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Land/Sea Cover and Land/Sea Uses in Relation to an Environmental Impact Assessment (EIA)

Undertaking of the permitting activities including environmental impact studies and related actions for the Malta-Italy Gas pipeline interconnection

Technical Report

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CLIENT REF. NO: PA 08757/17
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Approval Level	Name	Signature
Internal Check	Sacha Dunlop	
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DISCLAIMER

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1.0 Scope

An Environmental Impact Assessment (EIA) is hereby being presented in relation to PA 08757/17. This application is entitled "*construction of the Malta-Italy gas pipeline EU Project of Common Interest, including a terminal station at DPS, an onshore HDD route through Delimara Peninsula and the laying of an offshore 22" diameter pipeline extending up to Gela, Sicily, Site at Delimara Power Station and offshore route within the Malta Territorial Waters, Delimara, Marsaxlokk, Malta*".

This technical study identifies the land/sea cover and land/sea uses and assesses the impacts caused in relation to the Environmental Impact Assessment (EIA) for the proposed gas pipeline between Malta and Sicily. The terrestrial aspect of this study falls within the locality of Delimara, Marsaxlokk.

The study will focus on the Maltese part of the Scheme only i.e. the area of land reclamation at Marsaxlokk bay, the trenchless tunnel route through the Delimara peninsula and the offshore pipeline until the median line between Malta and Sicily.

The project shall connect Malta to the Trans-European Gas Network in Sicily. The primary aim of the project is to import gas from the Italian National Gas network via an approximately 159km long pipeline between Delimara (Malta) and Gela (Sicily) of which approximately 151km is subsea.[1] The length of the onshore pipeline section in Delimara is about 700m and will be connected to a new Terminal Plant by means of a trenchless construction method with the exit target point at approximately 42m below mean sea level at circa 650m from shore. The Front End Engineering Designers (FEED) have determined that the microtunnelling solution is the preferred option. A degree of preliminary trenching is required at the offshore target exit point to facilitate the entry of the pipeline from the seafloor into the trenchless borehole. The seabed shall be reinstated after the 22" pipeline installation is completed. The water depth of the offshore portion of the site ranges from 42m (offshore exit point at Delimara) to 158m at the deepest point and then it is buried from a depth shallower than 30m at the Gela side.

Once the project is implemented, the gas pipeline would provide a more reliable source to supply natural gas to Malta, eliminating the need for the Floating Storage Unit (FSU) recently installed to supply natural gas to the reciprocating internal combustion engine plant and the new gas turbines at the Delimara Power Station. The project will contribute to market integration and thus boost competitiveness. Use of sustainable energy will be supported by the project and will contribute towards the reduction of GHG emissions primarily from the LNG shipping and regasification process which currently take place as part of the FSU system. Once operational, the gas pipeline will also have the potential to import fuel gases from renewable sources (ex: biomethane) and thus help reduce Malta's carbon footprint.

[1] The project was confirmed as a "project of common interest" (PCI) and re-confirmed in the 2nd, 3rd and 4th PCI lists.

The gas pipeline project shall be designed to operate in bidirectional mode with the first phase supplying gas from Sicily to Malta and depending on market developments, can in the future be used to supply gas from Malta to Italy. The phase 1 of the pipeline project, i.e. flow of gas from Italy to Malta, shall have an estimated capacity of approximately 1.2 billion standard cubic meters per year, with a guaranteed maximum flow of 141,000 Sm^3/hour.

The pipe will make contact with land in Malta on the eastern side of the Delimara peninsula at a depth of approximately 42m below sea level. It will then transect the peninsula and connect to the Delimara Power Station via a trenchless excavation method. The Power Station needs to be extended in order to accommodate the additional infrastructures required for the operation of the pipeline. In order to do this, it is necessary to reclaim an area of 8,000m² from the sea.

The Sicilian terminal station will be constructed within the Gela municipality at 37°04'51.80" N; 14° 19'01.00" E. The onshore pipeline route in Sicily is expected to be 7km long, and confined within the Gela municipality. Since the pipeline shall cross two railway lines, a number of roads and the Gela-Ragusa ethylene pipeline, three block valve stations shall be installed onshore Sicily to isolate the pipeline sections as required by Italian legislation.

On the Sicilian shore, several construction methodologies, including HDD are being considered by the FEED (Front End Engineer Design) contractor, Techfem/SPS. For mechanical protection purposes, the underwater pipeline shall be covered when passing through waters shallower than 30m, while in deeper waters, the pipeline shall be laid on the seabed. The pipeline route is located in relatively shallow waters on the Malta-Sicily underwater ridge. Such a route minimises stresses on the pipeline during both the laying of the pipe as well as during the operation of the pipeline itself.

The proposed development, subject to the EIA and hereinafter referred to as the "Scheme", involves the following interventions (Figure 1):

- Construction and laying of a 22" diameter gas pipeline between Delimara and Gela
- The construction of a terminal station (land reclamation) at Delimara Power Station
- Onshore tunnel route across the Delimara Peninsula

