



FONDAZZJONI GĦALL-PATRIMONJU KULTURALI
TAL-ARĊIDJOĊESI TA' MALTA

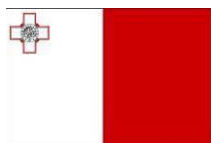
REFERENCE NUMBER: PA5/0103/3.1

**Tender for the Development of a three-dimensional computer model of
the masonry structure of Santa Marija Church, in Birkirkara, Malta**

Date Published: 8th July 2019

Deadline for Submission: 9th August 2018 at 09:30am CEST

Tender Opening: 9th August 2018 At 10:00am CEST



Operational Programme I – European Structural and Investment
Funds 2014-2020 –

*“Fostering a competitive and sustainable economy to meet our
challenges”*

Project part-financed by the European Regional Development Fund
Co-financing rate: 80% European Union; 20% National Funds



Bid Bond requirements for this tender: *Not Applicable*

Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta

Archbishop's Curia
St Calcedonius Square
Floriana FRN 1535
MALTA

Tel.: (356) 21245350 Email: fond.pkam@gmail.com

Website: <http://thechurchinmalta.org/en/>

SECTION 1 - INSTRUCTIONS TO TENDERERS

1. General Instructions

- 1.1 In submitting a tender, the tenderer accepts in full and in its entirety, the content of this tender document, including subsequent Clarifications issued by the Non Governmental Organisation (NGO), whatever the economic operator's own corresponding conditions may be, which through the submission of the tender is waived. Tenderers are expected to examine carefully and comply with all instructions, forms, contract provisions and specifications contained in this tender document. These Instructions to Tenderers complement the General Conditions of Contract Rules for NGOs Version .

No account can be taken of any reservation in the tender in respect of the procurement documents; any disagreement, contradiction, alteration or deviation shall lead to the tender offer not being considered any further.

Prospective tenderers must submit their offer by depositing it in the tender box, located at Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta, Archbishop's Curia, St Calcedonius Square, Floriana FRN 1535 MALTA. Any references in the tender document or tender forms to uploading of tender documentation and forms is to be ignored. Tenderers must submit one original tender offer as well as a soft copy on a USB. Tender reference number and tender title must be clearly indicated on the sealed bid. Prospective tenders take full responsible to submit their offer by the set tender submission deadline.

Note:

Where in this tender document a standard is quoted, it is to be understood that the Contracting Authority will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the Contracting Authority.

- 1.2 Santa Marija Church, Birkirkara is a prime example of the rich cultural and architectural heritage of the Maltese Islands. Unfortunately, this church has a long history of structural problems that have at times rendered it unserviceable and even led to its partial collapse in the mid-nineteenth century. At present, despite interventions over past decades, a number of cracks are once again visible in the structure, and there are strong indications that these are developing further. In recent years, there have been a number of instances when pieces of mortar fell down from the vault of the main nave, luckily at times when the church was not being used.

There is growing concern that the structural condition of the church may pose some degree of risk to its users. Although the risk of collapse is considered remote, the observed structural movement may continue and may result in further spalling of masonry units and loosening of mortar infill. If this happens at ceiling level, any falling pieces could have substantial energy and may therefore cause slight injuries to people below.

Any kind of intervention within or below the church needs to be studied very carefully before works are implemented on site, since such works are likely to be very disruptive and costly. A computer model will therefore be very useful in assessing the efficacy of

Version 1.0 NGO e-procurement document

possible interventions and in refining the methods used to implement such interventions. This tender is for the construction of a basic model that simulates the behaviour of the existing masonry structure of the church, in response to its own self weight and in response to seismic forces.

- 1.3 The place of acceptance of the works shall be the Parish Church of the Santa Marija, Birkirkara, the time-limits for the execution of the contract shall be 26 weeks, and the INCOTERM²⁰¹⁰ applicable shall be **Delivery Duty Paid (DDP)**.
- 1.4 This is a lump sum contract.
- 1.5 This call for tenders is being issued under an open procedure.
- 1.6 The beneficiary of this tender is Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta.
- 1.7 This tender is not a reserved contract

2. Timetable

2.

	DATE	TIME
Clarification Meeting/Site Visit (Refer to Clause 6.1)	N/A	N/A
Deadline for request for any additional information from the NGO Clarification requests should be addressed to: NGOs e-mail address fond.pkam@gmail.com	22 nd July 2019	17.00 CEST
Last date on which additional information can be issued by the NGO	30 th July 2019	20.00 CEST
Deadline for submission of tenders/Tender opening session (unless otherwise modified in terms of Clause 10.1 of the General Rules Governing Tendering for NGOs)	9 th August 2019	09.30 CEST
* All times Central European Time (CET) / Central European Summer Time (CEST) as applicable		

3. Lots

- 3.1 This tender is not divided into lots, and tenders must be for the whole of quantities indicated. Tenders will not be accepted for incomplete quantities.

