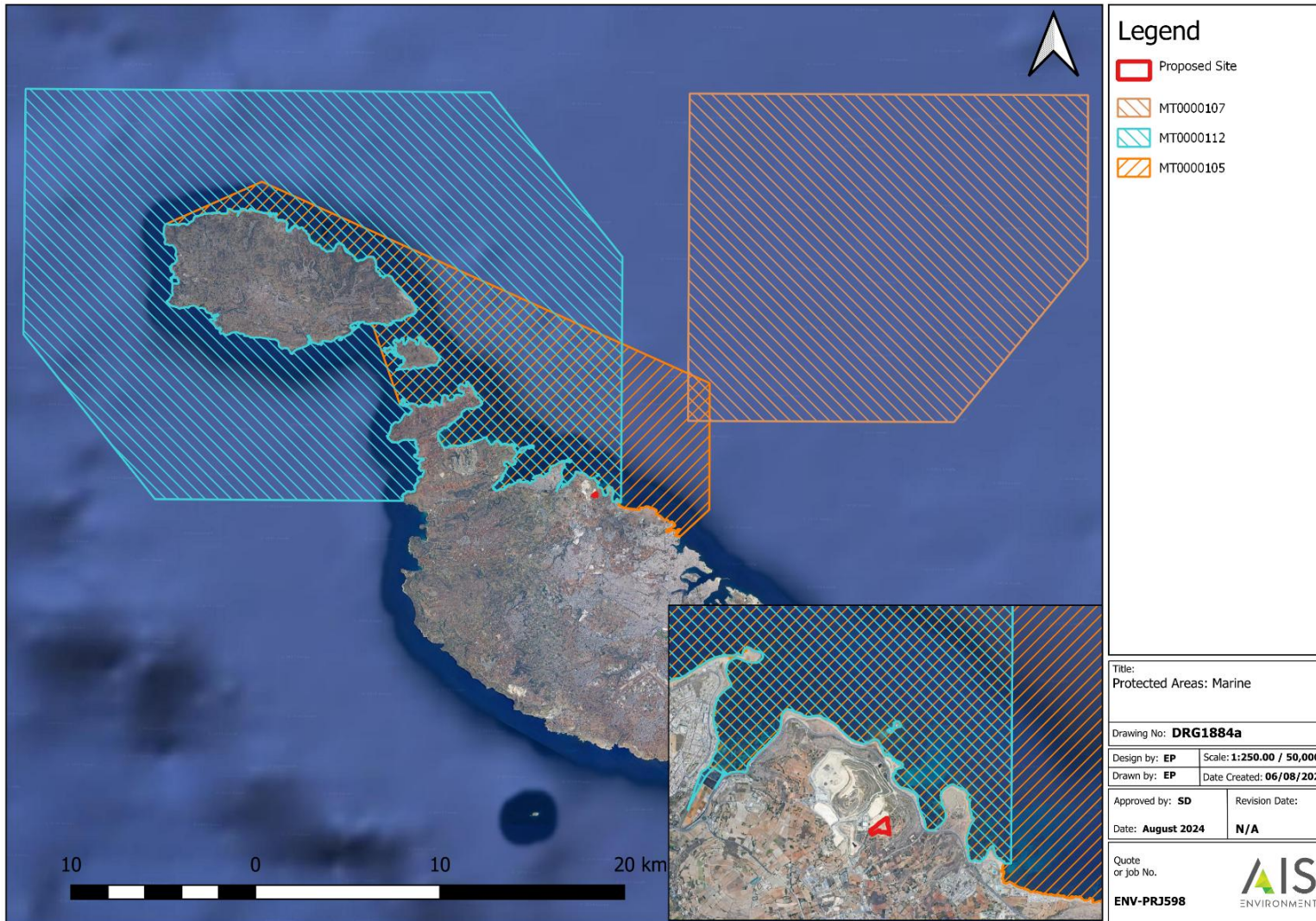


FIGURE 4: MARINE PROTECTED AREAS RELEVANT TO THE STUDY

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.

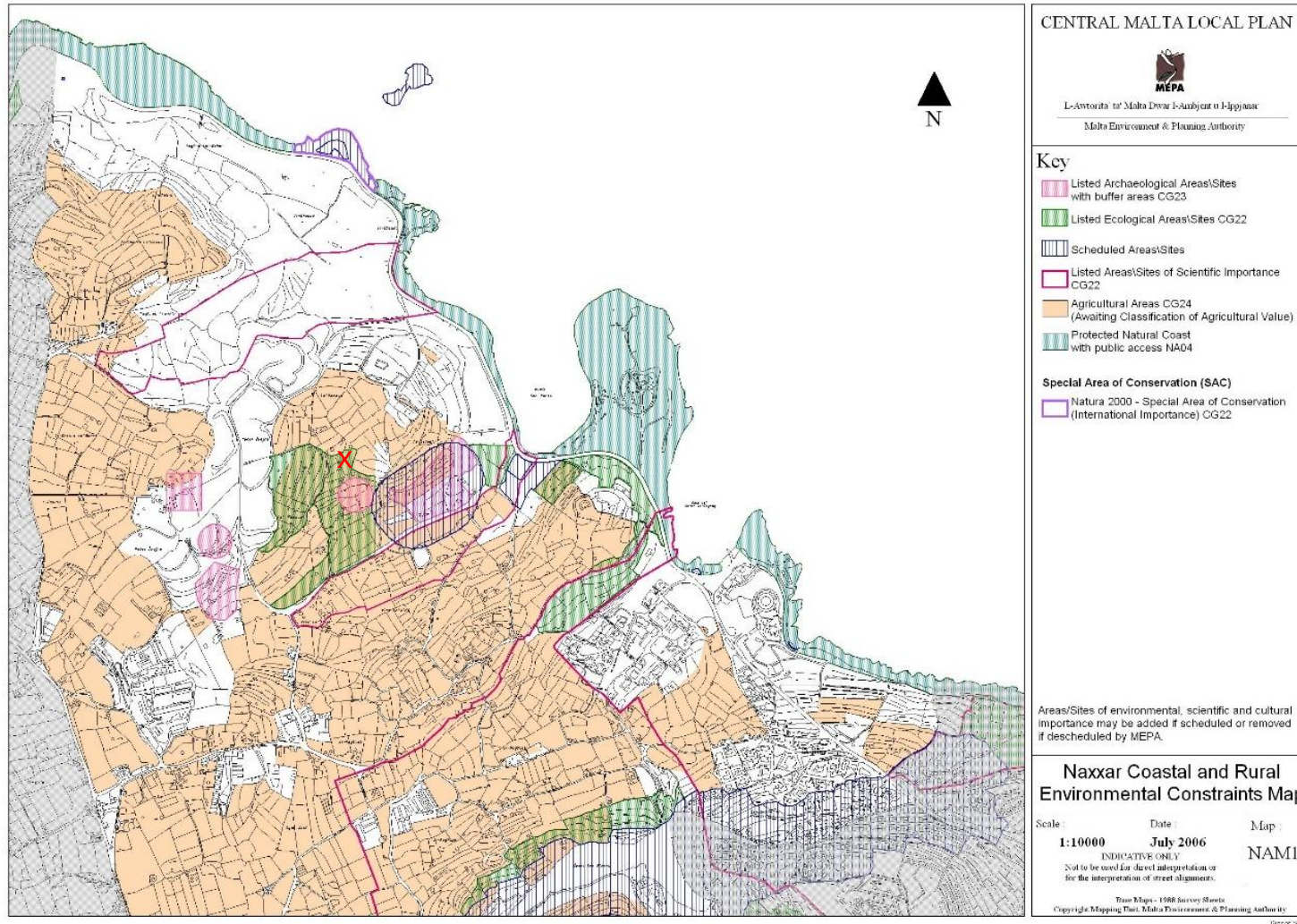


FIGURE 5: NAXXAR COASTAL AND RURAL ENVIRONMENTAL CONSTRAINTS MAP (CENTRAL MALTA LOCAL PLAN, 2006) SITE MARKED WITH RED X

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.