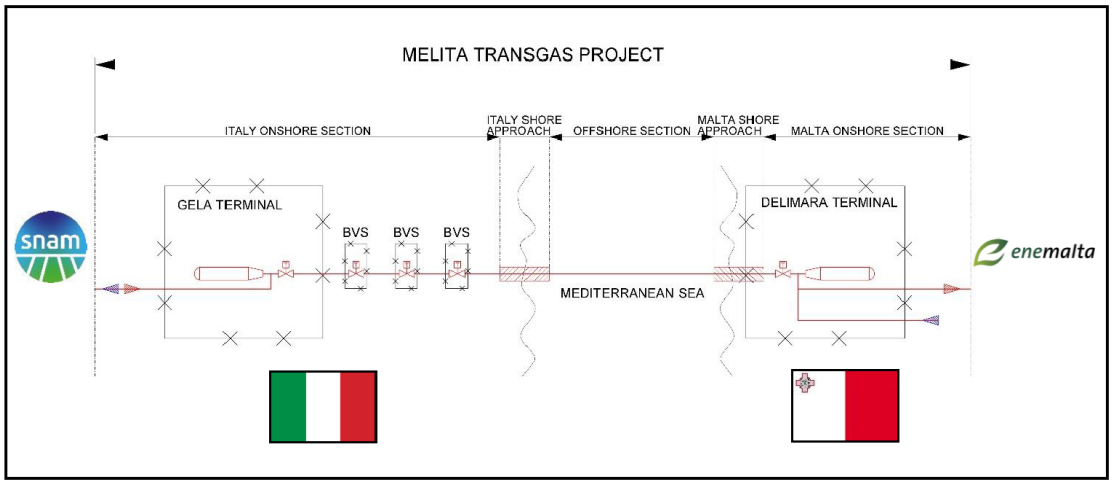

Figure 1: Project schematic

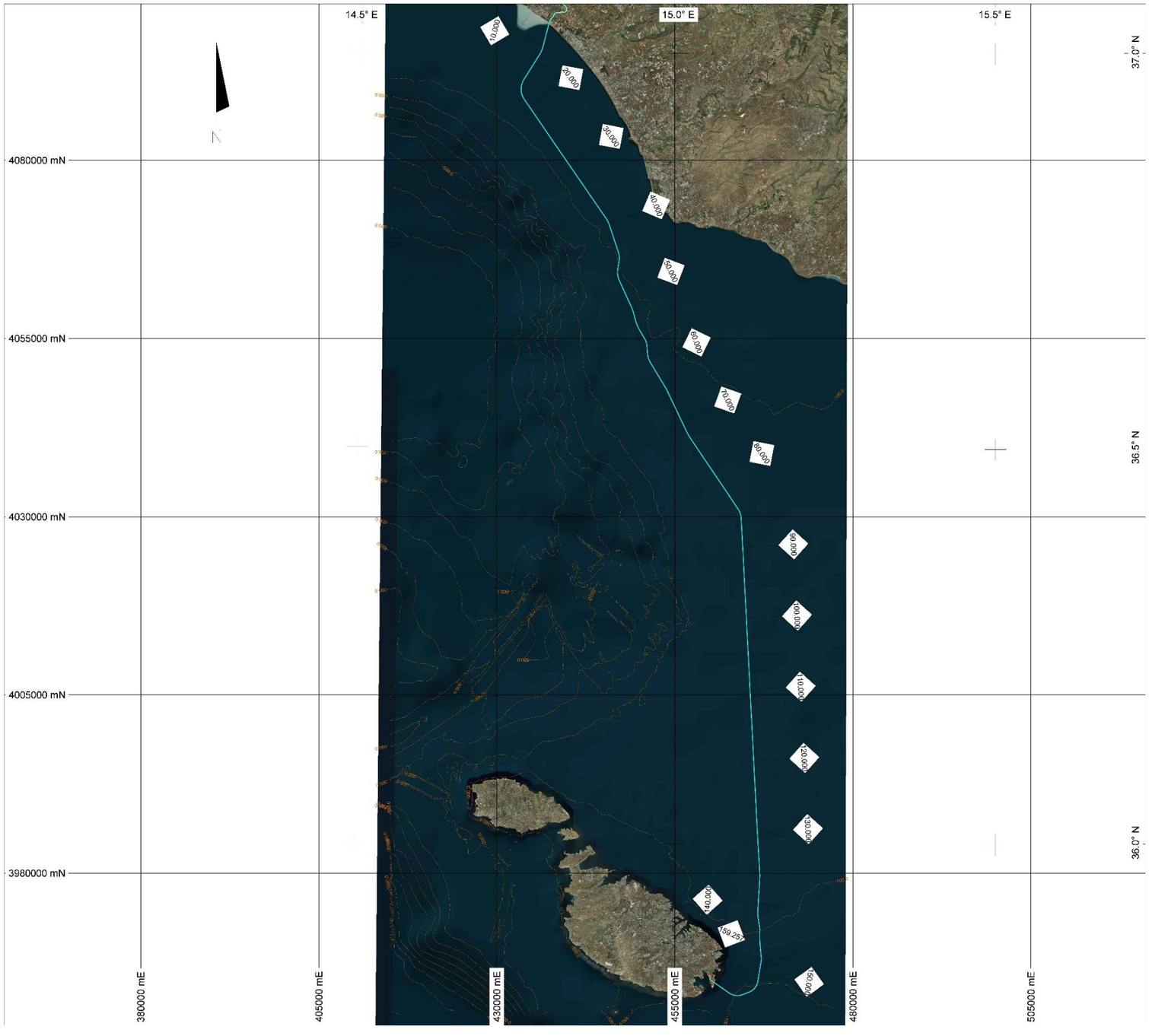

Figure 2: Site plan showing the 22” offshore pipeline route

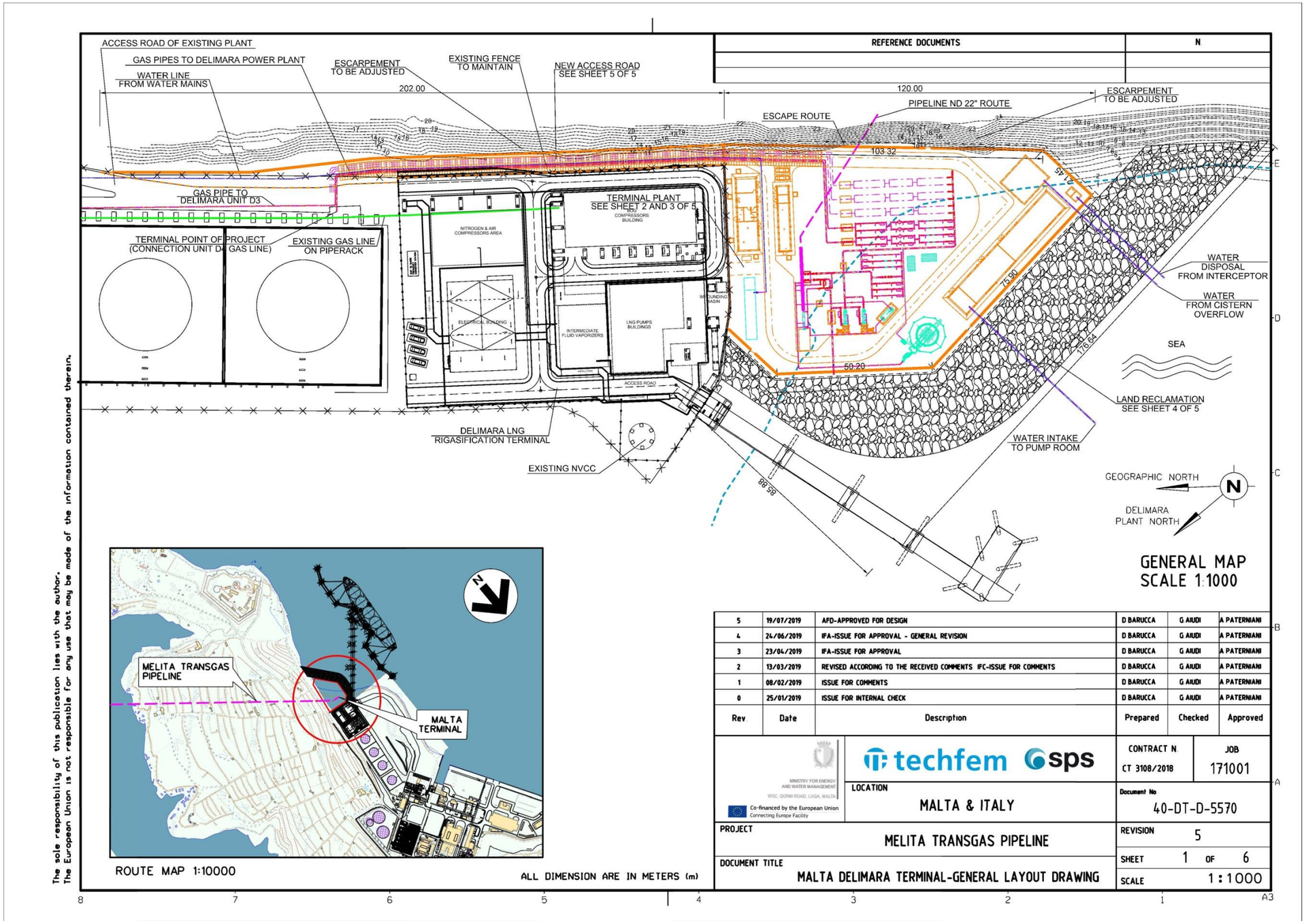

Figure 3: Site plan for the proposed Malta terminal and land reclamation area

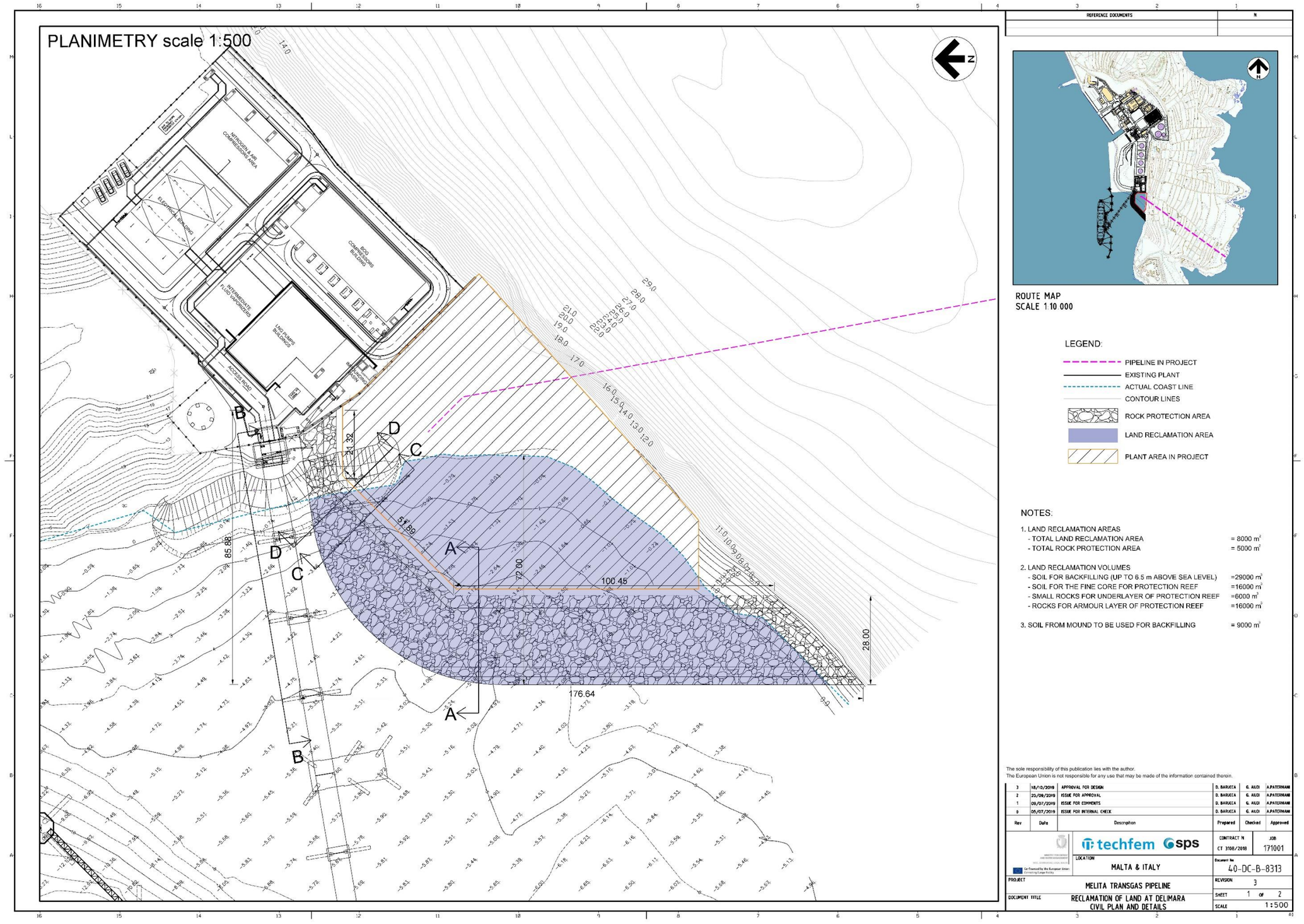

Figure 4: Land reclamation at Delimara

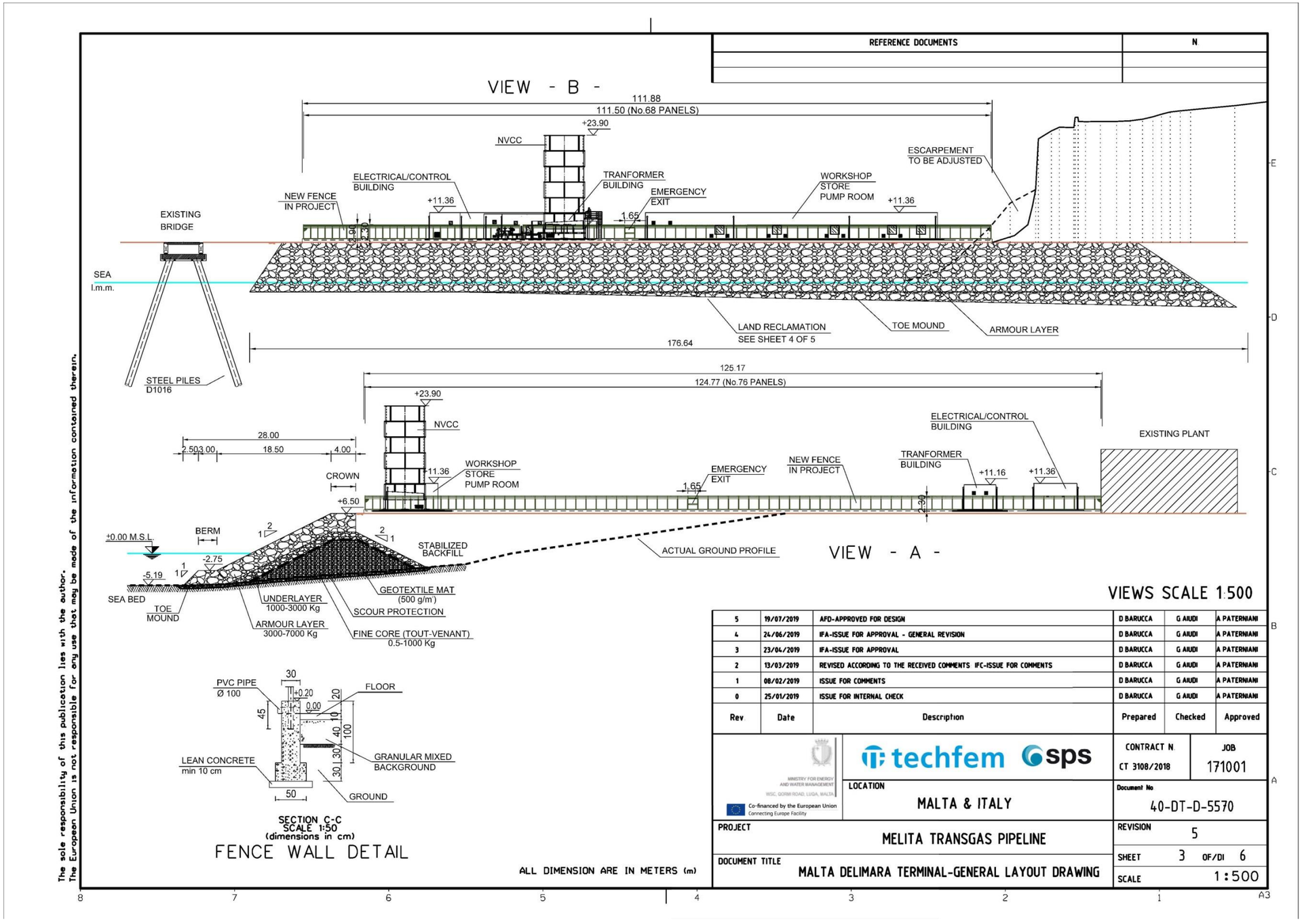

Figure 5: Sections for the proposed Malta terminal

2.0 Terms of Reference

The Terms of Reference related to the study on land/sea cover and land/sea uses for the EIS issued by ERA in March 2018 are:

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

This description is identified by the area of influence depicted in Figure 6 *and* Figure 7. *This description shall include:*

3.1 Land Cover and Land Uses

A description of the present land and sea uses of the proposed site together with a description of other uses located within the area of influence from the site. Details including nature, magnitude, proximity to site, etc. should be included.

The assessment shall first consider the proposed development in isolation and assess the impacts arising from the proposed development. These include impacts of the proposal on the adjacent sea uses including any existing sensitive receptors/uses with particular reference to: (i) navigational routes (international and local); (ii) fisheries; (iii) shipping and yachting; (iv) diving and tourism; and (v) any Marine Conservation Areas, during construction and operation.

4.0 ASSESSMENT OF ENVIORNMENTAL IMPACTS AND ENVIRONEMENTAL 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.

4.1 Effects of the environment aspects identified in Section 3

The assessment should thoroughly identify and evaluate the impacts and implications of the project on all the relevant environmental aspects identified in Section 3 above, also taking into account the various considerations outlined in the respective sections.

With regards to Section 3.4 and 3.5 above, the ecological status of the area in question is to be evaluated, taking into consideration the definition of status by relevant EU Policy, and assessing the extent to which the project will cause deterioration in status or compromise the achievement of good status in line with Article 4(7) of the EU Water Framework Directive.