4. Variant Solutions

- 4.1 Variant solutions are not permissible.

5. Financing

- 5.1 The project is *co-financed* by the European Union/Government of Malta, in accordance with the rules of *Operational Programme I - European Structural and Investment Funds 2014-2020* programme.
- 5.2 The Contracting Authority of this tender is Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta.

6. Clarification Meeting/Site Visit/Workshop

- 6.1 No clarification meeting/site visit is planned.

Meetings between economic operators and the NGO during the tendering period are not permitted.

7. Selection and Award Requirements

In order to be considered eligible for the award of the contract, economic operators must provide evidence that they meet or exceed certain minimum criteria described hereunder.

(A) Eligibility Criteria

- (i) No Bid Bond is required. ^(Note 1)
- (ii) Declare agreement, conformity and compliance with the provisions of the Statement on Conditions of Employment by completing and submitting the form with title Statement on Conditions of Employment. Please also attach the minimum hourly workers' costs involving the provision of the employees' services. ^(Note 2A)
- (iii) Power of Attorney (if applicable) ^(Note 2A)
- (iv) Submission of the declaration form that stipulates that following signature of contract, the successful bidder, will provide evidence in respect of the requirements stipulated regarding Energy Efficiency through the Energy Efficiency Form (if applicable) ^(Note 2A) - **Not applicable for this tender**
- (v) Information re Joint Venture/Consortium (if applicable) ^(Note 2A)

(B) Exclusion (including Blacklisting) and Selection Criteria - information to be submitted through the completion of the following declaration forms:

- (i) Declaration concerning exclusion grounds ^(Note 2A)
- (ii) Declaration concerning *Selection Criteria* (if any) ^(Note 2A)

(C) Technical Specifications

- (i) Tenderer's Technical Offer in response to specifications.

The Technical Offer shall constitute the following:

- 1) Key Expert: ^(Note 2A)

The key expert will be a Structural Engineer having minimum qualifications at MQF level 7, with demonstrated expertise in masonry structures and computer modelling of masonry structures. S/he will be responsible for overseeing and co-ordination of the project. He or she shall act as a single point contact for the duration of project.

This expert must fill in the Statement of Exclusivity Form and the CV of this Key Expert must be submitted at tendering stage.

- 2) Organisation and Methodology which shall include the following ^(Note 3):

A. RATIONALE

- An objective analysis of the Terms of Reference demonstrating the degree of understanding of the Project Scope as described in the Terms of Reference.
- An explanation of the risks and assumptions affecting the execution of the contract.

B. STRATEGY

- An outline of the approach proposed for contract implementation. A list of the proposed activities considered to be necessary to achieve the contract objectives.

C. TIMETABLE OF ACTIVITIES

- The timing, sequence and duration of the proposed activities, taking into account the given timeframes of 26 weeks.
- The Gantt Chart is to include and identify major milestones in execution of the contract, including an indication of how the achievement of these would be reflected in any reports, particularly those stipulated in the Terms of reference.

- (ii) **Literature** as per Form marked 'Literature List' to be submitted with the Technical offer at tendering stage.

No changes to the information provided in the Literature submitted with the bid will be allowed. Literature submitted shall be rectifiable only in respect of any missing information. (Note 2B)

(D) Financial Offer

- (i) The Tender Form and Tenderer's Declaration are to be completed and submitted with the offer. (Note 3)
- (ii) A financial offer is to be submitted by filling in the Financial Bid Form, and is to be calculated on the basis of **Delivered Duty Paid (DDP)²⁰¹⁰ (Grand Total)** for the service tendered. (Note 3)

Notes to Clause 7:

1. *Tenderers will be requested to clarify/rectify, within five (5) working days from notification, the tender guarantee only in the following circumstances: either incorrect validity date, and/or incorrect value.*
2. A) *Tenderers will be requested to either clarify/rectify any incorrect and/or incomplete documentation, and/or submit any missing documents within five (5) working days from notification.*
B) *Tenderers will be requested to rectify/submit only missing documents within five (5) working days from notification. No changes to the information provided in the Literature submitted will be allowed. Literature submitted shall be rectifiable only in respect of any missing information. All Rectifications are free of charge.*
3. *No rectification shall be allowed. Only clarifications on the submitted information may be requested.*

8. Tender Guarantee (Bid bond)

- 8.1 No tender guarantee (bid bond) is required.