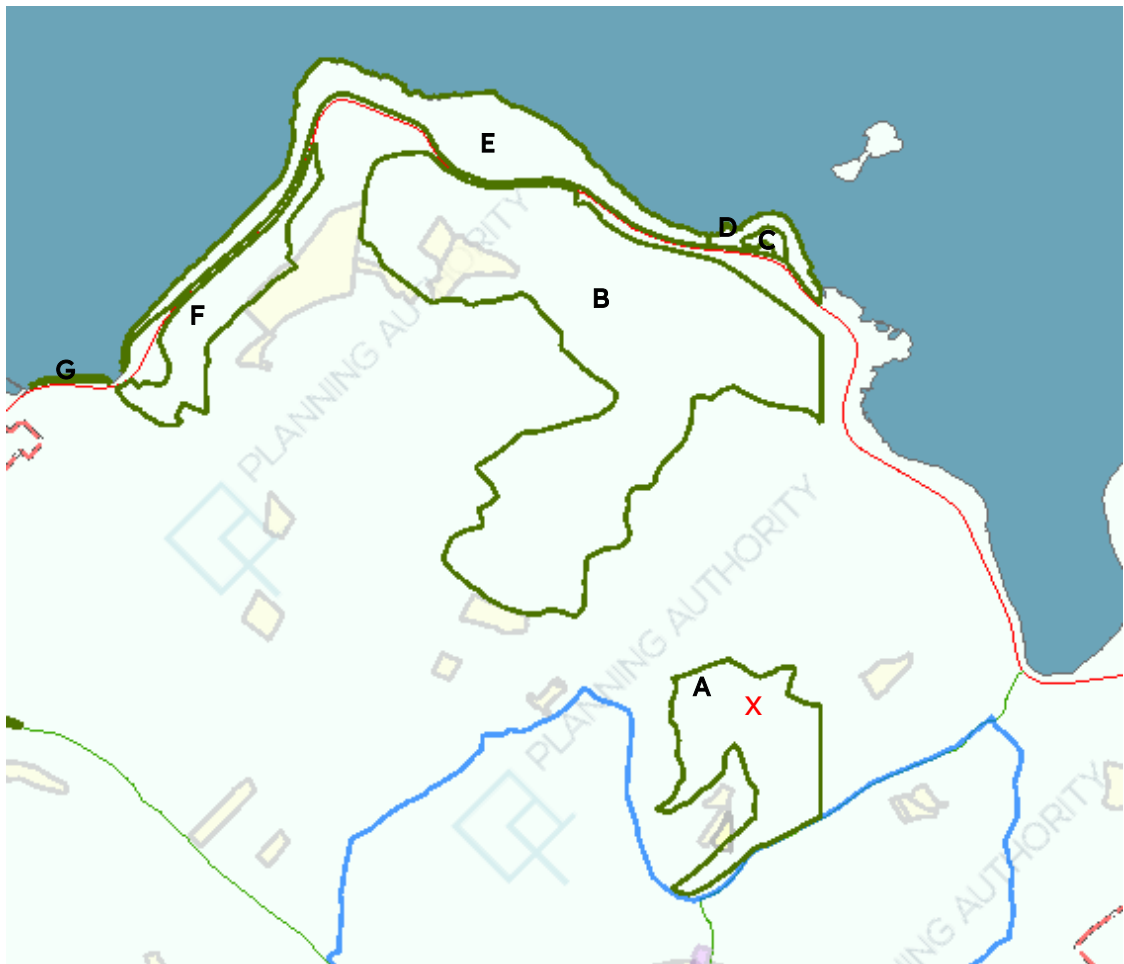


FIGURE 6: AREAS OF ECOLOGICAL IMPORTANCE (A-G) AROUND THE SITE ARE MARKED WITH A GREEN OUTLINE (PA GEOSERVER) SITE MARKED WITH A RED X

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.

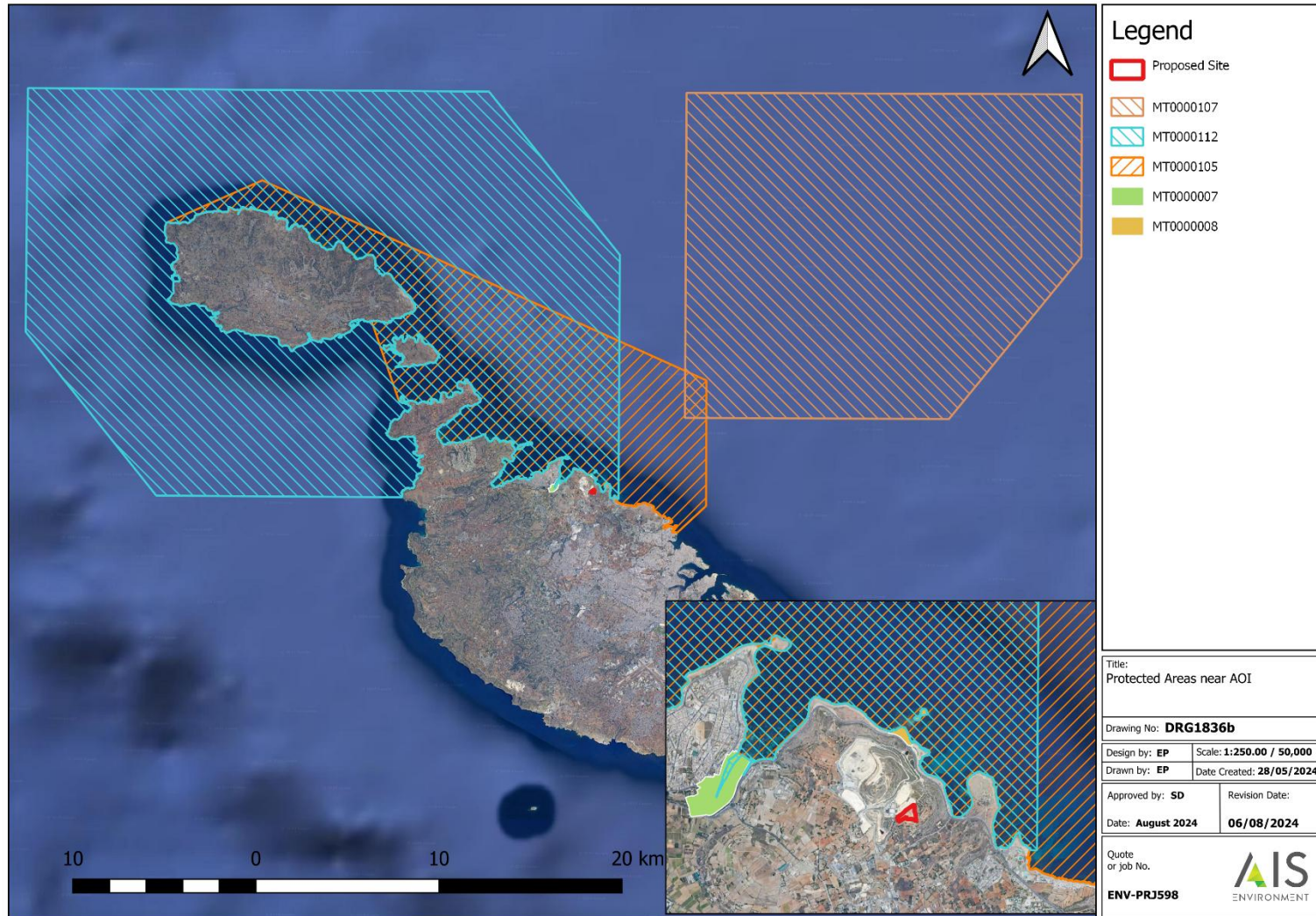


FIGURE 7: NEARBY SITES PROTECTED WITHIN THE NATURA 2000 FRAMEWORK CONSIDERED IN THE STUDY

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.