4.2 Impacts related to Climate Change and Climate Change Adaptation

The assessment should address the following aspects, as relevant:

1. *The contribution of the project to greenhouse gas (GHG) emissions and climate change, including:*

i. *The direct, indirect and off-site GHG emissions and related impacts during all relevant phases of the project, including those arising as a result of the electrical power demand of the project;*
ii. *Any massive GHG emissions that may occur as a consequence of accidents or malfunctions;*
iii. *The impacts of the proposal on carbon sinks (e.g. wooded/afforested areas, agricultural soils, landfills, wetlands, and marine environments);*
iv. *The components of the project that are expected to contribute to renewable energy generation on site or to a reduction in GHG emissions through substitution of current generation facilities, including a quantification and critique of their reliability and actual net contribution to climate change mitigation as well as an identification of the impacts of such components on other aspects of the environment (e.g. landscape, land take, avifauna); and*
v. *The implications of the project and its operations and ancillary demands on National GHG emission targets.*

2. *The implications of climate change on the proposal, including:*
   i. *The aspects/elements of the project that are likely to be affected by changes or variability in climate-related parameters (e.g. temperature, humidity, weather patterns, sea level, etc.);*
   ii. *The potential impacts that such changes may have on the proposal, including any possible impacts resulting from changes to multiple parameters; and*
   iii. *The adaptability of the project and its components and operations vis-à-vis the relevant climate change parameters and trends.*

4.3 Environmental risk

The assessment should also address, in sufficient detail, any relevant environmental risk (including major-accident scenarios such as contamination, emissions, blast, flooding, major spillages, etc.) likely to result in environmental damage or deterioration. The range of accident scenarios considered should exhaustively cover, as relevant:

1. *one-time risks (e.g. during construction or decommissioning works);*
2. *recurrent risks during project operation; and*
3. *risks associated with extreme events (e.g. effect of earthquakes or natural disasters on the project).*

The assessment should include, as relevant: a quantification of the risk magnitude and probability; and risk analysis vis-à-vis any hazardous materials stored, handled, or generated on site or transported to/from the site.

***Note:** Should the proposal fall within the scope of the Seveso/COMAH regulations, a stand-alone Risk Assessment may be required, to the satisfaction of the relevant Competent Authority. In such instances, separate Terms of Reference are issued for the Risk Assessment.*

Following a formal request to CPD by MEW dated 20th March 2018, CPD indicated that at EIA stage, it is too premature to present an update to the safety report, risk assessments and

internal emergency plan. Ongoing meetings are held with Comah competent authority and safety report, Internal and External Emergency plans will be updated at IPPC stage.

4.4 Effects on Human Populations resulting from impacts on the environment

This assessment should also identify any impacts of the development on the surrounding and visiting population (e.g. effects on public health or on socio-economic considerations), that may result from impacts on the environment. In the case of health-related effects, reference should be made to published epidemiological and other studies, as relevant, and the views of the Environmental Health Directorate should be sought.

4.5 Transboundary Impacts and Other Environmental Effects

The impacts whose area of influence reaches one or more neighbouring countries (affected country, i.e. Italy), should be described and assessed according to their nature and characteristics (e.g. direct and indirect, temporary or permanent, continuous or intermittent, reversible or irreversible, positive or negative, short- medium- or long-term, their magnitude, their mitigation and compensability, their transboundary nature, accumulation and synergies with other impacts).

Impacts should be identified for the construction, operation and decommissioning phases of the project, including all ancillary developments.

Any other environmental effects deemed relevant to the project but not fitting within any of the above sections should also be identified and assessed.

5.0 REQUIRED MEASURES, IDENIFITICATION OF RESIDUAL IMPACTS, AND MONITORING PROGRAMME

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]. Such measures could include technological features; operational management techniques; enhanced site-planning and management; aesthetic measures; conservation measures; reduction of magnitude of project; and health and safety measures. Particular attention should be given to mitigation of impacts on the marine resources and of conflicts between the different uses on site.*

*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.

5.4 Decommissioning Plan

A decommissioning plan (DP) should also be proposed to address the following circumstances, as relevant:

1. *Removal of any temporary or defined-lifetime development (or of any structures, infrastructure or land use required temporarily in connection with it) upon the expiry of their permitted duration; and*
2. *Removal of the development (or of any secondary developments, infrastructure or land use ancillary to it) in the event of redundancy, cessation of operations, serious default from critical mitigation measures, or other overriding situations that may emerge in future.*

The DP should also include, as relevant, a phasing-out plan, proposals for site remediation or decontamination, and methodological guidance on site reinstatement or appropriate after-use.

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. marine environment in terms of the benthos, 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)(including monitoring of the marine environment in terms of the benthos, water quality and other sensitive receptors); 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 4*** *- attached to Method Statement as Appendix 1.*

3.0 Methodology

The baseline information in this report presents an integrated view of the land/sea cover and land/sea uses incorporating all of the features that contribute to the character of the area under study. Such features include the physical, ecological, visual, historic and cultural features that have shaped the present landscape. The current area of influence is a living and working landscape shaped by social, economic and recreational characteristics that contribute to its present character.

3.1 Area of Influence

The Area of Influence (AoI) for this study is divided into two AoIs, as outlined in the approved Method Statement. The first AoI encompasses the terminal station, land reclamation area, terrestrial pipeline route and landfall site with a 100m buffer zone around the aforementioned features, as mapped in Figure 6. The second AoI covers the survey corridor around the offshore pipeline route up until the median line between Malta and Sicily, as shown in Figure 7.

3.2 Literature Review

A thorough literature review was conducted to collate any existing and available information on previous land/sea cover and land/sea use investigations carried out in the vicinity of the area of study. The land use activities were categorised as: agricultural, commercial, industrial, residential and other uses that shape the current landscape. The sea use activities were categorised as open water, bunkering area, waiting area and aquaculture.

3.3 Site Visits

A site visit was undertaken in May 2019 in order to confirm the land uses identified during the literature review. The site visit focused on all of the land types found within the AoI. Details including nature and magnitude of the land/sea uses and proximity to site were also assessed.

Figure 6: AoI for the onshore works with a 100m buffer zone

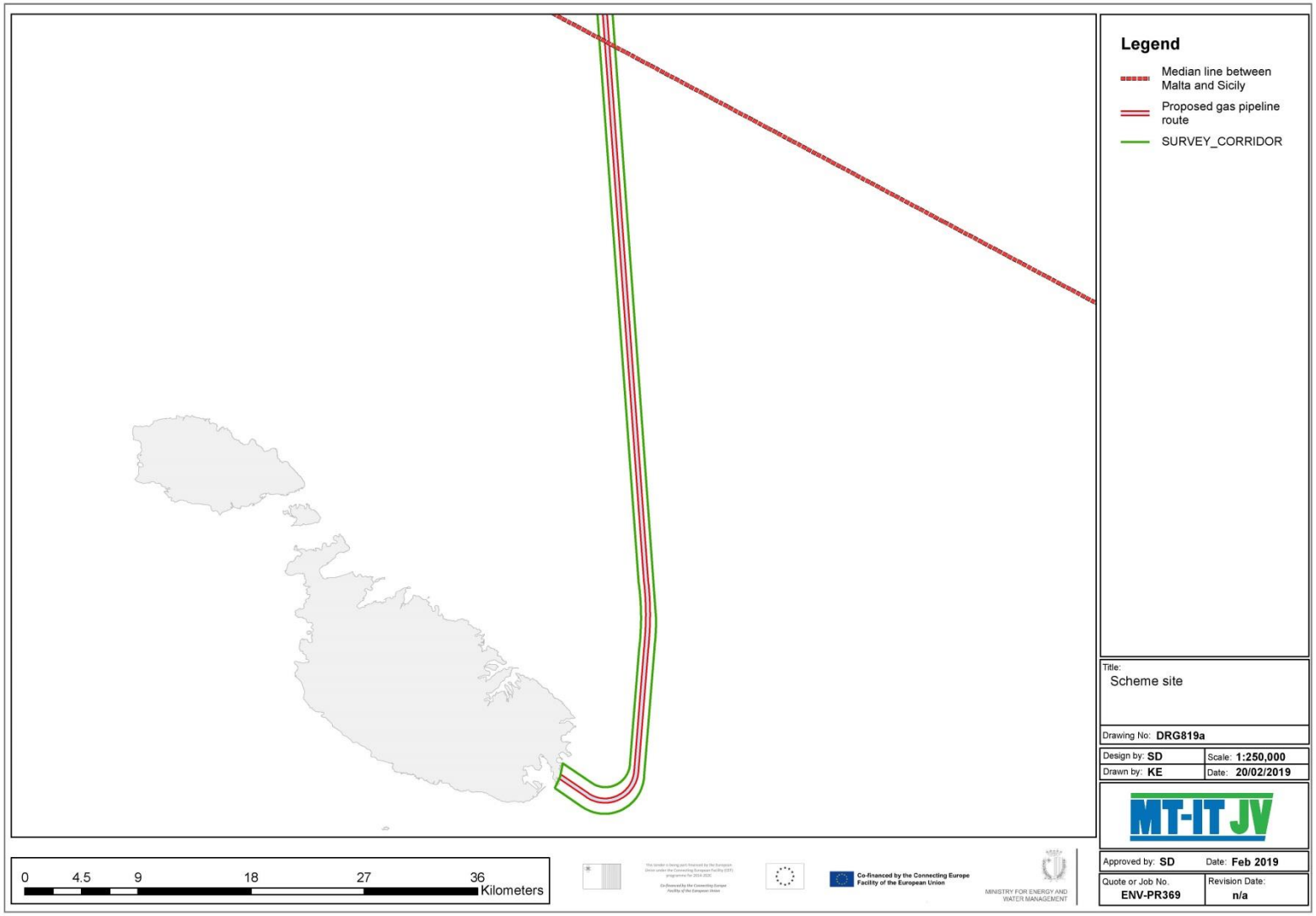

Figure 7: AoI around the offshore pipeline (buffer of 1km for the first nm and 600m up to the median line)

4.0 General Description of the Area of Influence

4.1 Marsaxlokk

Marsaxlokk is a traditional Maltese village located at the southeast end of Malta. Marsaxlokk is a fishing village which attracts numerous tourists due to its quaint traditional aesthetic and open spaces. Tourists visit Marsaxlokk harbour in great numbers, to experience the idyllic fishing village and even specifically for the traditional fish market that sets up every Sunday morning. The touristic nature of the town makes it consonant with the development of accommodation and dining facilities.

At present, Marsaxlokk's touristic nature mostly revolves around the fishing village and associated activities such as seafood restaurants which serve fresh catch. The attractive promenade and the vicinal historical remains at Tas-Silġ also contribute to the influx of people towards the area. However, Marsaxlokk has great promise for eco-tourism which has not yet been addressed. Due to the unique appeal and ecological importance of the Il-Ballut Special Area of Conservation (SAC), the Il-Magħluq area has a particularly large capacity for eco-tourism.

The Port of Marsaxlokk indents the East coast of Malta between Ponta ta' Delimara (2.5 km away) and Il-Ponta ta' Bengħajsa (3.5 km away). It is the second largest port in Malta following the Valletta Grand Harbour. Within the port of Marsaxlokk, a number of industrial facilities are located. These include the container terminal (Malta Freeport Terminals), storage facilities of oil products (Oiltanking Malta), Liquigas, Medserv, Enemed and San Lucian Oil Company, among others. Marsaxlokk is also the major base port for 70% of the Maltese fishing fleet, characterised by the colourful and traditional Maltese luzzijiet (fishing boats).[2]

The Delimara peninsula in Marsaxlokk is also home to Malta's only operational power station which comprises four electricity plants. The two main units are the DPS Phase 4, which is a natural-gas fired system which was inaugurated in 2017, and DPS Phase 3, which was commissioned in 2012 and runs fully on gas with the added facility that half of them have dual fuel capability (gas and diesel). The existing Floating Storage Unit (FSU) currently supplies liquefied natural gas to the regasification station which then supplies natural gas to DPS Phase 4 and Phase 3. The proposed permanent gas pipeline connection seeks to provide a stable connection to replace the FSU.