9. Criteria for Award

- 9.1 The sole award criterion will be the price. The contract will be awarded to the tenderer submitting the cheapest priced offer satisfying the administrative and technical criteria.

SECTION 2 - EXTRACTS FROM THE PUBLIC PROCUREMENT REGULATIONS

Part X of the Public Procurement Regulations

270. Any tenderer or candidate concerned, or any person, having or having had an interest or who has been harmed or risks being harmed by an alleged infringement or by any decision taken including a proposed award in obtaining a contract, a rejection of a tender or a cancellation of a call for tender after the lapse of the publication period, may file an appeal by means of an objection before the Review Board, which shall contain in a very clear manner the reasons for their complaints.

271. The objection shall be filed within ten calendar days following the date on which the NGO has by fax or other electronic means sent its proposed award decision or the rejection of a tender or the cancellation of the call for tenders after the lapse of the publication period.

272. The communication to each tenderer or candidate concerned of the proposed award or of the cancellation of the call for tenders shall be accompanied by a summary of the relevant reasons relating to the rejection of the tender as set out in regulation 242 or the reasons why the call for tenders is being cancelled after the lapse of the publication period, and by a precise statement of the exact standstill period.

273. The objection shall only be valid if accompanied by a deposit equivalent to 0.50 per cent of the estimated value set by the NGO of the whole tender or if the tender is divided into lots according to the estimated value of the tender set by the NGO for each lot submitted by the tenderer, provided that in no case shall the deposit be less than four hundred euro (€400) or more than fifty thousand euro (€50,000) which may be refunded as the Public Contracts Review Board may decide in its decision.

274. The Secretary of the Review Board shall immediately notify the Director and/or the NGO as the case maybe that an objection had been filed with his authority thereby immediately suspending the award procedure.

275. The NGO involved, as the case may be, shall be precluded from concluding the contract during the period of ten calendar days allowed for the submission of appeals. The award process shall be completely suspended if an appeal is eventually submitted.

276. The procedure to be followed in submitting and determining appeals as well as the conditions under which such appeals may be filed shall be the following:

- (a) any decision by the General Contracts Committee or the Special Contracts Committee or by the NGO shall be made public by affixing it to the notice-board of the same NGO as the case may be or by uploading it on Government's e-procurement platform prior to the award of the contract if the call for tenders is administered by the NGO;
- (b) the appeal of the complainant shall also be affixed to the notice-board of the Review Board and shall be communicated by fax or by other electronic means to all participating tenderers;
- (c) the NGO and any interested party may, within ten calendar days from the day on which the appeal is affixed to the notice-board of the NGO and uploaded where applicable on the Government's e-procurement platform, file a written reply to the appeal. These

replies shall also be affixed to the notice-board of the Review Board and where applicable it shall also be uploaded on the Government's e-procurement platform;

(d) within three working days of the publication of the replies, the Secretary of the Review Board shall prepare a report (the Analysis Report) analysing the appeal and any reply to it. This report shall be circulated to the persons who file an appeal and to all parties who submitted a reply to the appeal;

(e) after the preparatory process is duly completed, the Director or the Head of the NGO shall forward to the Chairman of the Review Board all documentation pertaining to the call for tenders in question including files, tenders submitted, copies of deposit receipts and any motivated letter;

(f) The secretary of the board shall inform all the participants of the call for tenders, the NGO of the date or dates as the case maybe when the appeal will be heard;

(g) When the oral hearing is concluded, the Public Contracts Review Board, if it does not deliver the decision on the same day, shall reserve decision for the earliest possible date to be fixed for the purpose, but not later than six weeks from the day of the oral hearing:

Provided that for serious and justified reasons expressed in writing by means of an order notified to all the parties, the Public Contracts Review board may postpone the judgment for a later period.

(h) The secretary of the board shall keep a record of the grounds of each adjournment and of everything done in each sitting;

(i) After evaluating all the evidence and after considering all submissions put forward by the parties, the Review Board shall decide whether to accede or reject the appeal.

SECTION 3 - SPECIAL CONDITIONS

These conditions amplify and supplement, if necessary, the General Conditions governing the contract. Unless the Special Conditions provide otherwise, those General Conditions remain fully applicable. The numbering of the Articles of the Special Conditions is not consecutive but follows the numbering of the Articles of the General Conditions. Other Special Conditions should be indicated afterwards.

For the purposes of contracts issued by NGOs, the term 'approval from the Central Government Authority' shall be substituted by the term 'approval by the Head responsible for that NGO'; Furthermore, any references to the Contracting Authority throughout the General Conditions shall be deemed to be referring to the NGO responsible for that procurement.