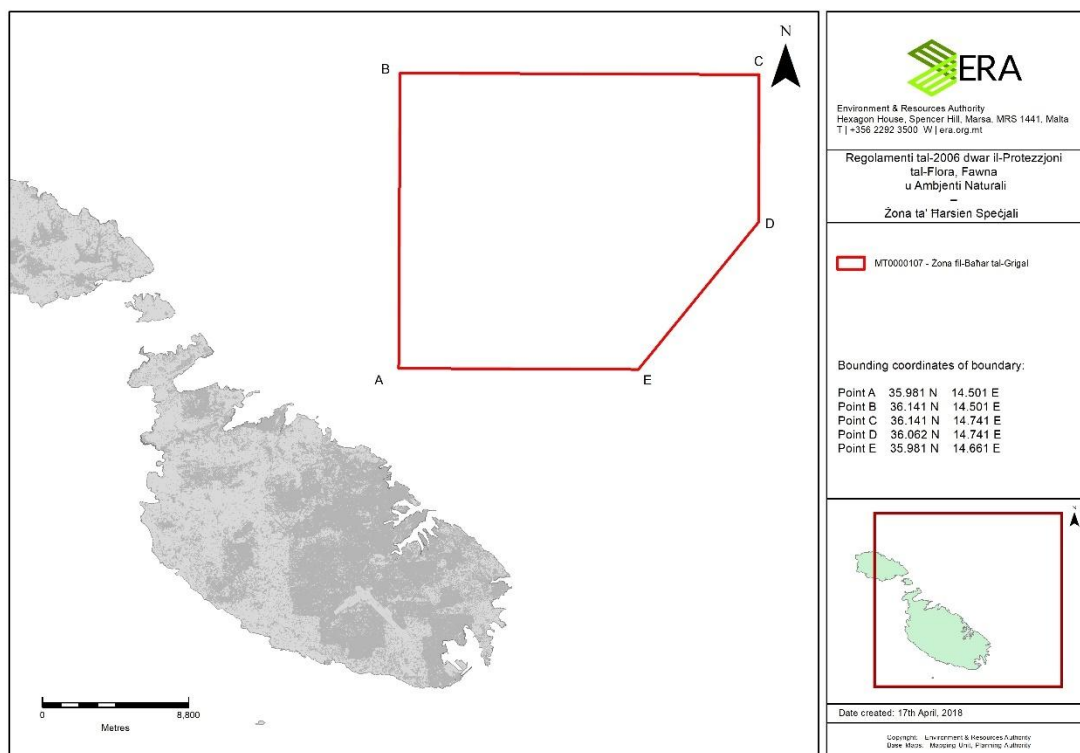


FIGURE 8: BOUNDARY OF THE ŻONA FIL-BAĦAR FIL-GRIGAL SPA

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.

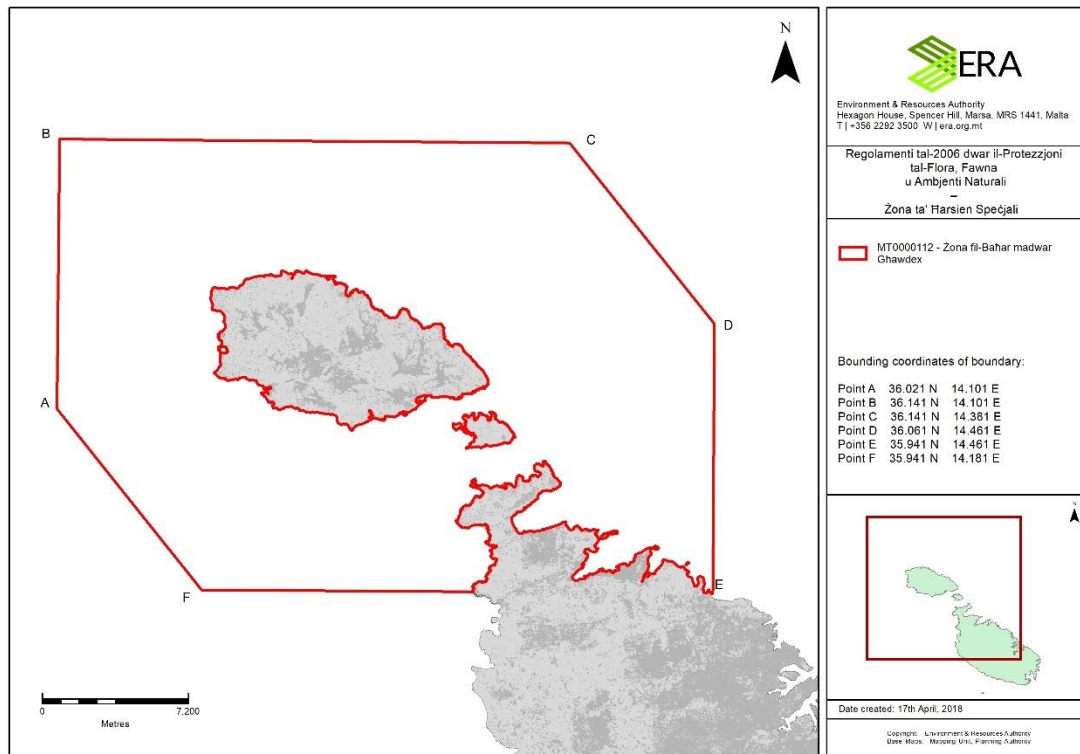


FIGURE 9: BOUNDARY OF THE ŻONA FIL-BAĦAR MADWAR GĦAWDEX

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 *Peyssonellia 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.

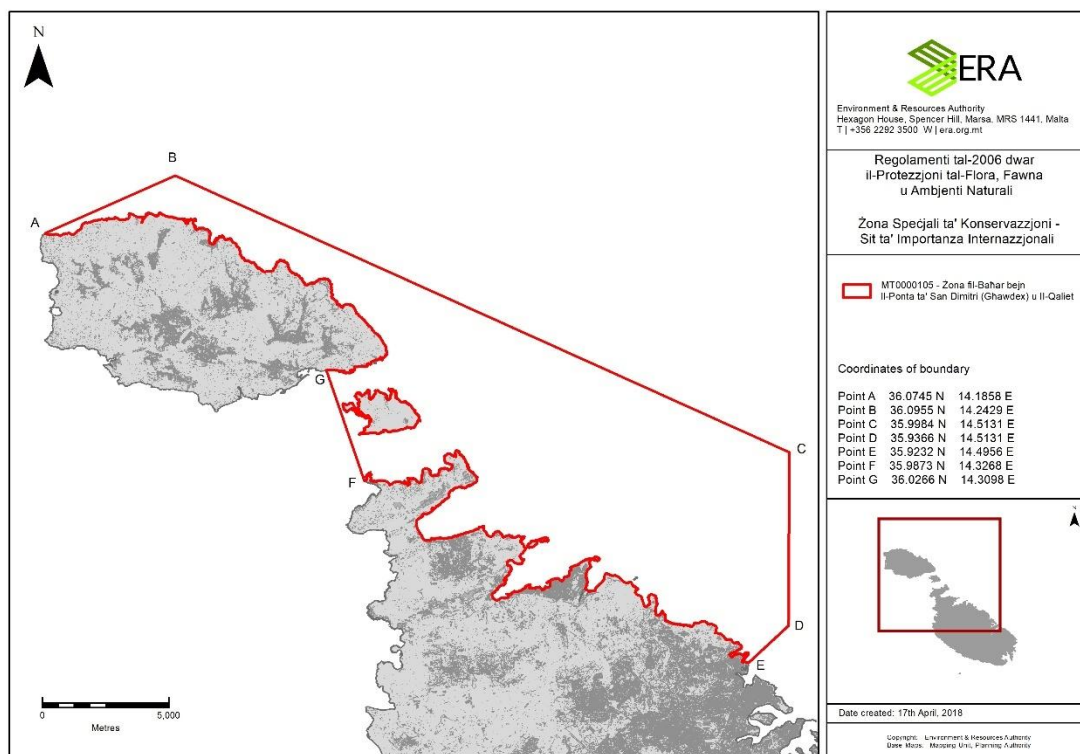


FIGURE 10: BOUNDARY OF THE ŻONA FIL-BAĦAR BEJN IL-PONTA TA' SAN DIMITRI (GĦAWDEX) U IL-QALIET SCI

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.