The site in question is located on the Delimara peninsula, thereby falling within the Marsaxlokk Bay Local Plan (MBLP). Relevant policy maps are presented in Figure 8 and Figure 9.

[2] *http://www.transport.gov.mt/ports-marinas/ports-in-malta/port-of-marsaxlokk*

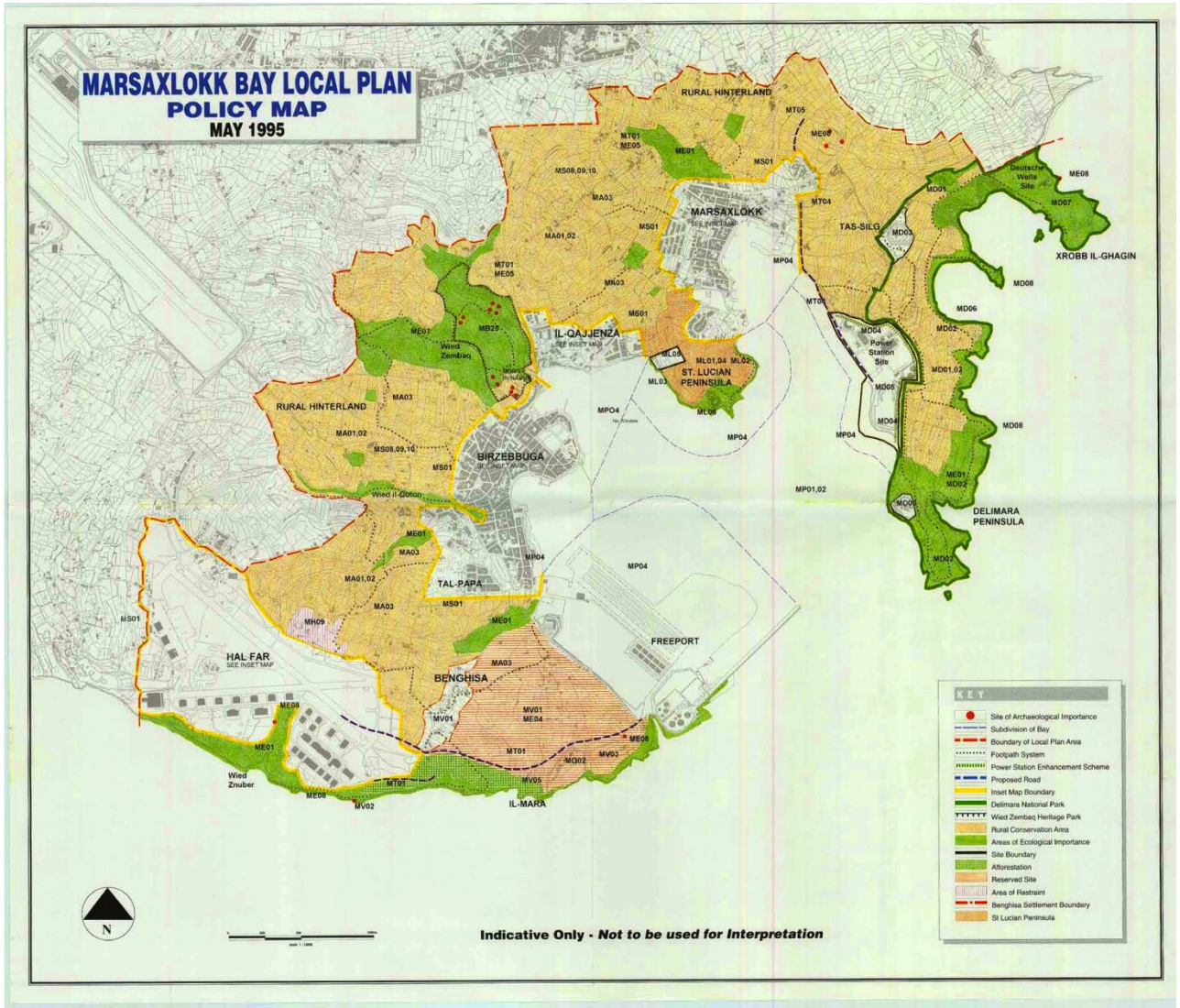

Figure 8: Area policy map for Marsaxlokk Bay (Source: MBLP, 2006)

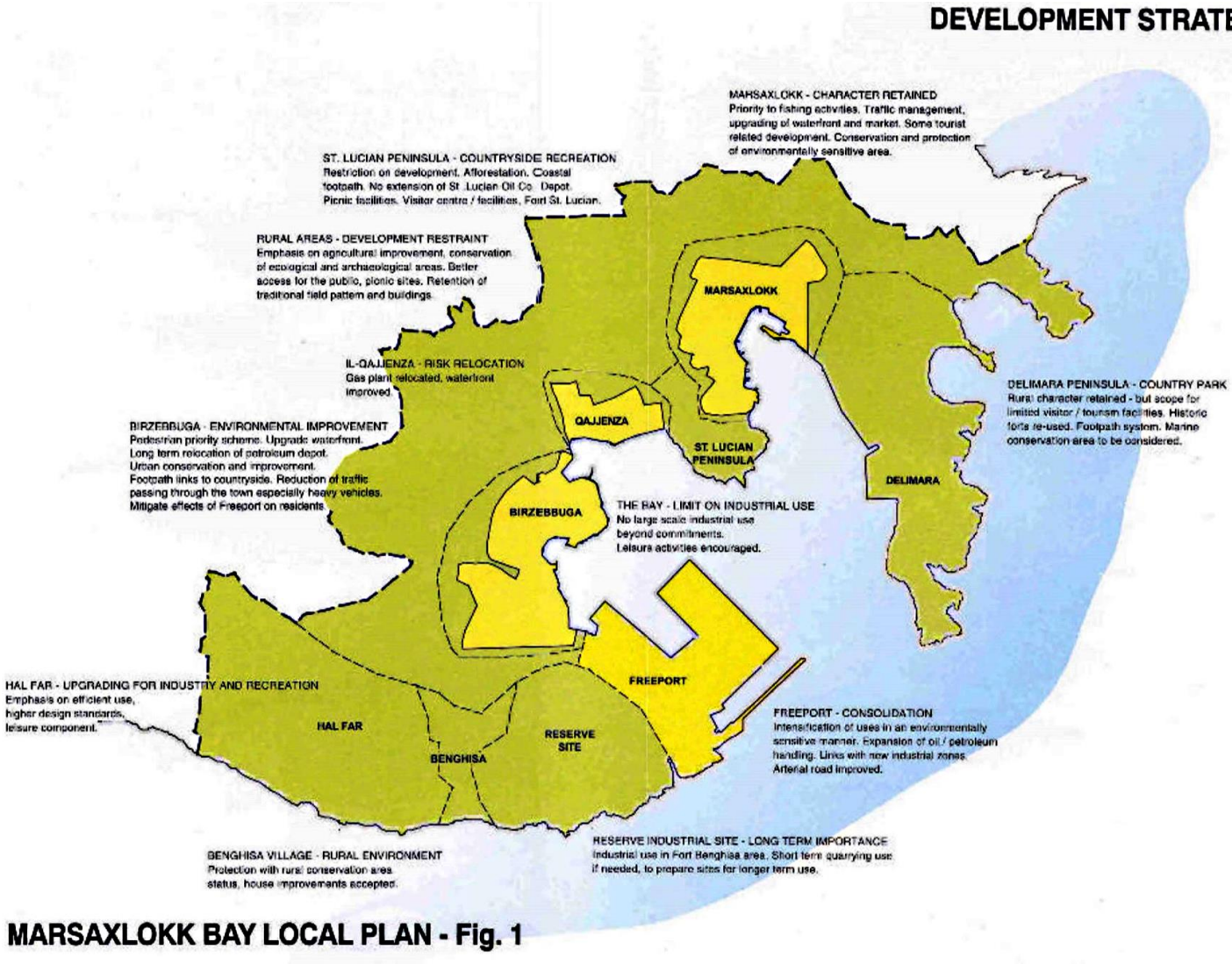

Figure 9: Strategy map (MBLP, 2006)

5.0 Surrounding Land Uses at the Proposed Site

5.1 Terrestrial environment

The Scheme incorporates both terrestrial and marine areas, as shown in Figure 6 and Figure 7. A wide range of land uses were identified within the AoI during the site visit carried out in May 2019, namely (Figure 10):

- Delimara Power Station (Figure 11)
- Floating storage unit (FSU) and jetty (Figure 12)
- Residential areas (Figure 13)
- Agricultural land (Figure 14)
- Go & Melita radio transmitters (Figure 15)
- Coastal garigue (Figure 16)
- Disturbed ground (Figure 17)

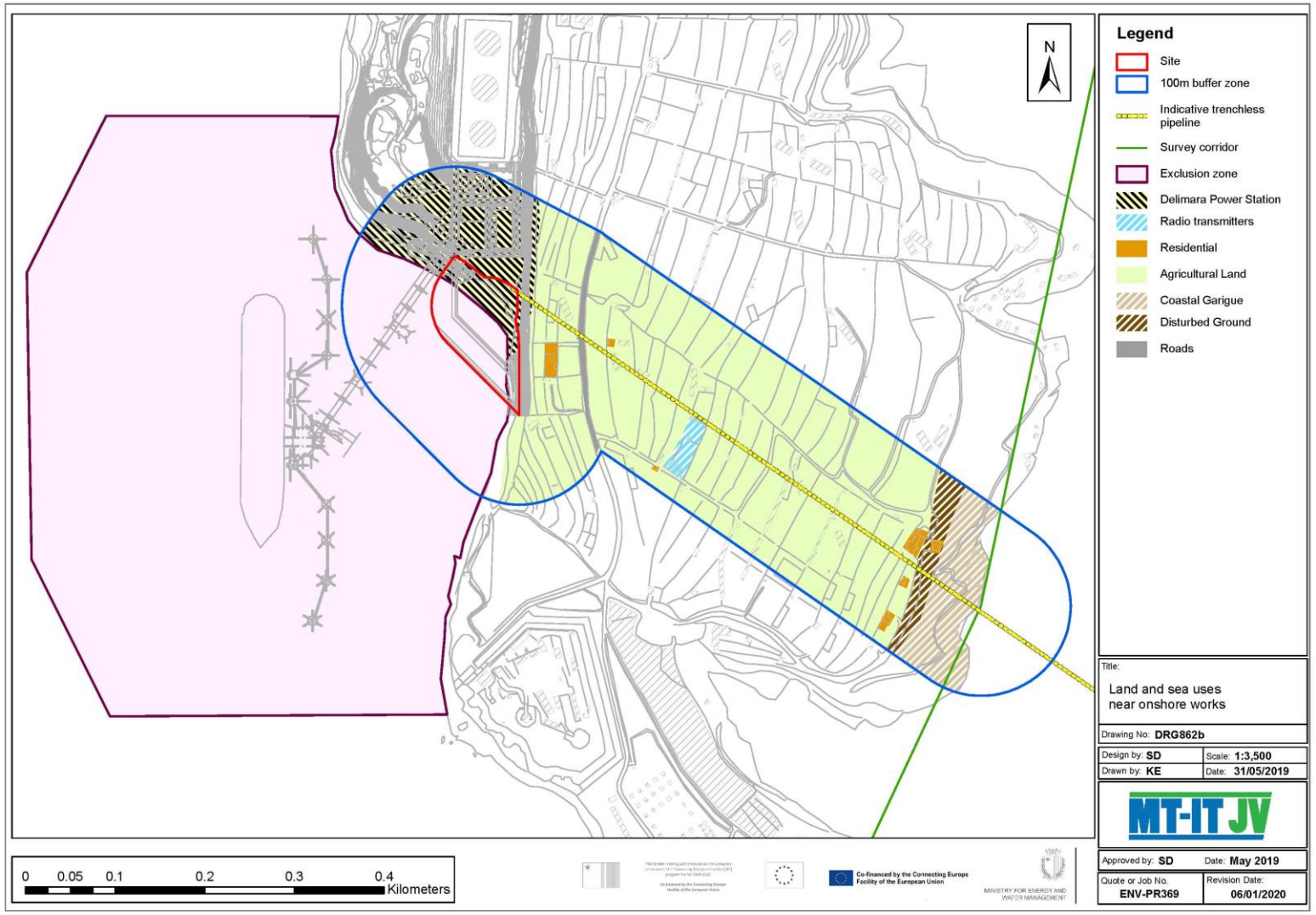

Figure 10: Land and sea uses near onshore part of the AoI

Figure 11: Delimara Power station and FSU in the distance

Figure 12: Floating storage unit (FSU) and jetty linked to the Delimara Power Station