Article 2: Notices and Written Communications

- 2.2 Further to the provision of Art. 2.2 of the General Conditions, the Contracting Authority shall, upon signing of contract and submission of the Performance Guarantee by the Contractor, notify the names of the Supervisor/Project Leader and any other authorized representatives of the Contracting Authority, specifying the relative addresses and relevant contact information.

The Contracting Authority shall appoint a single point contact to act as Project Leader

The Project Leader may issue to the Contractor instructions at any time. The Contractor shall only take instructions from the appointed Technical Consultant and/or the Representative both appointed by the Contracting Authority.

All formal communication between the Contractor and the Contracting Authority and/or all submissions, shall pass at all times and unless otherwise stated, through the Technical Consultant and the Representative, and must be accompanied by the respective forms, as may be applicable. All written correspondence to the Contracting Authority is to be addressed to the Project Leader keeping in copy the Technical Consultant and the Representative of the Contracting Authority.

Article 5: Supply of Information

- 5.1 Further to the provisions of the General Conditions, any documents, plans, drawings and modelling prepared by the Contractor are to be submitted for approval to the Contracting Authority, the procedure being agreed to between the parties as indicated in Clause 2.2 of the Special Conditions.

Article 6: Assistance with Local Regulations

- 6.1 Further to the provisions of the General Conditions, the contractor is responsible for complying with local regulations at his expense to ensure the project is compliant with all the relevant local regulations.

Article 7: Obligations of the Contractor

- 7.8 The Contractor shall, within 15 calendar days of receipt of the contract, sign and date the contract and return it together with a copy of the Performance Guarantee. The Contractor is further obliged to forward the original performance guarantee to the NGO.

The NGO will not affect any payment to the contractor until the performance guarantee is submitted. The amount of the guarantee shall be 4% where the amount of the total contract value is between €10,000 and €500,000 ex VAT. If the same Contractor has more than one contract with the Contracting Authority, then the Contractor will be allowed to submit a single bid bond in accordance with the schedule stipulated in the Tender Form.

The contractor shall draw up and submit any report as well as any literature, documents or items required for the execution of the contract and submit them for approval to the Contracting Authority, the procedure being agreed to between the parties as indicated in Clause 2.2 of the Special Conditions. Any such reports and information will become the property of the Contracting Authority and the Contractor may not reproduce or communicate them to third parties except with the Contracting Authority's agreement. The Contracting Authority may circulate the reports and information provided by the Contractor to third parties as it may deem necessary.

The contractor shall deploy the necessary resources so as to maintain a good progress of work and shall also, where necessary, undertake to perform works outside normal working hours, and on public holidays and weekends at no additional cost to the Contracting Authority, so as to ensure the completion of the tasks within the required time-frame, in accordance with the Technical Requirements and with the Period of Execution.

Article 13: Medical, Insurance and Security Arrangements

13.2 As per General Conditions.

13.3 In addition to the requirements specified in Article 13.3 of the General Conditions, the Service Provider shall also furnish and maintain a Professional Indemnity insurance cover of minimum €500,000 throughout the entire period of execution of the contract up to the issue of the Final Acceptance Certificate.

Article 14: Intellectual and Industrial Property Rights

14 Article 14 of the General Conditions to the Contract applies in its entirety and reports and data sheets listed in Article 14.1 of the General Conditions to the Contract are to also include the modelling being requested in this tender.

Article 15: Scope of the Services

15.1 The scope of the services is defined in Section 4 (Terms of Reference)

Article 16: Personnel and Equipment

16 As per General Conditions.

Article 18: Execution of the Contract

18.1 The period of performance of this contract shall be 26 weeks from the Commencement indicated in the Order to Start Works. The Commencement Date for this contract shall be 1 week from the Order to Start Works. The Order to Start Works will not be issued later than one (1) month from the last date of signature shown on contract.

The contractor will be expected to commit sufficient resources to carry out the tasks assigned

and to guarantee the completion of all tasks assigned in the contract within the completion period specified above.

- 18.2** The performance period of this contract is stipulated above in sub-Article 18.1 of the Special Conditions.

Article 19: Delays in Execution

- 19.2** Any delay in performance from the approved programme of works for this contract, will be charged 0.1% of the contract value per calendar day of delay up to a maximum of 20% of the contract value.

Upon reaching the maximum penalty, the Contracting Authority reserves the right to terminate the contract and seek the services of a third party for the completion of works.