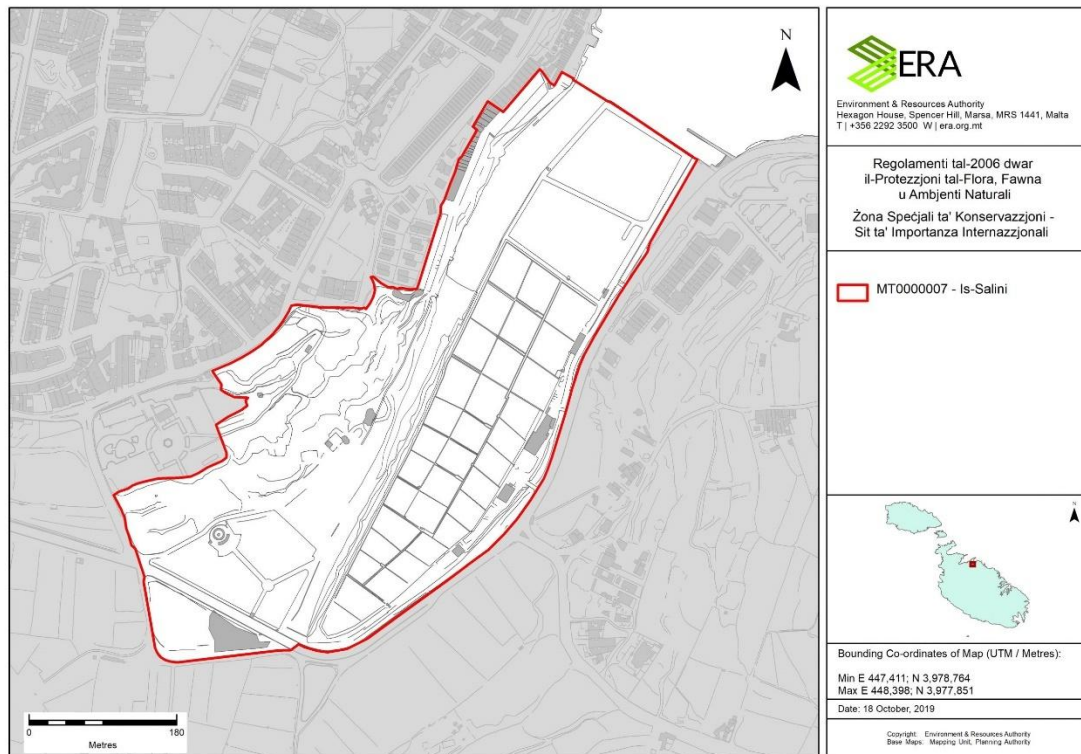


FIGURE 11: BOUNDARY OF THE SALINI SAC

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 prickle 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.

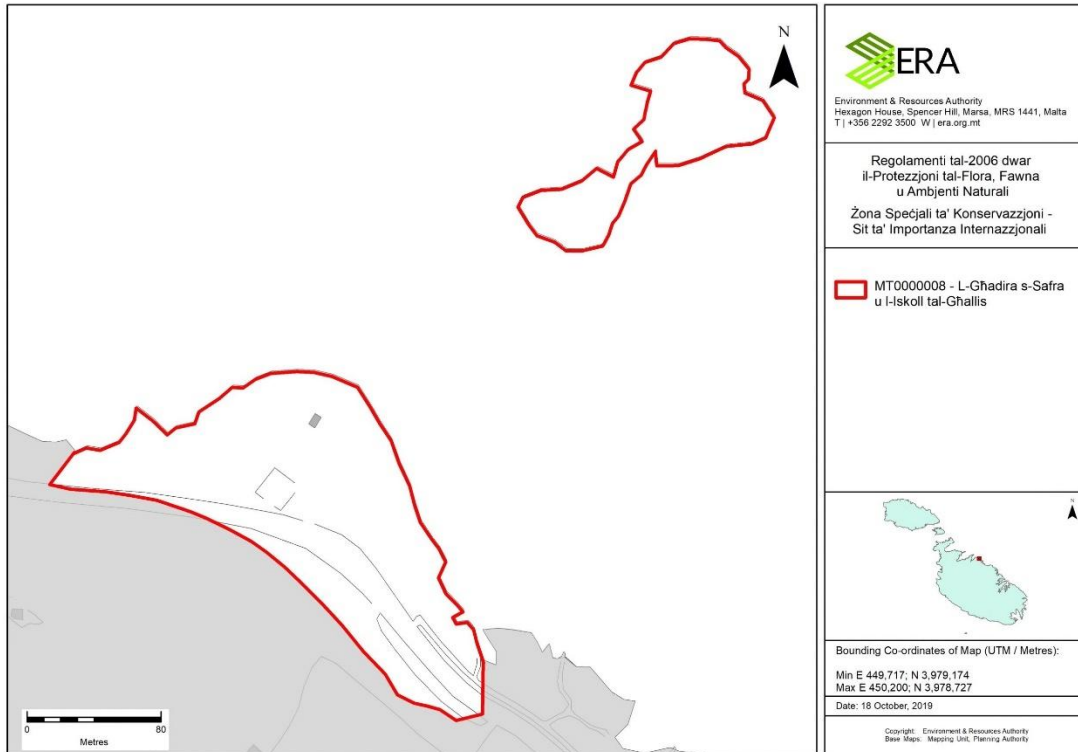


FIGURE 12: BOUNDARY OF THE L-GĦADIRA S-SAFRA U L-ISKOL TA L-GĦALLIS SCI/SPA

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 and Impact Assessment - Doublet and Zammit (2022)

Wasteserv Malta has commissioned an in-depth study carried out by a third-party consultant for a terrestrial ecology baseline study and impact assessment of a number of 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 and Impact Assessment in relation to the removal of soil in areas within the ECOHIVE Complex'.

The scope of the report was to assess whether the schemes will cause impacts on protected sites and natural ecosystems, habitats and species. The schemes' footprints as planned at the time of writing were presented within the report for all aforementioned proposals conjoined. The overall perceived impacts on the identified ecological receptors were discussed, mitigation measures proposed and residual impacts and compensatory measures stated within said report. The assessment addressed Terms of Reference for a terrestrial ecology baseline study and impact assessment (EclA) 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.