Figure 13: Residential area

Figure 14: Agricultural land

Figure 15: Go & Melita radio transmitters

Figure 16: Coastal garigue

Figure 17: Disturbed ground

5.2 Marine area

The marine portion of the Scheme was assessed through a literature review. The following sea uses were identified in the vicinity of the proposed gas pipeline route (Figure 18):

- Exclusion zone for LNG tanker (present within the AoI, Figure 10)
- Open water (present within the AoI)
- Bunkering area 3 (outside the AoI) and bunkering area 4 (outside the AoI)
- Waiting area (outside the AoI)
- SE aquaculture zone (present within the AoI)
- Restricted area for the Blenheim Bomber wreck (outside the AoI)
- Restricted area for the ORP Kujawiak (inside the AoI)
- Identified wrecks during the PMRS survey (inside the AoI)

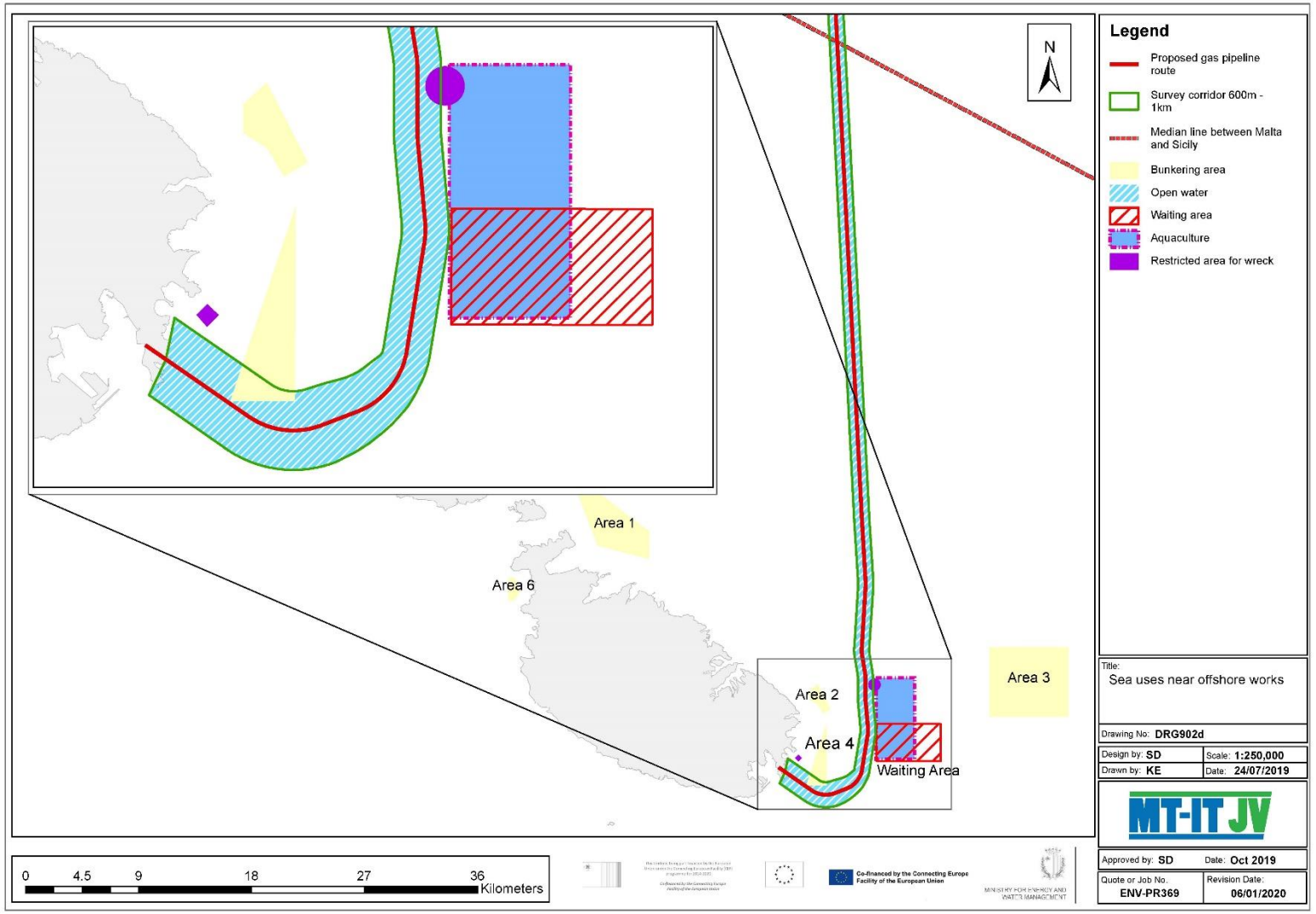

Figure 18: Sea uses near the offshore route of the AoI

Another significant activity which may occur along the entire route is fishing. The density of the fishing vessels along the proposed Scheme route and potential impact frequencies was studied in the FISHING ACTIVITIES AND MARINE TRAFFIC report compiled by Techfem/SPS in March 2019. Maltese waters are represented by KP 93 up to KP 159. The density of fishing vessel crossings along the Maltese portion of the proposed pipeline route is shown in Figure 19, indicating that the highest density occurs between KP 125 until the entry point of the trenchless solution in Malta.

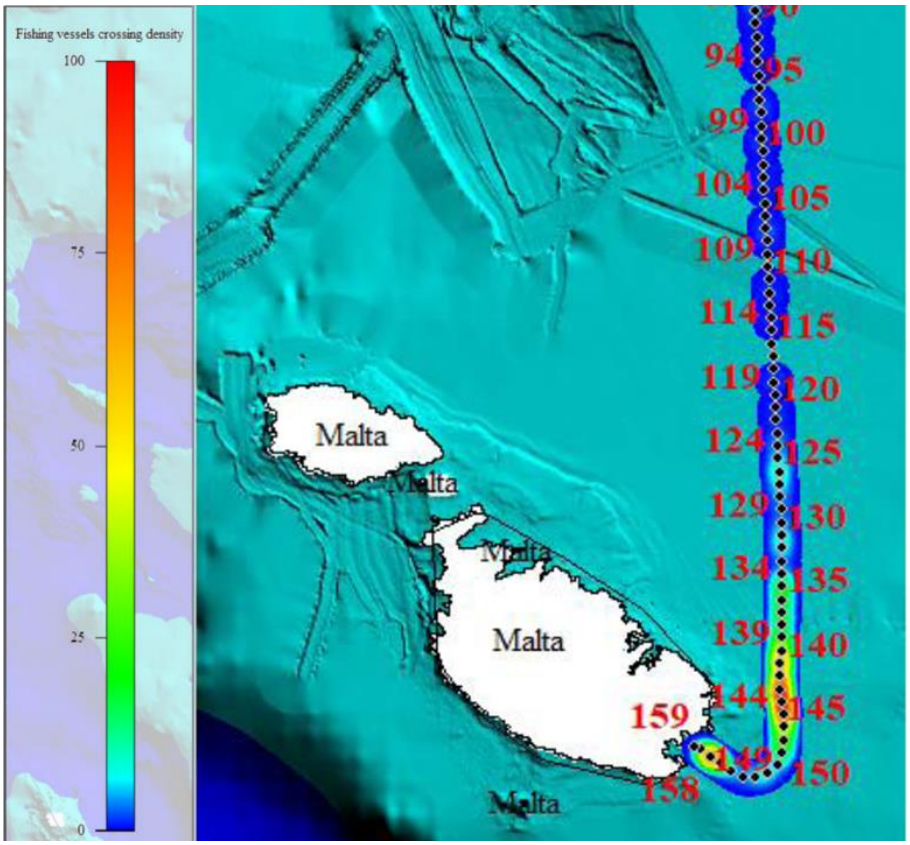

Figure 19: Density of fishing vessel crossings along the route (Source: Techfem/SPS, 2019)

The offshore pipeline route will traverse through two Birds Directive Special Protection Areas (SPAs), namely the Żona fil-Baħar fil-Lvant (MT0000108), Żona fil-Baħar fil-Grigal (MT0000107) and Żona fil-Baħar tal-Lbiċ (MT0000111).

6.0 Impacts on Surrounding Land Uses

The following is a description of the envisaged impacts on the land uses of the AoI.

6.1 Impact Significance Criteria

A qualitative assessment has been carried out to determine the potential impact on the present land uses arising from the proposed Scheme. The potential impacts that may arise from the Scheme are those that could result in a restriction or limited accessibility to current land use activities, along with permanent loss of certain land uses.

The tables presented in this section (Table 1 to Table 7) provide a definition for each of the criteria used in Table 8, which summarises the assessment of impacts on land use activities.

Table 1: Criteria for the impact significance

Impact Significance	
Level	**Definition**
Not significant	Negligible impact.
Minor Significance	Low order impact and therefore likely to have little real effect on land use. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both.
Moderate Significance	Impact on land use is real but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible.
Major Significance	Of the highest order possible within the bounds of impacts on land/sea use that could occur. In the case of adverse impacts, there is little or no possible mitigation that could offset the impact. A substantial change in the use, or intensity of use, of land/sea including, or in its capacity to support existing uses.

Table 2: Criteria for the duration of the impact

Duration of Impact	
Level	**Definition**
Permanent	Impact would still be detectable during the concerned phase
Temporary	Impact would not persist through the whole duration of the concerned phase

Table 3: Criteria for the probability of the impact occurring

Probability of Impact Occurring	
Level	**Definition**
Inevitable	Level of certainty that impact will occur is greater than 90%
Likely	Level of certainty that impact will occur ranges between 50-90%
Unlikely	Level of certainty that impact will occur ranges between 30-50%
Remote	Level of certainty that impact will occur is below 30%

Table 4: Criteria for the nature of the impact

Effect of Impact	
Level	**Definition**
Adverse	Land and/or sea uses would suffer consequences as a direct result of the proposed development
Beneficial	Land and and/or sea uses would benefit as a direct result of the proposed development

Table 5: Criteria for the consequences of the impact

Consequences of Impact	
Level	**Definition**
Direct	Changes that result from direct cause-effect consequences of interactions between the result of action under consideration and the proposed project
Indirect	Result from cause-effect consequences of interactions between the action under consideration and direct impacts

Table 6: Criteria for the sensitivity of receptors to the impact

Sensitivity of receptors to impact	
Level	**Definition**
High	This action is a major contributor to the activities in the area of influence
Medium	This action is a moderate contributor to the activities in the area of influence
Low	This action is a minor contributor to the activities in the area of influence

Table 7: Criteria for the reversibility of the impact

Reversibility of Impact	
Level	**Definition**
Reversible	State of the activity/action is potentially expected to return to baseline background level following cessation of the source of impact
Irreversible	Impact is expected to cause partial or total destruction of the action under consideration and a return of the state of the resource to baseline levels should be considered highly improbable

6.2 Impacts on Land Uses

A number of the land uses within the AoI are expected to be affected by the construction and operational phases of the proposed Scheme. The impact significance varies depending on the impact type, sensitivity of the receptors and duration of the impact, as discussed hereunder.