Article 20: Amendment of the Contract

- 20.5** The repetition of services shall be capped at 20% of the original contract value.
- 20.6** Additional services (i.e. new services not included in the original tender) shall be capped at 20% of the original contract value.

Article 24: Interim and Final Progress Reports

- 24.1** Further to the provisions of the General Conditions, the Contractor will submit an inception report as specified in Section 4, Terms or Reference as well as a progress report as at the end of the 13th week of project implementation from the order to start works. Both reports must be approved by the Contracting Authority prior to issuing the corresponding payment as specified in the Payment Schedule, Article 26 of the Special Conditions.

A final report must be submitted by the Contractor to the Contracting Authority upon completion of the tasks assigned in this contract. The final report will be approved by the Contracting Authority prior to issuing final payment.

Prior to issuing any of the payments stipulated in Article 26 of the Special Conditions of the Contract, the Contractor must submit to the Contracting Authority, hard and soft copies of all the above mentioned reports and of all the project deliverables required in this contract in addition to the final report.

Article 26: Payments and Interest on Late Payment

- 26.1** This is a fee-based contract.

Specify any additional provisions regarding the scope of the Contractor's tender

The payments will be made according to the following schedule, subject to the provisions of Articles 28 to 33 of the General Conditions:

Month	Narrative	Percentage (%)
	1 st payment due following submission of an	20% of the contract value

	inception report and following approval of this report by the Contracting Authority	
	Interim Payment due following submission of the progress report due at the end of the 13 th week of implementation and following approval of this report by the Contracting Authority.	30% of the contract value
	Final Payment due following submission of the final report and following approval of this report by the Contracting Authority	50% of the contract value
TOTAL		100%

26.2 As per General Conditions.

Article 27: Pre-Financing Guarantee

27.2 No Pre-financing payment will be provided for this contract.

Article 39: Further Additional Clauses

39.1 The Provisional Acceptance Certificate of the tasks carried out by the Contractor can only be issued by the Contracting Authority once all tasks have been completed and are to the satisfaction of the Technical Consultant appointed by the Contracting Authority and all relevant documentation has been submitted by the Contractor to the Contracting Authority

SECTION 4- TECHNICAL SPECIFICATIONS (NOTE 3)

Note:

Where in this tender document a standard is quoted, it is to be understood that the NGO will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the NGO.

1. Background Information

1.1 - Beneficiary Country

Malta

1.2 - NGO

Fondazzjoni Għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta

1.3 - Relevant Country Background

Malta is endowed with a rich cultural heritage which also includes, amongst other things, the various village and town churches. This contract forms part of a project aimed at safeguarding the ecclesiastical cultural patrimony in Malta and more specifically the rich architectural heritage of Santa Marija Parish Church, Birkirkara.

1.4 - Current State of Affairs in the Relevant Sector

N/A

1.5 - Related Programmes and Donor Activities

Conscious of the diverse cultural heritage assets that fall within its portfolio, the Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta has undertaken a cohesive plan which seeks to restore its cultural assets and conserve them for the enjoyment of future generations. This project will seek to achieve the restoration of external structures of churches and chapels, restoration of artefacts, valorisation of religious historical artefacts and documentation as well as the creation of a heritage trail and undertaking of marketing initiatives. This contract forms part of a component aimed at safeguarding the ecclesiastical patrimony of the Santa Marija Parish Church, Birkirkara.

2. Contract Objectives and Expected Results

2.1 - Overall Objectives

The overall objective of the project which is the subject of this contract will be to provide a working tool that will enable exploration of the behaviour of the masonry structure of the church at different points in time during its 400-year history. The state of the church will need to be considered in the following situations:

- 1) In its original state, after the building was completed, and when the original dome was still in place;
- 2) After the ground had deformed but before the vaults and the dome had collapsed;
- 3) In its collapsed state, when the building had no dome and most of the vaults had collapsed;
- 4) In its state at the end of the restoration process, after it was rebuilt;
- 5) In its current state, after the existing cracks have appeared; and
- 6) When foundation settlement around the external perimeter of the church is restrained, whereas the rest is allowed to settle. For this purpose, elastic behaviour of the ground is deemed to be sufficient.

The objective of the model is to attempt different scenarios and different patterns of ground deformation, such that the stress distribution in the model can be assimilated to the observed state of stress in the as-built structure, as evidenced by the existing cracks.

The model is intended to further the current understanding of the structure of the church, in preparation for an envisaged underpinning or ground improvement intervention, that does not form part of this contract.

2.2 - Specific Objectives

The objectives of this contract are as follows:

- **Objective 1** - To help preserve the current state of the Santa Marija Parish Church, Birkirkara through computer-aided modeling; and
- **Objective 2** - To help in the preparation for an envisaged underpinning or ground improvement intervention to support the existing church structure.