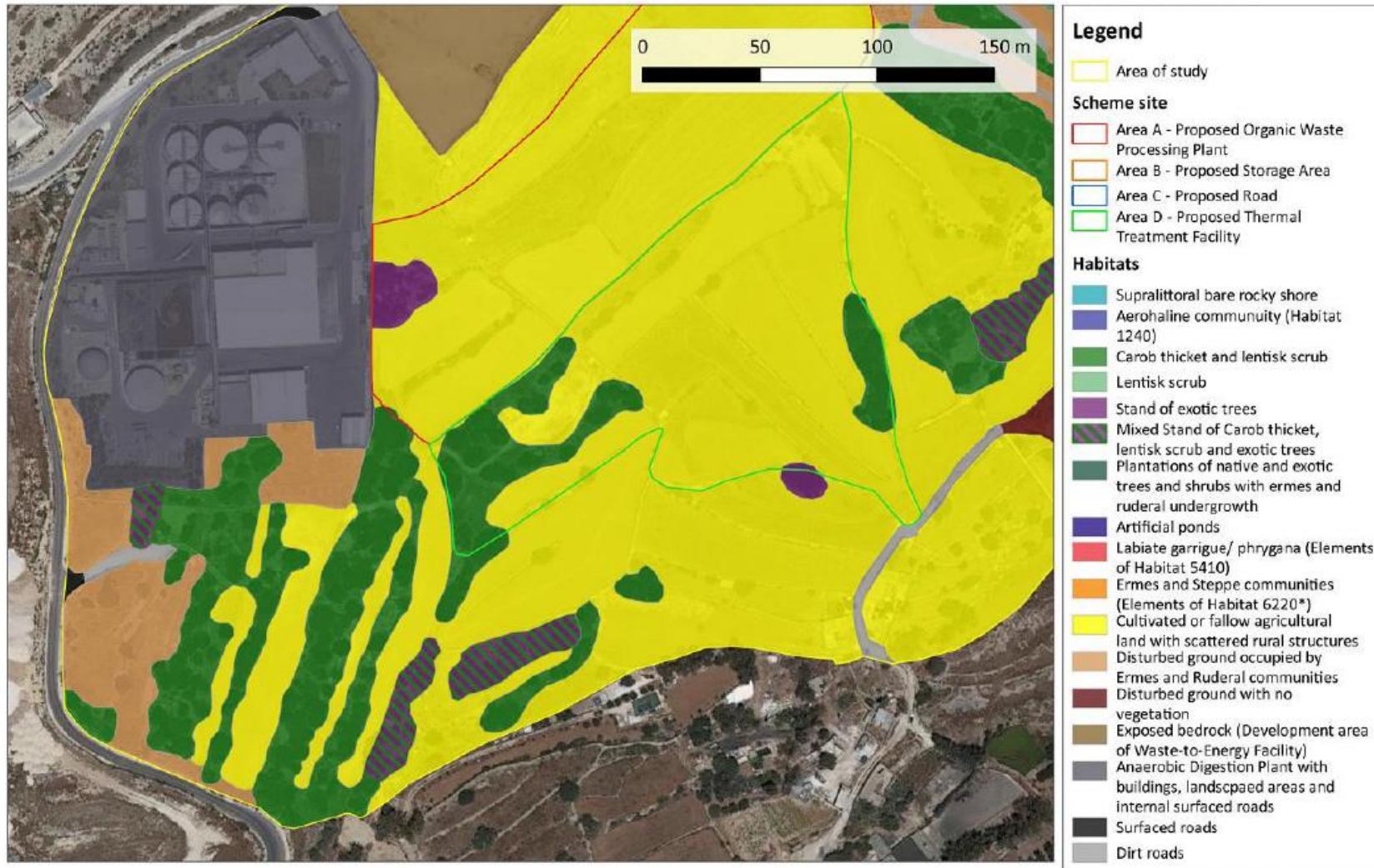


FIGURE 13: HABITAT MAP OF THE AOS – PROPOSED SCHEME SITE MARKED WITH GREEN BORDER (SOURCE: BASELINE AND IMPACT ASSESSMENT..., DOUBLET AND ZAMMIT, 2022)

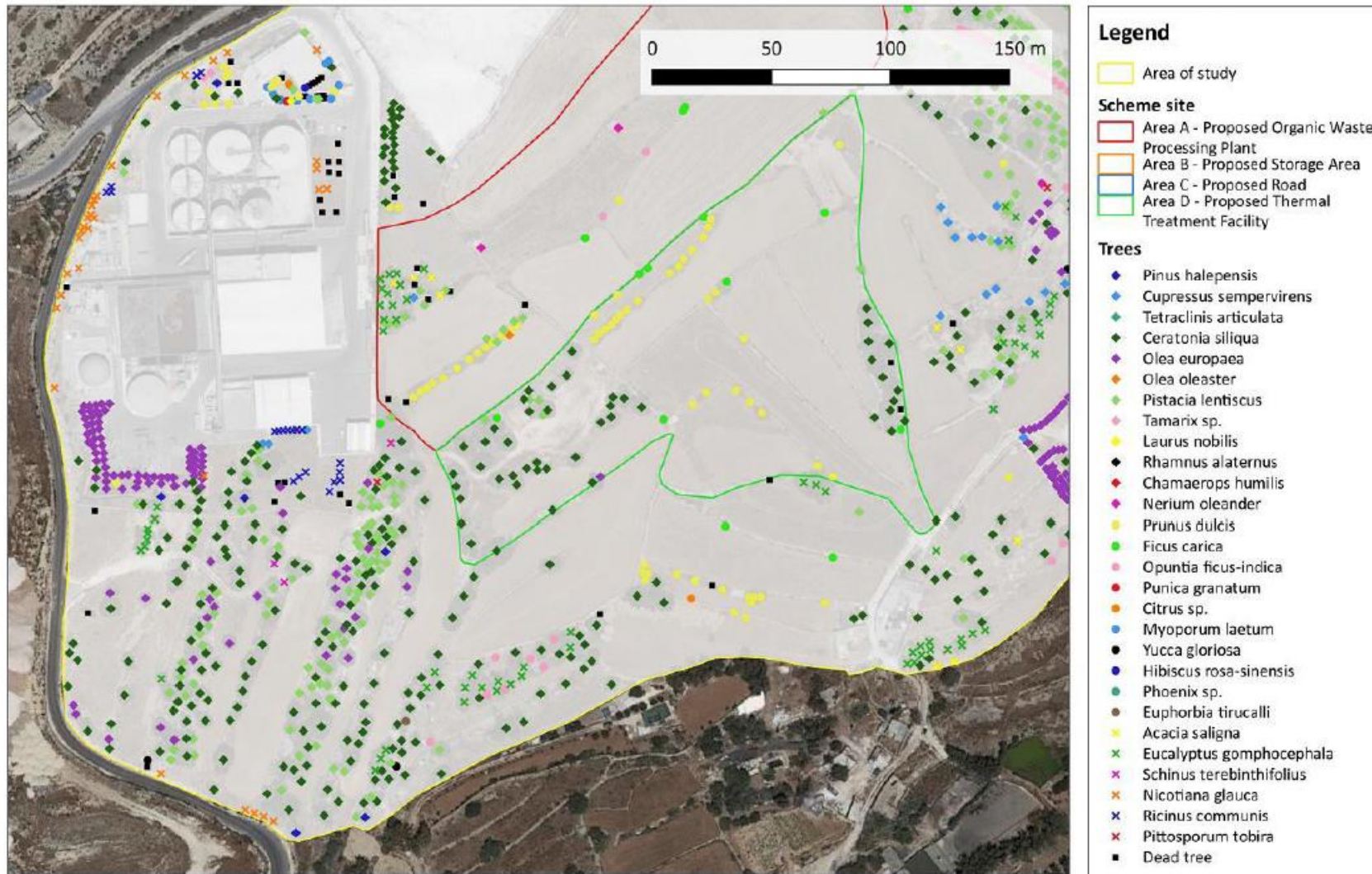


FIGURE 14: TREES IN THE AOS – PROPOSED SCHEME SITE MARKED WITH GREEN BORDER (SOURCE: BASELINE AND IMPACT ASSESSMENT..., DOUBLET AND ZAMMIT, 2022)

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.