6.2.1 Construction phase

The construction of the gas pipeline on the terrestrial portion of the Scheme is described in detail in the IDENTIFICATION OF CONSTRUCTION, OPERATION AND MAINTENANCE METHODOLOGY report

which was prepared by Techfem/SPS in June 2019. A summary of the construction works, which in total is envisaged to take 21 months, is provided hereunder:

- Clearance of cliff base from loose material and rubble, followed by the cutting of the cliff face by 3.5-5.1m depth over approximately 310m length and a height of 18m;
- Stabilisation of the exposed rock face through application of shotcrete and rockfall mesh;
- Construction of 202m long access road connecting the existing Delimara Power Station to the new Terminal Plant, to be used during construction and operation;
- Land reclamation of an area of 8,000m^2 including 5,000m^2 for the construction of a breakwater (rock protection area) which will be backfilled using a mixture of material from the rock cutting exercise and material brought from a nearby quarry, and the border covered with material sourced from abroad;
- Construction of the Delimara Terminal Plant;
- Drilling of onshore pipeline and shore approach through microtunnelling (MT), with the pipeline inside the Terminal trenched using a culvert;
- Pre-lay activities and laying works of the pipeline in the offshore area;
- Installation of the plant equipment, including valves, pig system, maintenance area, workshop, stores, pump room, electrical building, filters, gas analysers, metering stations, heaters, pressure reducing valves;
- Pipeline pre-commissioning activities to ensure full function of the pipeline;
- Reinstatement works of underwater portion of the Scheme; and
- Offshore intervention works including, construction of MT transition pit and its reinstatement, pipeline crossings (pre-lay mattresses and mattresses) and the installation of the rock protection areas using gravel.

The construction of the Delimara Terminal Plant, onshore pipeline and shore approach are likely to produce a number of impacts on the land uses of the surrounding area, all of which range in significance, as summarised hereunder.

The clearance of the cliff base and rock cutting activities are likely to produce dust, noise and vibrations which will affect the operation of the Delimara Power Station which is located within a few metres from the Scheme site. The land uses on top of the cliff, namely agricultural land and a residential plot will be affected by the rock cutting due to potential instability of the rock, dust, noise and vibration. The potential instability of the rock is the impact of highest significance since consequences of rockfalls are severe and permanent. This impact is therefore considered to be of major significance but temporary in nature since the project includes restabilisation of the cliff face. However, the impact of dust, noise and vibrations on the Power Station is minimal considering the industrial nature of this facility. The impacts from dust, noise and vibrations on the remaining land uses are also considered to be of minor significance since the cliff face itself will shield the surrounding land uses.

The cliff face will be restabilised following the rock cutting works by making use of shotcrete and rockfall mesh. These stabilisation works constitute a moderate beneficial impact on the land uses above the cliff and on the Power Station since previous rock cutting was not followed by restabilisation. The works will mitigate against rockfalls and landslides, thereby improving upon the existing scenario. The restabilised cliff face will be similar to the

conditions of other parts of the power plant, namely behind Phase 2b, Phase 3 and next to the fuel tanks.

The construction of the access road will also result in the production of dust, noise and vibrations which may affect the operation of the Delimara Power Station, as well as the agricultural land and residential unit on top of the cliff face. However, the impact on the Power Station and surrounding land uses is considered to be minor due to the aforementioned reasons.

The construction of the Delimara Terminal Plant will require the temporary take-up of additional land in order to provide a working area. This portion of the shore forms part of the existing exclusion zone for the FSU, and therefore it is not open to the public. In fact, all onshore construction work is being carried out in areas previously earmarked for power generation use. This impact is therefore considered to be of negligible significance. The construction phase may nevertheless affect the operators of the FSU system, which constitutes an impact of moderate significance due to the temporary take-up of the exclusion zone.

The construction of the Delimara Terminal Plant will occur after the land reclamation works, and may produce dust, noise and vibration impacts which may affect the Power Station and surrounding agricultural/residential land. This impact is considered to be minor considering the present impacts on these land uses from the Power Station itself.

The onshore pipeline is unlikely to produce impacts along its route since the onshore work will not require trenching at the surface. The microtunnelling (MT) method would entail the excavation of an entry shaft at the Delimara Terminal Plant (Figure 20). The tunnel will have a downwards slope of 3° followed by an upwards slope of 1° towards the target exit point. Therefore, the overlying land uses are located at least 30m above the tunnelling area. This working depth is unlikely to produce significant vibrations on the overlying route.

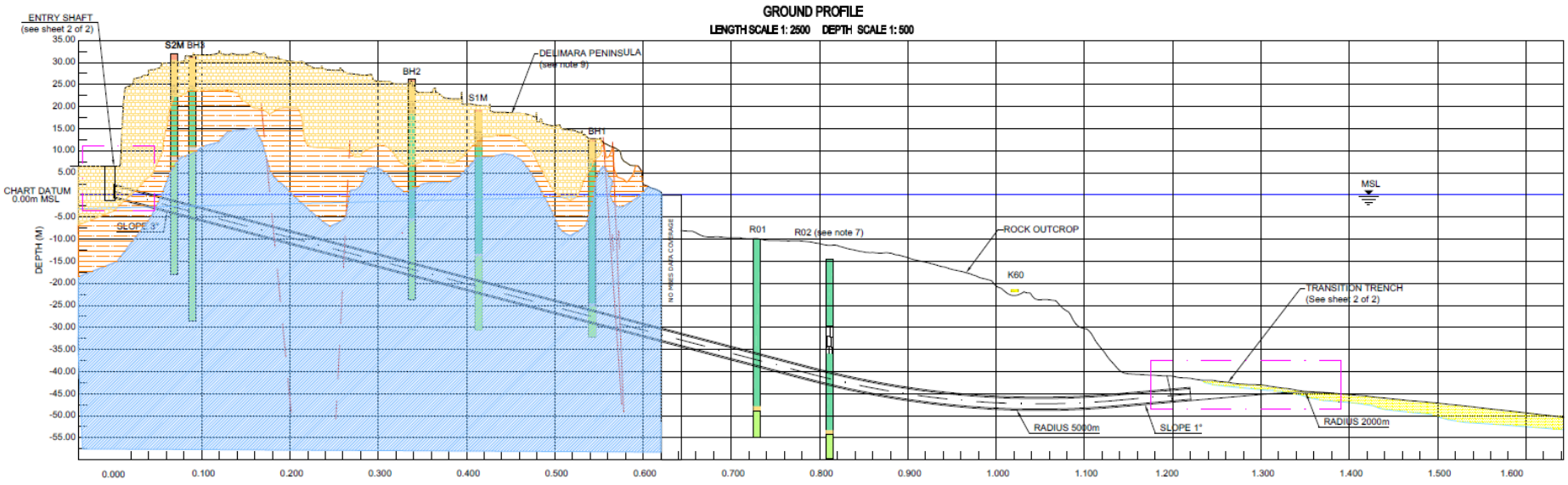

Figure 20: Profile for the onshore tunnel and shore approach

The pre-lay and laying works of the pipeline in the offshore area, pipeline pre-commissioning activities and offshore reinstatement works are unlikely to produce significant impacts on the surrounding land uses.

6.2.2 Operational phase

One of the two most notable adverse impacts on surrounding land uses during the operational phase of the Scheme is the instability of the cliff face due to the overhang produced from the rock cutting. The rock will be cut to a depth of 5.1m and maximum height of 18m along a length of 310m, and will allow for the access road and Delimara Terminal Plant. To mitigate the impact on the surrounding land, the surface above the cliff face will not be altered. Interventions and rock cutting will only be carried out on the cliff face so as to modify its slope. The rock will be stabilised using shotcrete and rockfall mesh, which should reduce the impact. Nevertheless, due to the sensitivity of the equipment at the base of the cliff (i.e. the Delimara Power Station and Delimara Terminal Plant), this impact is considered to be of moderate significance.

The second adverse impact on surrounding land uses is the permanent loss of shore for the Delimara Terminal Plant (8,000m^2), along with the additional land to be taken up for the 202m long access road (1,750m^2). This portion of the shore forms part of the existing exclusion zone for the FSU, and therefore it is not open to the public. Nevertheless, it goes against the SPED (2015) coastal objective 1, which is "*to prioritise uses that necessitate a location on the coastal zone and marine area*" This impact is therefore considered to be of minor significance.

Additional adverse impacts during the operational phase are expected from a slight increase in noise and vibration. These impacts are considered to be of negligible significance since the activities do not generate significant noise impacts. Any increase in operational noise is unlikely to be noticeable over and above the existing noise from the Power Station.

One of the primary objectives of the Scheme is to enable the removal of the existing FSU in the Marsaxlokk Bay by creating a permanent source of natural gas and a direct link with the European Gas Network/Grid. The removal of the FSU will reduce the significant visual impact of existing agricultural and residential land uses, not only on the Delimara peninsula, but along the entire Marsaxlokk Bay. Since the pipeline is also less vulnerable to physical damage than the FSU, there will also be a reduction in various operational risks and hazards and an improvement on existing infrastructure, thereby addressing thematic objective 4 of the SPED (2015), which is "*to seek to ensure that existing strategic infrastructure is safeguarded and that provision is made for infrastructure (water, electricity, sewers, fuel storage, telecommunications) to sustain socio-economic development needs whilst encouraging the Best Available Technology and protecting the environment*". Both improvements constitute beneficial impacts of major significance.

6.3 Impacts on Sea Uses

A number of the sea uses within the AoI are expected to be affected by the construction and operational phases of the proposed Scheme. The impact significance varies depending on the impact type, sensitivity of the receptors and duration of the impact, as discussed hereunder.

6.3.1 Construction phase

Land reclamation works will be necessary in order to construct a breakwater which will be backfilled with material generated from the rock cutting activities. The level of the reclaimed land (8,000m^2, of which 5,000m^2 is the total rock protection area) will be raised to 6.5m above mean sea level in order to bring it to the same level as the surrounding land (Figure 21). This exercise will generate noise and dust which will affect land uses in the surrounding area, and the loss of shoreline. This portion of the shore forms part of the existing exclusion zone for the FSU, and therefore it is not open to the public. This impact is therefore considered to be of negligible significance.

Figure 21: Approximate area for land reclamation and Terminal Plant

Impacts on the nearby sea uses of the FSU jetty (Figure 21) include direct physical impacts, along with dust, noise and vibration from the construction site. Direct physical damage of the jetty is considered to be of moderate significance due to the sensitivity of this structure. Great care should be taken during the construction phase in order to protect the jetty from direct impacts. Indirect impacts such as dust, noise and vibration impacts are considered to be of minor significance. No direct or indirect impacts are envisaged on the FSU itself, since it is located outside the 100m buffer zone.

No impacts on the sea uses are expected from the remainder of the onshore works since they will be located at a significant distance from the marine environment.

Impacts on the SE aquaculture zone may include disruption of the fish in the cages due to the propagation of underwater noise from the pipeline installation works. The southeast corner of the aquaculture zone is located at a distance of over 600m from the gas pipeline route, which is considered to be of sufficient distance from the construction site for there to be only minor impacts from the construction stage, all of which are temporary in nature.

Impacts on wrecks identified during the PMRS may occur during the pipe laying works, since the AoI overlaps with the potential wrecks and designated restricted areas. As outlined in the Archaeology chapter, negligible impacts are envisaged in areas where works will be undertaken more than 100m away from the wreck itself. Those wrecks which are within a

+/- 100m buffer need to be considered when planning the lay barge anchor pattern and positioning the catenaries. If this is not possible, guidance from SCH will be sought.