2.3 - Results to be achieved by the Project

The analysis of the structure is to be carried out on computer using finite element techniques or their equivalent. The static situation is to be modelled for the stages of the church's history, outlined in 2.1 above. Following this, a dynamic analysis of the structure will be required to assess its behaviour during historic earthquake events and during possible future ones.

3. Assumptions and Risks

3.1 - Assumptions Underlying the Project Intervention

- All tasks and activities shall be carried out within the specified timeframes, as approved in the inception report which will include an updated 'Methodology & Organisation' report and which must be submitted to and approved by the Contracting Authority by no later than two weeks from the order to start works.
- The Contractor appointed for the implementation of this contract is expected to modify the Inception report which will included the 'Methodology & Organisation' report as necessary until it is approved by the Contracting Authority.

3.2 - Risks

- The existing drawings of the church may have some inaccuracies in terms of the dimensions of the structural elements
- The exact nature of the masonry construction of the church is unknown, although it is assumed that most walls consist of masonry skins with an internal rubble infill.
- Strict adherence to the Implementation timeframes and disbursement schedules of the project must be followed.
- The administrative procedures governing the project process are more time consuming than envisaged thus causing delay to the start of works.

4. Scope of the Work

4.1 - General

4.1.1 Project Description

The provision of a three-dimensional computer model of the masonry structure of Santa Marija Church in Birkirkara, Malta

History

Documentation regarding the Parish of Birkirkara dates back to the 15th century. In fact, known sources show that Birkirkara was already a parish at least by 1402. The Rollo of 1436 compiled by Bishop de Mello shows that at this time, there were 10 parishes in Malta, that of Birkirkara being one of them.

It is not precisely known when the works on the present church were initiated, although some sources mention the year 1607. It is maintained that the church plans are the work of Vittorio Cassar. After the death of Cassar in 1607, Dun Filippu Borg, Birkirkara's parish priest at that time, employed Tommaso Dingli to continue the work on the church. It is estimated that the church took around fifty years to be built.

During the time in which the church was being built, Dun Filippu Borg managed to obtain

permission from Pope Urban VIII to establish the first Collegiate of the Maltese Islands in 1630. The church of the Assumption of Birkirkara was the first Collegiate established in the Maltese Islands, apart from that of Mdina.

The church was in use up to the early 18th century, when the people of Birkirkara decided to build a new, bigger church, closer to the old village centre. In 1727, the foundation stone of the new parish church dedicated to St. Helen was laid. The church of the Assumption was abandoned, despoiled and closed for worship. In 1787, Bishop Labini visited the church and ordered it to be sealed up as the church had developed visible structural problems after it had been abandoned. Thus the church of the Assumption was only open for worship for about 120 years.

Very little is known about the church's fate during the 19th century since it was closed, but it is worth mentioning Dun Gaetano Mannarino who was buried in the church in 1812. The most tragic part of the church's history is surely when the church's dome caved in, demolishing the whole barrel vault and leaving the church roofless.

During WWII, the church was used as a temporary Government school, parts of the sacristy roof being covered by sheets of metal especially on rainy days. During the 1960s, Archbishop Gonzi visited the church a number of times and decided that the time had arrived for the church to be restored and reconstructed where necessary. The restoration works were officially started on the 7th October 1969.

On the 25th March 1992, Archbishop Mons. Ġużeppi Mercieca declared the area around the church of the Assumption as an Autonomous Pastoral Zone, separated from the Parish of St. Helen. On the 8th May 2005, the church was once again granted the title of Parish. Parishioners have been very much concerned with the church's current state of repair. Worrying cracks have appeared on various columns and also along the reconstructed barrel vault, all of which show that the church has structural problems.

Cultural and artistic value

Numerous writers and art historians have frequently praised the architectural beauty and historical importance of Santa Marija Church, because it has artistic and cultural value on many levels. It was built during the transition period between the Renaissance and the introduction of the Baroque (early 17th century) so it has elements from both styles of architecture. It was originally planned by Vittorio Cassar, son of Gerolamo Cassar, one of the Order of St. John's main architects during the 16th century. The project was continued by Tommaso Dingli, a *scalpellino* by trade, but who planned a few amongst the most important churches of the 17th century such as those in Ғaḡ-Ғebbuḡ, Naxxar, St. George in Qormi, Ғal Balzan, Attard and many others. It is the only Church by Dingli which has retained most of its original appearance, without the later Baroque additions of the following centuries.