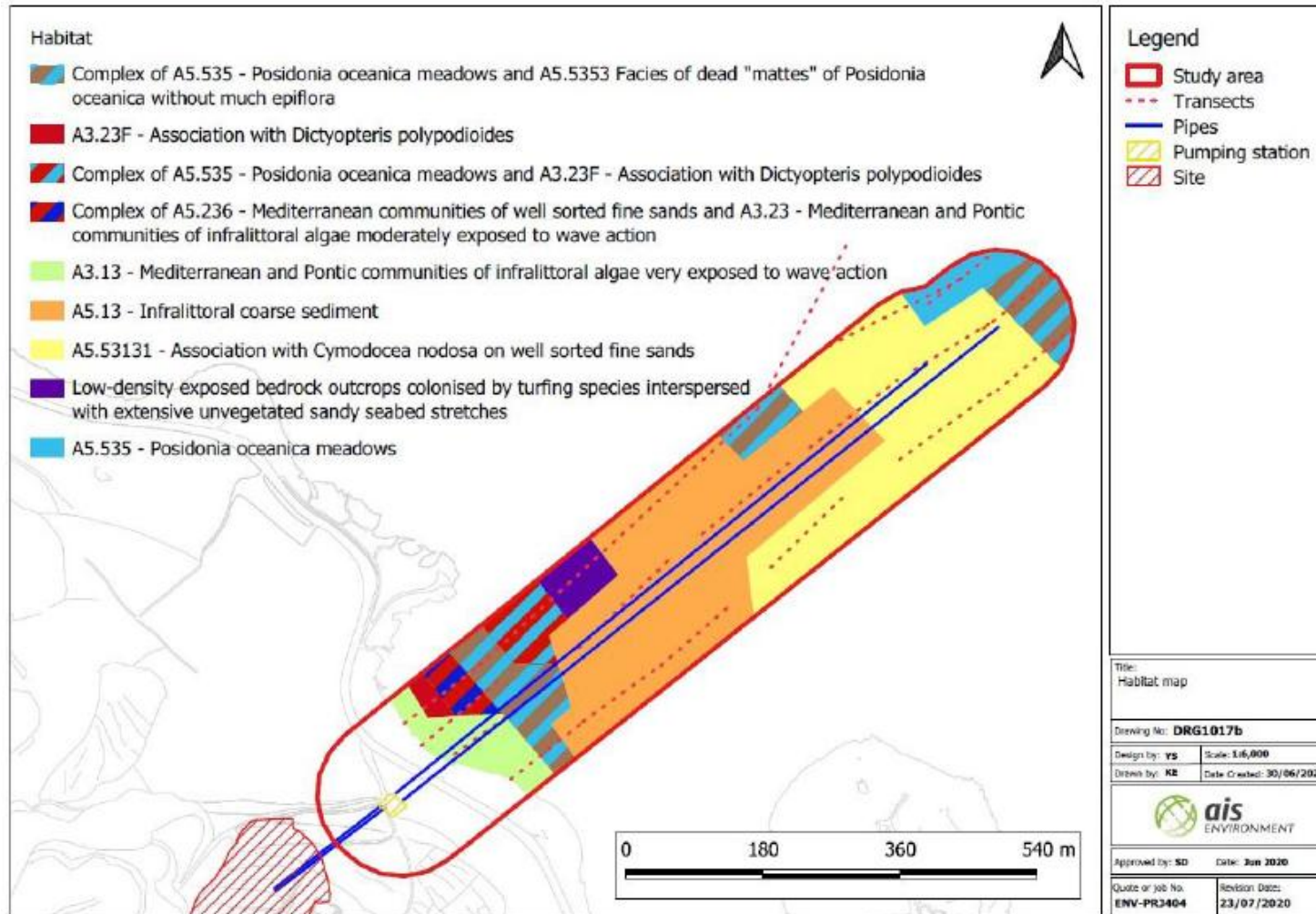


FIGURE 15: BENTHIC HABITAT MAP FOR THE SURVEYED AREA

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: PROTECTED TREE SPECIES WITHIN THE SITE FOOTPRINT

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AOI	RECORDED AMOUNT
<i>Capparis orientalis</i>	Caper bush	Schedule VIII of S.L. 549.44	Soft landscaped areas and excavated area	Scattered individuals
<i>Ceratonia siliqua</i>	Carob tree	Schedule I Part A Table 2 S.L.549.123	Excavated area	45 (of which 5 are dead)
<i>Olea europaea</i>	Olive tree	Schedule I Part A Table 2 S.L. 549.123	Excavated area	1

SPECIES NAME	ENGLISH NAME	PROTECTION	TYPICAL HABITAT IN AoI	RECORDED AMOUNT
<i>Pistacia lentiscus</i>	Lentisk tree	Schedule I Part A Table 2 S.L. 549.123	Maquis	4
Total protected trees directly affected by the proposed development				50

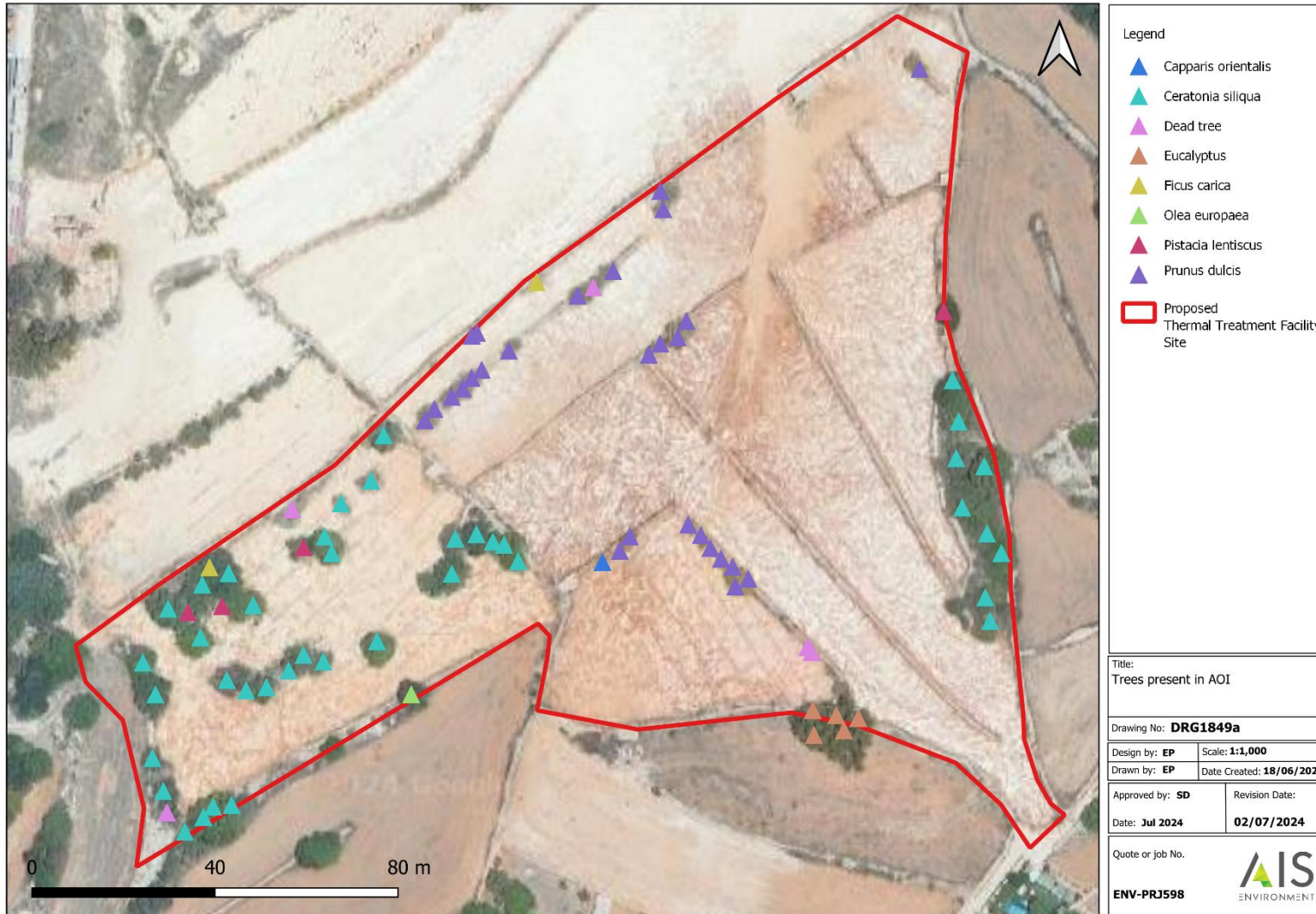


FIGURE 28: TREES AND SHRUBS PRESENT WITHIN THE SITE FOOTPRINT (SITE SURVEY HELD JULY 2024)

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 and Impact Assessment 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

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>Tamarix africana</i>	African tamarisk	10
<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.