Following discussions with Transport Malta, the applicant has submitted a Navigational Risk Assessment which takes into account the intended route, bunkering areas, force majeure conditions and any mitigating measures that may need to be included. The sea traffic and port approaches, including navigation in way of bunkering area 4 and further afield have also been assessed in line with TM recommendations, and were based on intended time line of works and type of works intended to complete the project. These reports will aide in minimising the risks on sea uses.

Other impacts on sea uses along the offshore route are due to the necessary presence of temporary exclusion zones during pipeline installation in order to prevent vessels from navigating too close to the work area. These zones may affect fishing activities along the route. As shown in Figure 19, the highest density of fishing vessel crossings occurs from KP 125 until the entry point of the trenchless solution in Malta. The impact is generally of minor significance since it is recommended that temporary exclusion zones are introduced around the laybarge. These exclusion areas will surround the laybarge at a safe distance and should be continuously moved during the pipeline installation in order to minimise the area taken up at any point. Monitoring of these exclusion zones by representatives of the relative Competent Authorities is also recommended. Since these exclusion zones will be small and temporary, these are expected to cause only minor impacts on the fishing industry.

6.3.2 Operational phase

Land reclamation works will be necessary in order to construct a breakwater which will be backfilled with material generated from the rock cutting activities. The level of the reclaimed land (8,000m^2) will be raised to 6.5m above mean sea level in order to bring it to the same level as the surrounding land (Figure 21). This portion of the shore forms part of the existing exclusion zone for the FSU, and therefore it is not open to the public. At the start of the operational phase, public access is unlikely to change since the area is already an exclusion zone.

One of the primary objectives of the Scheme is to enable the removal of the existing FSU in the Marsaxlokk Bay by creating a permanent source of natural gas. Once the infrastructure is removed, the present exclusion zone may be modified and reduced. This modification/reduction is likely to increase the accessibility of the area by vessels, therefore serving as a beneficial impact of minor significance.

The only other adverse impacts that can occur on the surrounding sea uses during the operational stage of the pipeline are through physical damage of the pipeline from fishing gear, sinking of vessels, machine failure, interaction with anchors and other scenarios which may cause hazardous situations.

The collision frequency of fishing gear with the proposed pipeline for each kilometre point (KP) were estimated in the FISHING ACTIVITIES AND MARINE TRAFFIC report, as shown in Figure 22. Maltese waters are represented by KP 93 up to KP 159. The different colours represent fishing vessels of different gross tonnage (GT). The results indicate that the highest collision frequency for Maltese waters was found to be 1.3x10^{-5} evt/KP/y between KPP 151 and KP

152. From the data, it can be extrapolated that a collision is likely to occur somewhere along the Maltese portion of the pipeline once every 3,200 years. Due to the low probability, this impact is therefore considered to be negligible.

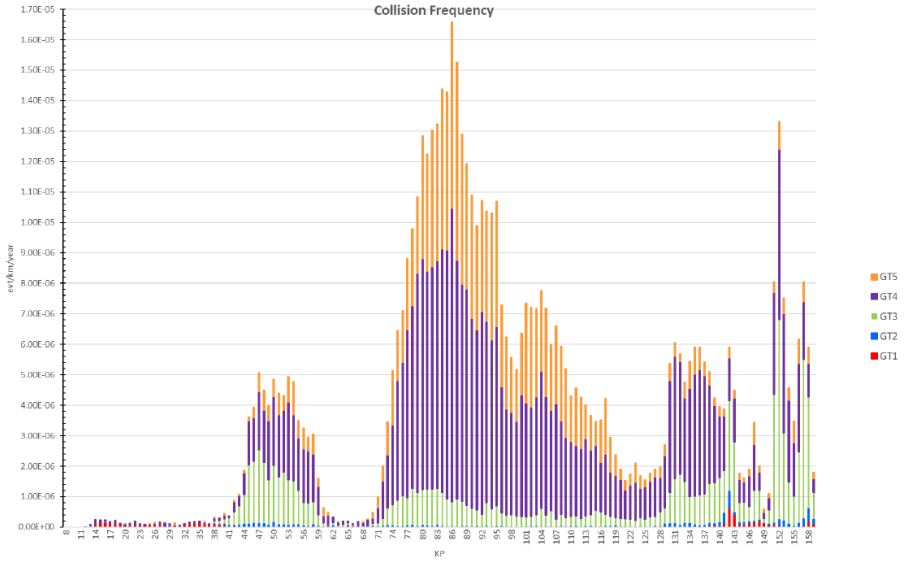

Figure 22: Collision frequency from fishing gear per KP

The FISHING ACTIVITIES AND MARINE TRAFFIC report also estimated the frequency of damage on the pipeline originating from sinking of vessels, as shown in Figure 23. The results indicate that the highest sinking frequency is 2.3×10^{-7} evt/KP/y between KP 132 and KP 133. From the data, it can be extrapolated that damage from sinking is likely to occur somewhere along the Maltese portion of the pipeline once every 176,500 years. Due to the low probability, this impact is therefore considered to be negligible.

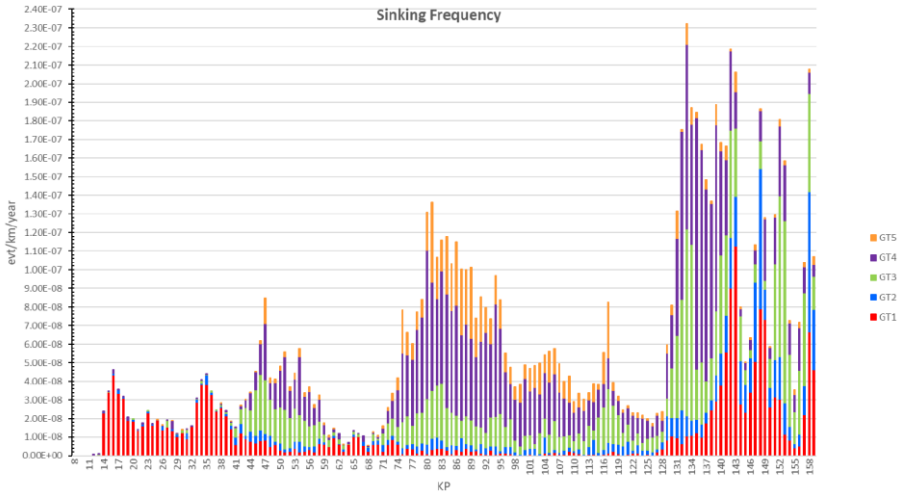

Figure 23: Sinking frequency from vessels per KP

The FISHING ACTIVITIES AND MARINE TRAFFIC report also estimated the frequency of damage on the pipeline originating from total machine failure, as shown in Figure 24. The results indicate that the highest machine failure frequency is 2.6×10^{-6} evt/KP/y between KP 151 and KP 152. From the data, it can be extrapolated that damage from total machine failure is

likely to occur somewhere along the Maltese portion of the pipeline once every 15,700 years. Due to the low probability, this impact is therefore considered to be negligible.

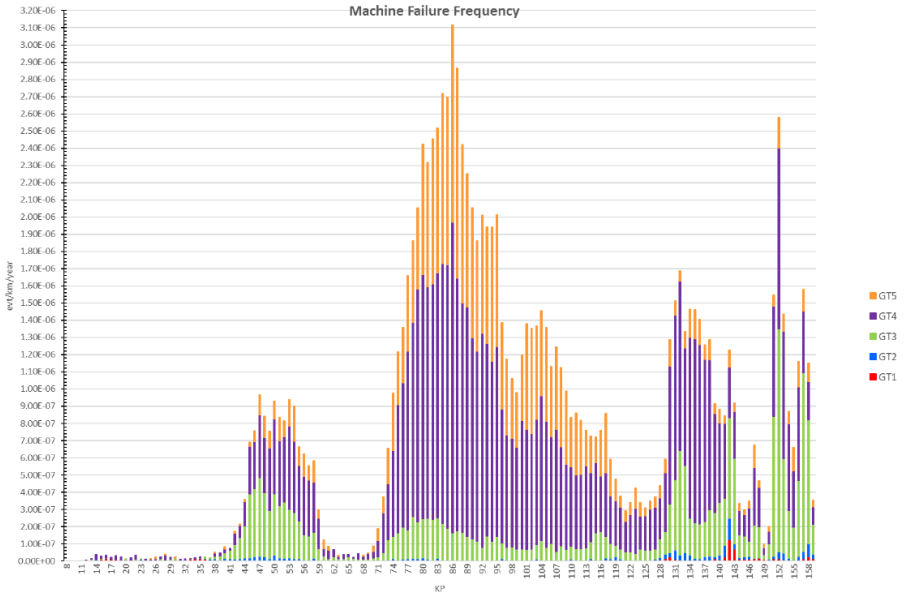

Figure 24: Machine failure frequency per KP

The FISHING ACTIVITIES AND MARINE TRAFFIC report also estimated the frequency of damage on the pipeline originating from interaction with anchors, as shown in Figure 25. The results indicate that the highest interaction with anchors frequency is $1.5x10^{-8}$ evt/KP/y between KP 151 and KP 152. From the data, it can be extrapolated that damage from anchor interaction is likely to occur somewhere along the Maltese portion of the pipeline once every 2,415,600 years. Due to the low probability, this impact is therefore considered to be negligible.

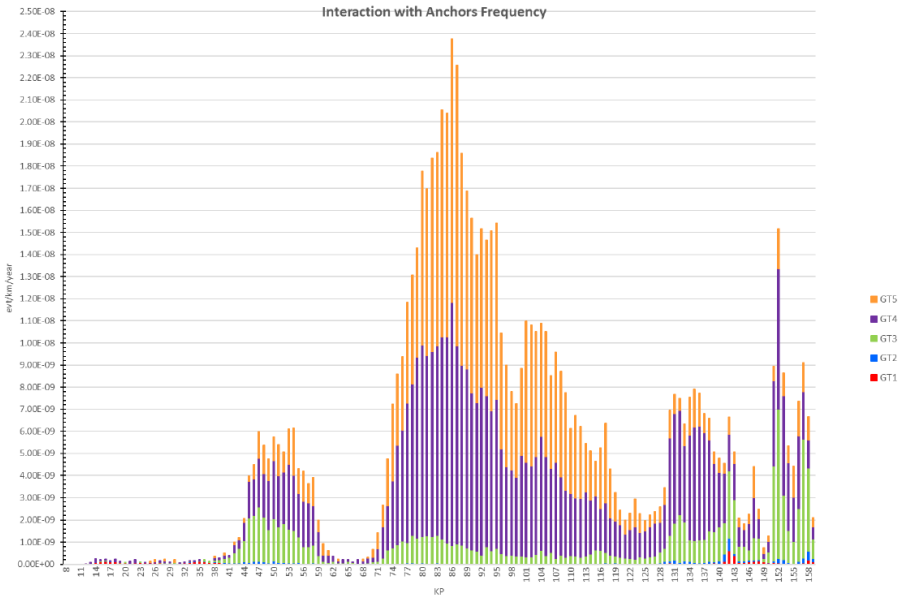

Figure 25: Interaction with anchors frequency from vessels per KP

The FISHING ACTIVITIES AND MARINE TRAFFIC report also estimated the frequency of damage on the pipeline originating from other scenarios, as shown in Figure 26. The results indicate that

the highest frequency from other scenarios is $4.6x10^{-6}$ evt/KP/y between KP 151 and KP 152. From the data, it can be extrapolated that damage from other scenarios is likely to occur somewhere along the Maltese portion of the pipeline once every 8,900 years. Due to the low probability, this impact is therefore considered to be negligible.