The church is also important because it was the first Collegiate church to be established in the Maltese Islands in 1630 (besides the Mdina Cathedral) through the influence of Dun Filippo Borg, a prominent cleric in the 17th century Malta. He is buried within the church, together with another infamous cleric, Dun Gaetano Mannarino, the mastermind behind the Rising of the Priests in 1775 during the Grandmastership of Ximenes.

The church is also very important for the community that developed around it during the late 1960s and 1970s to the extent that the whole area is still known until today as Old Church area, the church having given an identity to a newly formed and tightly knit community.

Investigation

The development of cracks within the masonry walls and vaults of the church has been observed for a number of years, and has been first documented by Heritage Malta in 2006. This first report had suggested that ground conditions beneath the church could have caused these structural movements and recommended further studies in this regard.

In November 2009, a preliminary investigation was carried out during which three boreholes were drilled within and below the foundations of the church. Core was recovered from each of these three boreholes, and later inspected in the laboratory. A number of observations were made, namely that a relatively hard but very thin layer of rock exists below the church foundations, followed at depth by a thick layer of marl (a very weak rock or hard clay) of a whitish/greyish colour that has probably undergone some consolidation and compression over the lifetime of the church structure. Although these observations were made, the weak nature of the rock did not allow undisturbed samples to be taken for further testing in the laboratory.

A further two boreholes were drilled in September 2012, one below the west front of the church (the façade) and another one below the bell tower. These confirmed the findings of the first three boreholes, but also allowed higher quality samples to be extracted and preserved for analysis in the laboratory.

In October 2012, a trial pit was also excavated next to the façade of the church, down to a depth of 3.5m, thus allowing the upper hard crust and the underlying softer rock to be inspected at close range. A small section of the foundations of the church façade were also exposed in this trial pit. Several block samples of the weaker rock material were taken for subsequent analysis in the laboratory.

Research

In 2013, two parallel studies were carried out, one concerning the structure of the church and another on the weak rock existing below foundation level. The first study consisted of a detailed survey of all the cracks visible inside the church. Cracks were measured and recorded on drawings of the interior elevations, and classified in terms of severity, width and persistence. An attempt at understanding the deformational characteristics of the structure as a whole was also made during this study, and it was amply evident that the church has undergone severe distortion due to movement at foundation level.

The findings of this study have clearly shown that the cracks visible within the church are not the result of a one-off event, but represent an ongoing process. Recent surveys have confirmed the development of new cracks and the widening of existing ones.



Figure 1 - Some of the observed cracks within the church

The second study, consisted in the classification and strength testing of the natural ground material found beneath the church. Detailed studies of the microstructure of this material have been carried out, using the scanning electron microscope and also by carrying out a series of laboratory tests. Initial results have already shone light on possible deformational mechanisms occurring within this material when it is loaded, and some hypotheses regarding the effect of this on the observed cracks have already been made.

Monitoring system

The on-going structural movement and the development of cracks within the church is a matter of concern but it also provides important clues towards understanding the behavioural patterns of the church structure in relation to seasonal cyclic changes in environmental and ground conditions. An electronic monitoring system has been designed and installed (in conjunction with the Faculty of Engineering, University of Malta) to allow movements in the structure to be studied scientifically and to be interpreted in the light of the findings of the laboratory tests on the ground materials.

Current concerns

There is growing concern that the structural condition of the church may pose some degree of risk to its users. Although the risk of collapse is considered remote, the observed structural movement may continue and may result in further spalling of masonry units and loosening of mortar infill. If this happens at ceiling level, any falling pieces could have substantial potential energy and may therefore cause slight injuries to people below. The probability of this happening during the limited time interval when the church is actually in use is small, but it cannot be ruled out completely.

4.1.2 *Geographical Area to be covered*

The Santa Marija Church in Birkirkara, commonly known as the ‘Old Church of Birkirkara’ is a Roman Catholic parish church in Birkirkara, dedicated to the Assumption of Mary.

4.1.3 *Target Groups*

Target groups are structural engineering companies that are qualified in creating the computer model as specified in this tender.