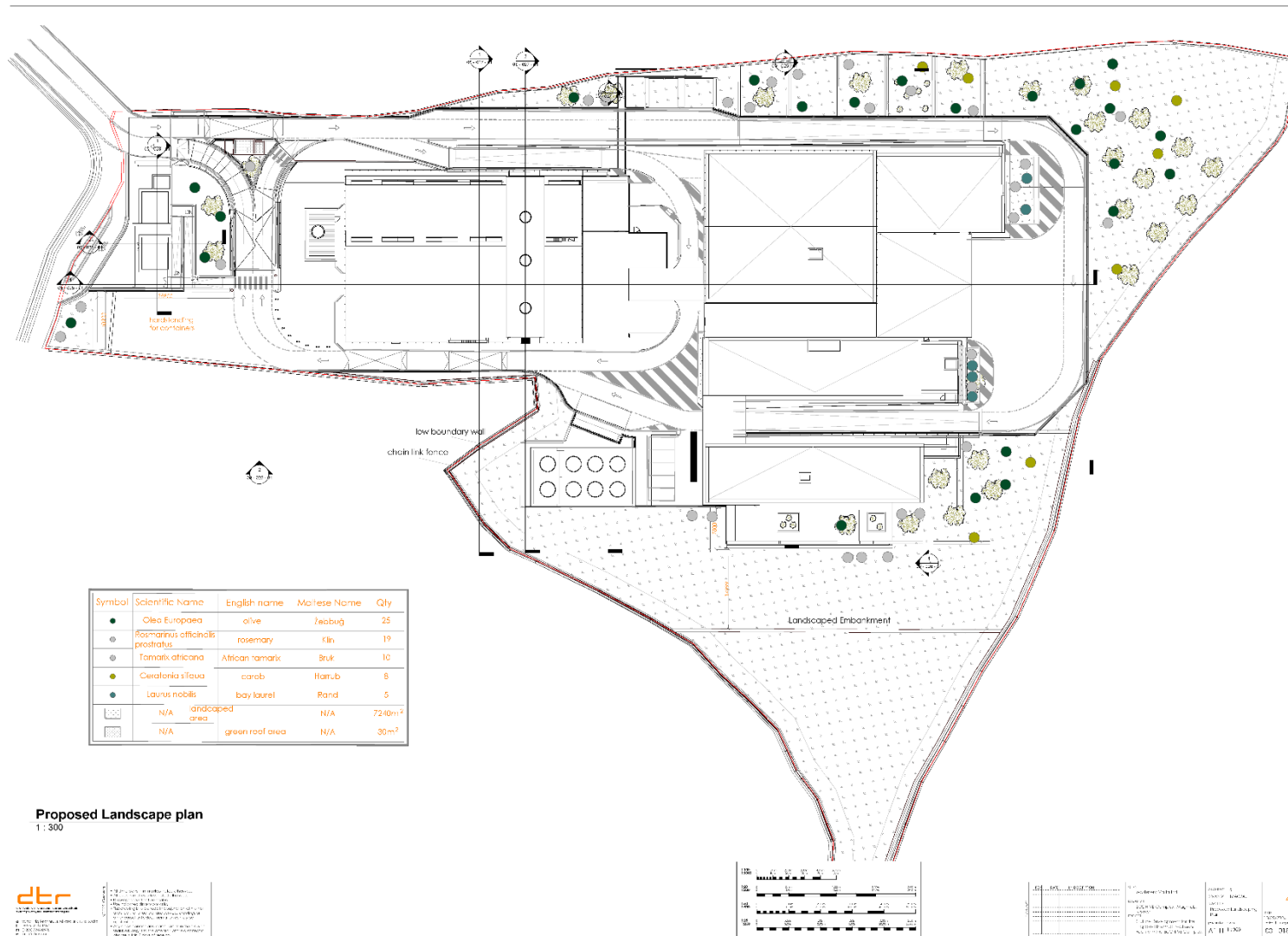


FIGURE 29: PROPOSED LANDSCAPING PLAN

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 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 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.

5.1.4 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.

5.1.5 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 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.

5.2.2 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.

5.2.3 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.

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.

The proposed facility will be designed to adhere to the most stringent standards outlined in these guidelines and policies.

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 MTF 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 MTF 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 and fauna.

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

5.2.4 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, namely:

- 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 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.

9 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 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	N/A
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	N/A
Increased Light, Vibration & Noise generation	Excavation, backfilling, building construction	Construction	Fauna	High	Direct	Adverse	Moderate	Local and near vicinity	Short-term	Temporary	Reversible	Likely	Minor	Works will be limited to daylight hours. Use of lighting for safety reasons should be limited to downward facing, shielded and low-frequency lights. Equipment well maintained to	Negligible	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					
															avoid excessive noise.	
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 the bare minimum and use of down-facing lights.	Negligible	N/A

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 Palaearctic), 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 FIGURES

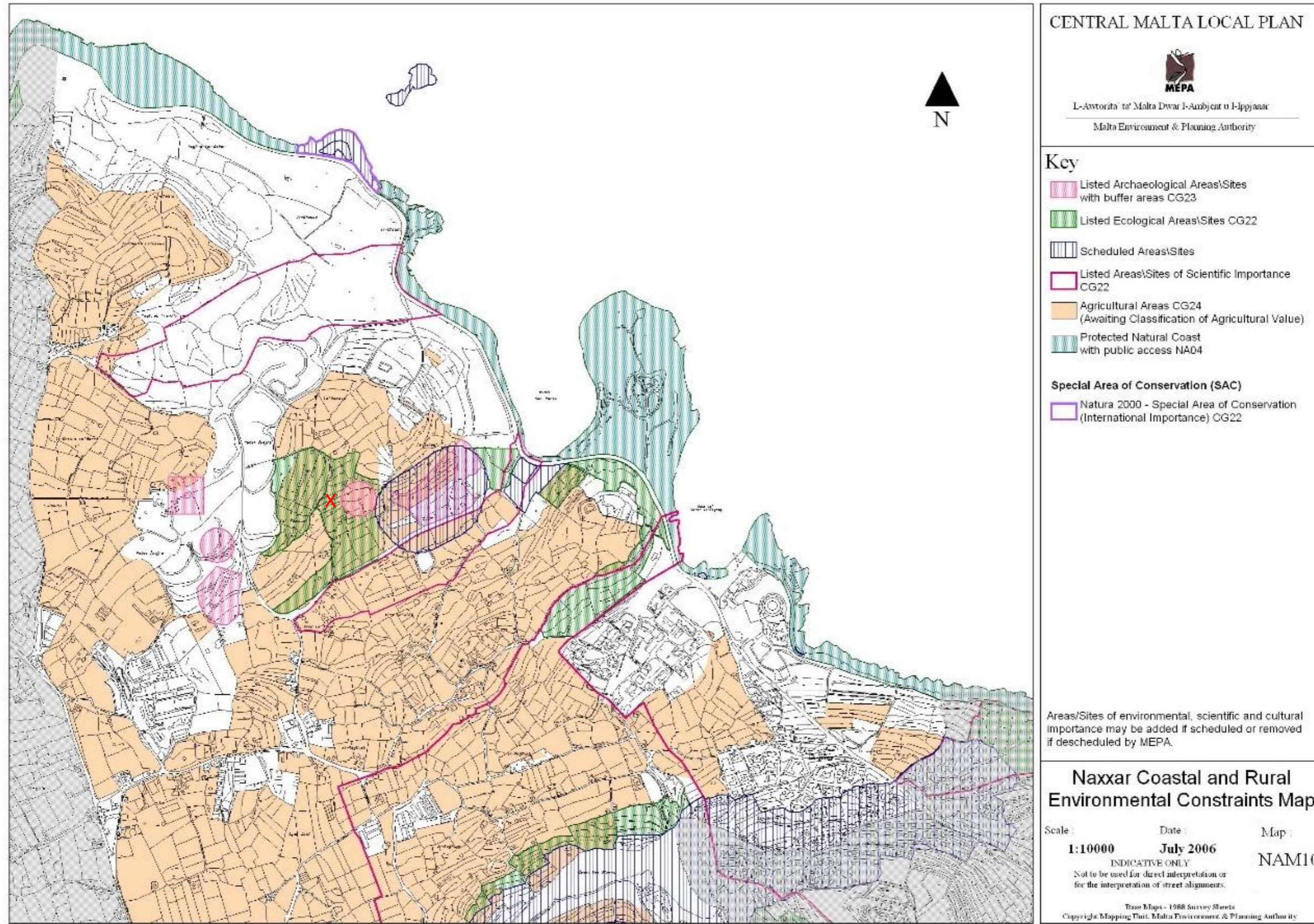


FIGURE 30: LARGE-SCALE NAXXAR COASTAL AND RURAL ENVIRONMENTAL CONSTRAINTS MAP (CENTRAL MALTA LOCAL PLAN, 2006)