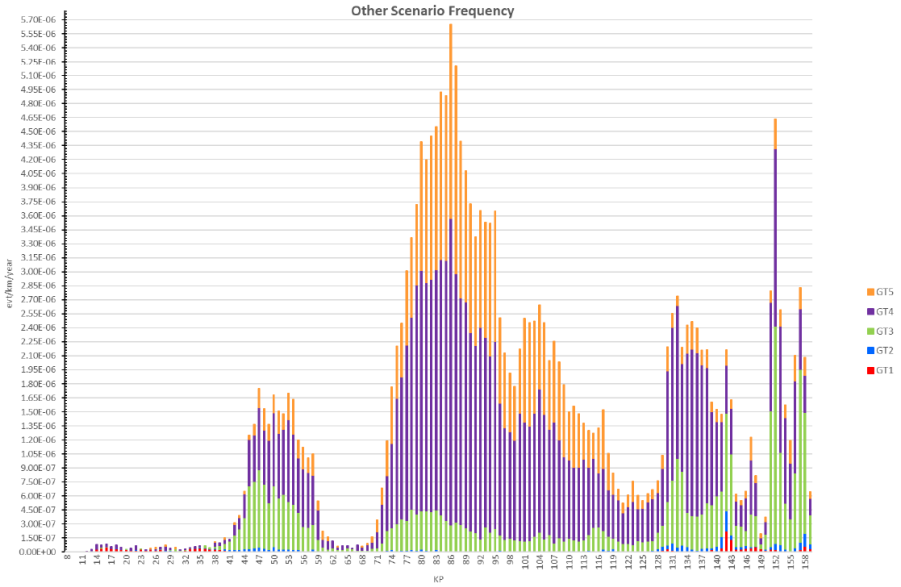

Figure 26: Damage from other scenarios per KP

The FEED contractors are foreseeing the inclusion of additional protection measures in areas where anchoring operations could interfere with the pipeline, as shown in Figure 27, as extracted from the PROTECTION STUDY REPORT compiled by the FEED contractors.

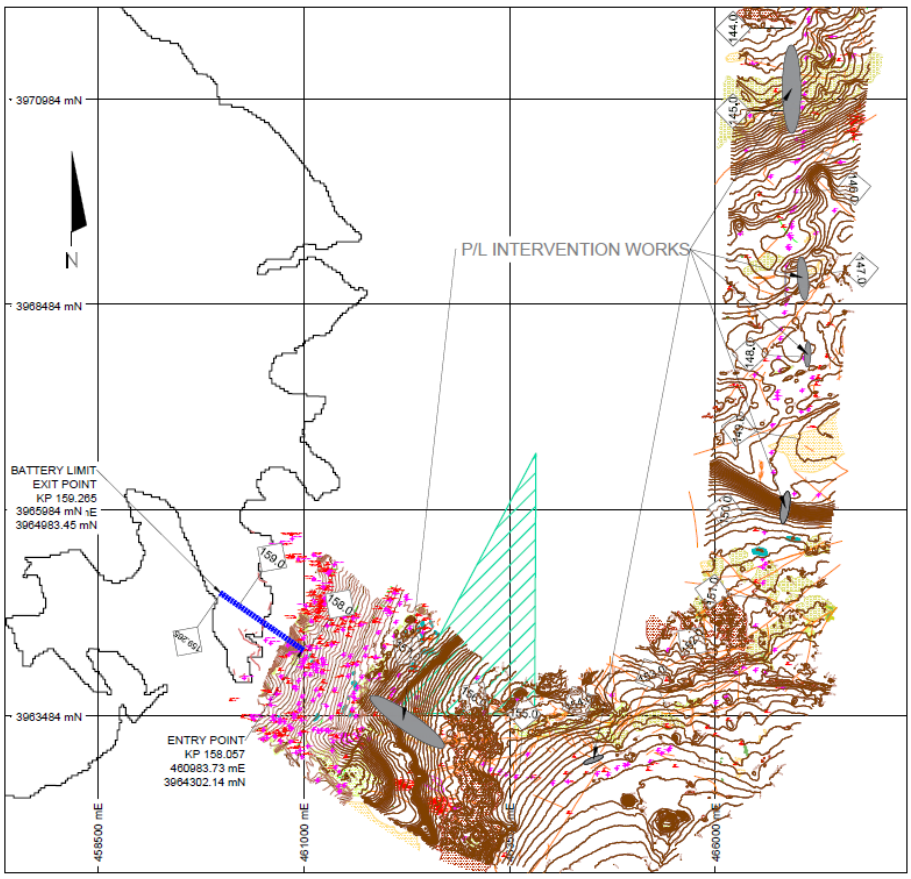

Figure 27: Areas selected for protection with gravel

Four potential interactions were assessed along the pipeline route, and the results were as follows:

1. Pipeline indentation due to dropped objects – additional protection by a gravel layer of 2m is necessary to guarantee adequate protection of the pipeline
2. Pipeline indentation due to trawl board impact – no additional protection is necessary since the thickness of the steel alone is sufficient
3. Pipeline hooking by trawl board interference – no additional protection is necessary since the pipeline stresses are always within allowable limits
4. Pipeline pull-over by trawl board interference – no additional protection is necessary since the pipeline stresses are always within allowable limits

6.4 Mitigation Measures

During the construction phase, adverse impacts on land use vary between minor and major significance. With appropriate mitigation measures, the significance of the impacts could be reduced to result in residual impacts with lower significance levels. Examples of mitigation measures during the construction phase include:

- Keeping noise and vibration levels throughout the construction phase to within the stipulated limits set by the Competent Authority.
- Implementation of environmentally sound construction practices as outlined in S.L. 522.09 (ENVIRONMENTAL MANAGEMENT CONSTRUCTION SITE REGULATIONS, 2007). This

includes the use of dust suppression equipment and techniques to minimise the levels of fine particulate matter being released into the surrounding area.
- Installation and maintenance of a silt curtain around the Delimara Terminal Plant construction site.
- Monitoring of construction works to ensure effective mitigation measures are being implemented.
- Monitoring of rock cutting and restabilisation works to provide early notice of potential rockfalls.
- Stabilisation of cliff face following rock cutting through shotcrete and rockfall mesh.
- Appropriate communication between contractors and FSU operators.
- Implement and monitor offshore exclusion zones around the laybarge to ensure vessels do not enter the working area. These exclusion zones should be mobile and move around the barge to limit the area to the minimum area which is nevertheless safe.
- Working hours close to the SE Aquaculture Zone should be limited as much as possible.
- Following the conclusion of the PIPELINE BUFFER ZONE, UXOS, CHOS AND INTERFERENCE WITH OTHER AREAS report by the FEED contractors, a buffer zone has been set around the pipeline in order to protect the pipeline and the laybarge anchors during construction.

Examples of mitigation measures during the operational phase are also necessary, including:

- A corridor will be established around the pipeline, as follows:
  - 100m buffer zone for anchors not crossing the pipeline
  - 300m radially from where the anchor line crosses the pipeline, in case of crossing
  - Anchoring and drilling activities are not to be allowed in the mentioned corridor
- Regular monitoring of cliff face to visually note any evident cracks, thus ensuring long-term stability.
- Navigational charts should be updated once the pipeline is installed to increase awareness of the location of the pipeline.

7.0 Summary of Impacts

Table 8: Summary of expected impacts of the proposed Scheme

Impact type and source			Impact receptor		Effect & 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 (construction/ operation/ decommissioning)**	**Receptor type**	**Sensitivity & resilience toward impact**	**Direct/ Indirect/ Cumulative**	**Beneficial/ Adverse**	**Severity**	**Physical/ geographic extent of impact**	**Short-/ Medium-/ Long-term**	**Temporary (indicate duration)/ Permanent**	**Reversible (indicate ease of reversibility)/ Irreversible**					
Dust, noise and vibration	Clearance of cliff base and rock cutting, access road construction, land reclamation	Construction	Delimara Power Station, FSU system, agricultural land and residential	Low	Direct & indirect	Adverse	Low	Immediate surroundings	Short	Temporary for construction phase	Easily reversible	Likely	Minor	Environmentally sound construction practices (S.L. 522.09); monitoring of construction works	Not significant	N/A
Damage on Power Station from rockfall	Clearance of cliff base and rock cutting	Construction	Delimara Power Station	High	Direct	Adverse	High	Immediate surroundings	Short	Temporary prior to restabilisation	Reversible with some difficulty	Remote	Major	Monitoring of rock stability during rock cutting & restabilisation after works (shotcrete and mesh)	Moderate	N/A
Stabilisation of cliff face	Restabilisation of cliff following cutting works	Construction	Delimara Power Station & Terminal Plant	High	Direct	Beneficial	Medium	Immediate surroundings	Long	Permanent	Irreversible	Inevitable	Moderate	N/A	Moderate	N/A
Temporary take-up of exclusion zone	Land reclamation	Construction	FSU operators	Low	Direct	Adverse	Low	Immediate surroundings	Short	Temporary for construction phase	Easily reversible	Inevitable	Moderate	Appropriate communication between contractors and FSU operators	Minor	N/A
Direct physical damage of the jetty	Land reclamation	Construction	FSU operators	Low	Direct	Adverse	Medium	Immediate surroundings	Short	Temporary for construction phase	Reversible with some difficulty	Remote	Moderate	Appropriate communication between contractors and FSU operators	Minor	N/A

Impact type and source			Impact receptor		Effect & 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 (construction/ operation/ decommissioning)**	**Receptor type**	**Sensitivity & resilience toward impact**	**Direct/ Indirect/ Cumulative**	**Beneficial/ Adverse**	**Severity**	**Physical/ geographic extent of impact**	**Short-/ Medium-/ Long-term**	**Temporary (indicate duration)/ Permanent**	**Reversible (indicate ease of reversibility)/ Irreversible**					
Noise disturbance of fish in SE aquaculture zone	Offshore pipeline installation	Construction	Fish in SE aquaculture zone	Medium	Indirect	Adverse	Low	SE aquaculture zone	Short	Temporary during nearby pipe laying	Easily reversible	Inevitable	Minor	Limiting the hours of operation in vicinity of SE zone	Not significant	N/A
Damage to identified wrecks	Offshore pipeline installation	Construction	Wreck of archaeological importance	Low	Direct/indirect	Adverse	Medium	Wreck	Long	Temporary during nearby pipe laying	Irreversible	Unlikely	Negligible	Obtaining necessary permission and guidance from SCH	Not significant	N/A
Exclusion zones around laybarge	Offshore pipeline installation	Construction	Fishermen	Low	Direct	Adverse	Low	Immediate surroundings	Short	Temporary during nearby pipe laying	Easily reversible	Inevitable	Minor	Exclusion zones should be temporary and move with laybarge	Not significant	Exclusion zones should be properly marked and monitored
Instability of overhang following rock cutting	Rock cutting works	Operation	Delimara Power Station & Terminal Plant	High	Direct	Adverse	Medium	Immediate surroundings	Long	Permanent	Easily reversible	Inevitable	Moderate	Restabilisation of cliff face using shotcrete and mesh; regular monitoring of rock stability	Minor	N/A
Take-up of coastline	Delimara Terminal Plant	Operation	Marsaxlokk inhabitants and tourists	Low	Direct	Adverse	Low	Immediate surroundings	Long	Permanent	Irreversible	Inevitable	Minor	N/A	Minor	N/A
Improvement of visual amenity	Removal of FSU	Operation	Marsaxlokk inhabitants and tourists	Medium	Direct	Beneficial	Medium	Marsaxlokk	Long	Permanent	Irreversible	Likely	Major	N/A	Major	N/A
Boundary revisions of exclusion zone	Removal of FSU	Operation	Fishermen and other vessels	Low	Direct	Beneficial	Low	Immediate surroundings	Long	Permanent	Irreversible	Likely	Minor	N/A	Minor	N/A