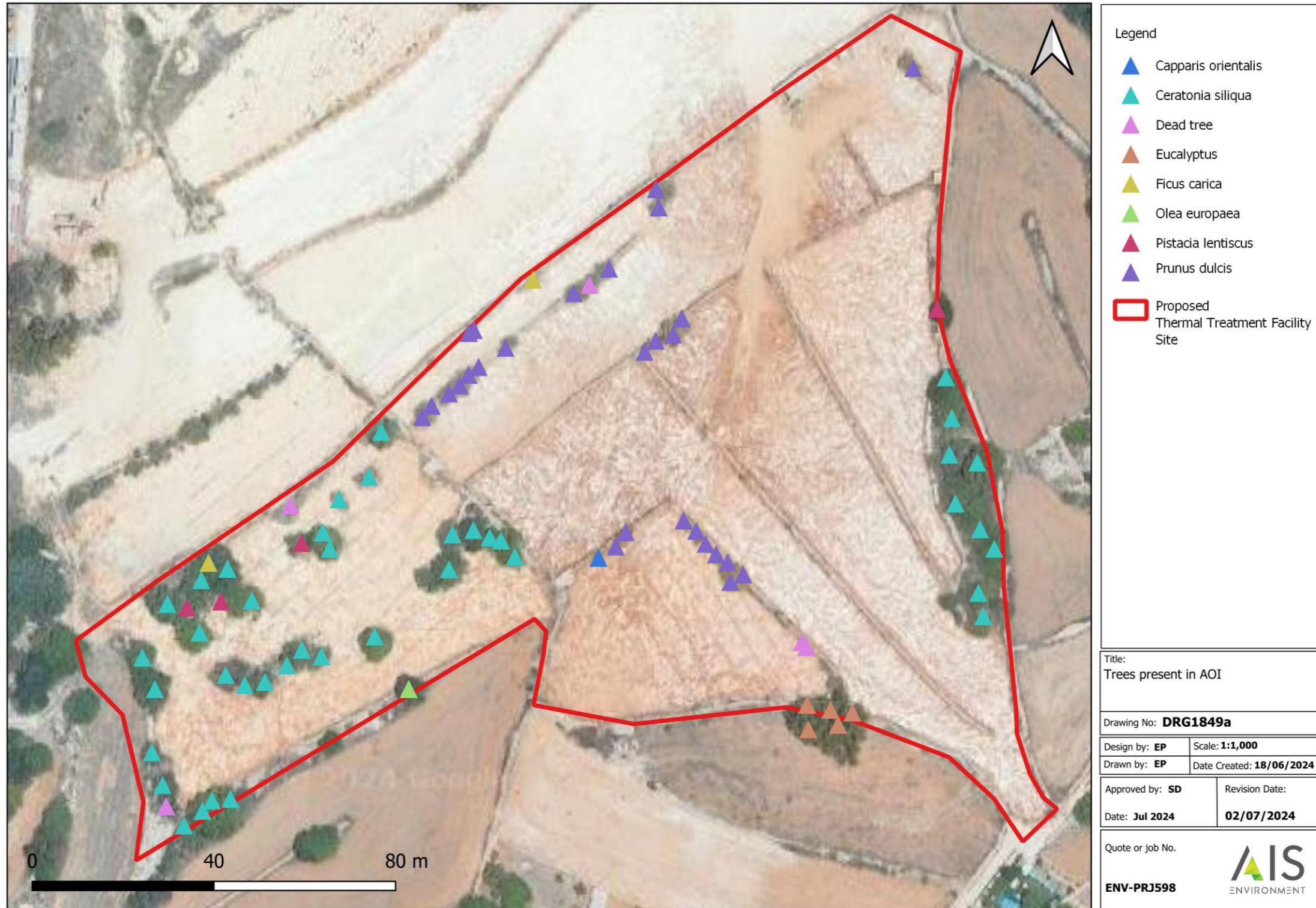


FIGURE 31: LARGE-SCALE TREES WITHIN PROPOSED SITE

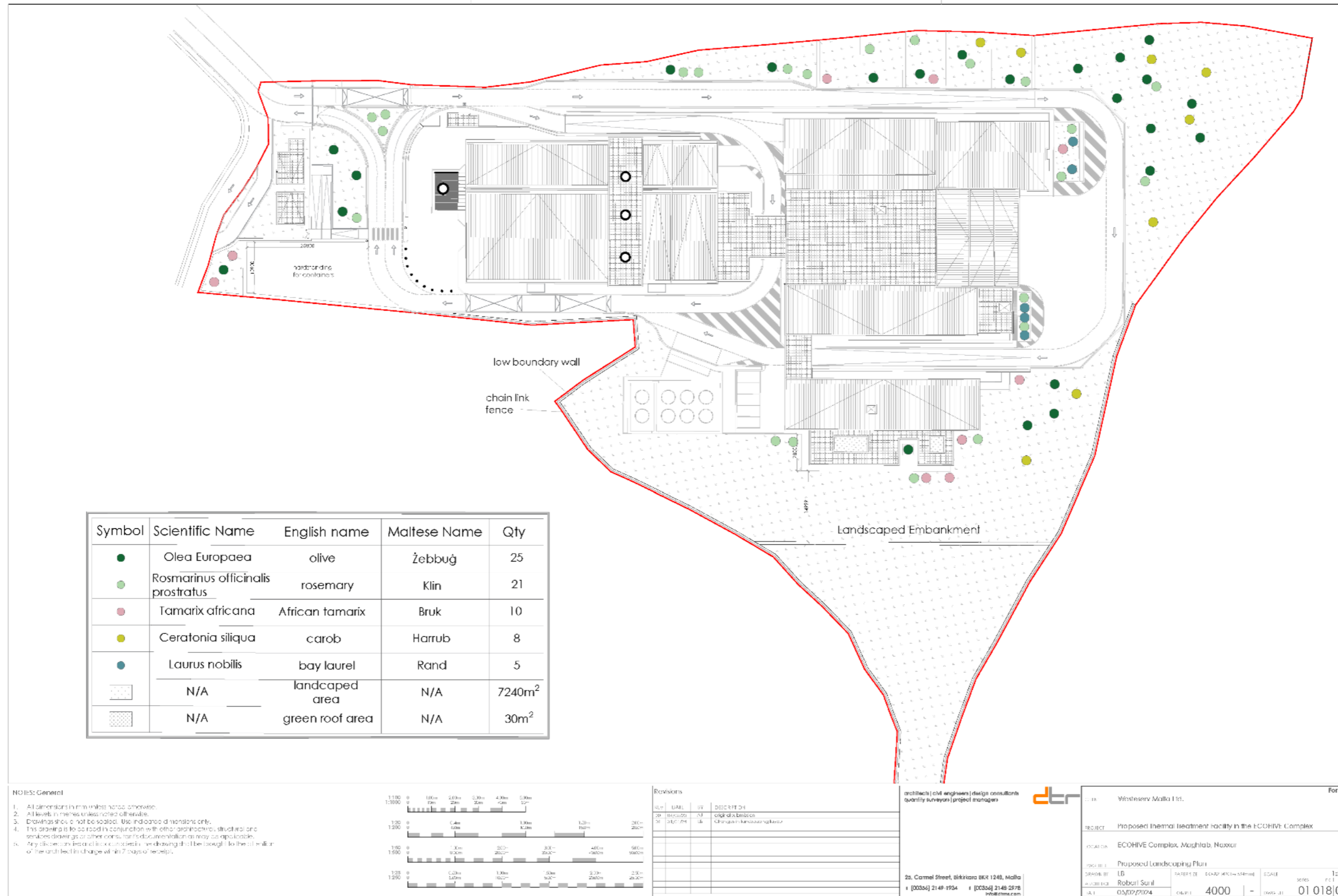


FIGURE 32: LARGE-SCALE PROPOSED LANDSCAPING PLAN