4.2 - Specific Activities

This computer model will need to simulate the masonry structure, inclusive of all internal and external masonry elements. This will involve

- Checking the existing drawings of the church, which are known to include some inaccuracies in terms of the thickness of some of the masonry elements;
- Simplification of the architectural elements to enable a realistic (but not overly-simplistic) 3-D model to be created;
- Creation of 3-D model in XYZ coordinates in typical FE modelling software;
- Assignment of different materials to the model to simulate the external and internal ashlar masonry as well as the inter-wall rubble infill (this may require testing of masonry samples, or research into the properties of such materials and the bidders must factor this when doing the costings for this contract);
- Analysis run of the model to determine stress distribution in the masonry structure, prior to foundation movement;
- Analysis run of the model to determine stress distribution after foundation movement, on the basis of measurements made on the existing structure;
- Correlation of stress distribution in the model with observed cracks in the masonry structure, and if necessary, calibration of the model until faithful reproduction of observed stress state is replicated in the model;
- Arresting movement around the outer perimeter of the model (to simulate an underpinning intervention) such that the effect of restraining movement at the external perimeter (but not the internal perimeter) of the structure can be investigated; and
- Presentation of results and reporting.

The successful bidder will be required to provide the following deliverables for both static and dynamic (seismic) modes, for the states described in Clause 2.1 above. This would require at least 10 runs of the model in different configurations.

- The resultant pattern of stress acting at foundation level for the cases in 2.1 above, contoured in kPa or equivalent;
- Contoured plots of principal stress and principal stress directions for the walls of the church;
- Contoured plots of principal stress and principal stress direction for cross-sections through the vaults and the adjacent supporting walls;
- Contoured plots of expected deformation for the walls and for cross-sections through the vaults;
- A report of the analysis process, describing the assumptions taken, the constitutive models used, the results obtained in both plot and table format, the identified inaccuracies and limitations of the model and the conclusions derived from the analysis; and
- The results in digital format, such that the results can then be used in other computer programs.

The tasks assigned through this contract must adhere to the implementation timeframes stipulated in Article 1.3 of the ITT and Article 19.1 of the Special Conditions of the Contract.

Upon completion of the tasks assigned through this contract, the Contractor will provide a detailed report on the work conducted together with the necessary supporting documentation. Such report will have the necessary EU publicity requirements which will be communicated to the Contractor by the Contracting Authority.

4.3 - Project Management

4.3.1 *Responsible Body*

The Contracting Authority responsible for managing this contract is the Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta.

4.3.2 *Management Structure*

The role of the Project Leader is vested upon the Head of the Fondazzjoni għall-Patrimonju Kulturali ta' l-Arcidiocesi ta' Malta as represented by the appointed Technical Expert and the project coordinators appointed by the Contracting Authority. The Contractor shall report to the Technical Expert and the Project Co-ordinators as representatives of the Project Leader. Any decisions which affect the contract objectives and results, related deadlines and financial aspects shall be taken into account following consultation with and approval by the Contracting Authority. During the execution of the services, the Contracting Authority shall moreover be involved in the supervision of the activities involved to the extent to be able to ensure prompt consultation and communication between the parties involved, liaison between the Contractor and third parties and monitoring of the services to be executed by the Contractor.

Communications between the Contracting Authority and/or its Technical Representative on one hand, and the Contractor on the other, shall be exclusively in writing and in the English language. Specific and standard procedures of communication (templates of request for information, contract submittal, time of communication and for replies, frequency of meetings) shall be agreed among the Contracting Authority and the winning bidder within fifteen (15) days from the Commencement Date of the Contract.

The Contractor shall abide by the conditions stipulated in Article 7 Contractor's Obligations, of the Special Conditions to the Contract.

4.3.3 *Facilities to be provided by the NGO and/or other parties*

It is not envisaged that the Contracting Authority will be providing any facilities to the Contractor.

5. Logistics and Timing

5.1 - Location

The Santa Marija Church in Birkirkara, commonly known as the 'Old Church of Birkirkara'

5.2 - Commencement Date & Period of Execution

Article 18.1 of the Special Conditions will determine the actual commencement date and period of execution is 26 weeks from the order to start works.

The Commencement Date for this contract shall be 1 week from the Order to Start Works. The performance of the contract is to commence on order to start works. The order to start works will not be issued later than one (1) month from the last date of signature shown on contract.

No implementation however will be allowed to commence on site unless the Contractor has furnished the Contracting Authority with a certified true copy of the Professional Indemnity Insurance together and the performance guarantee. Delay in submitting the documentation following the elapse of the 1 month period from the last date of signature of the contract, will result in daily penalties of €50 a day up to a maximum 2% of the contract value.

6. Requirements

6.1 - Personnel

6.1.1 *Other Experts*

The key expert^(Note 2A) will be a Structural Engineer having minimum qualifications at MQF level 7, with demonstrated expertise in masonry structures and computer modelling of masonry structures. The Structural Engineer will also be responsible for the management and co-ordination of the project from the Contractor's side.

The CV of the Structural Engineer must be submitted by the Bidder/s at tendering stage.

All experts engaged by the Contractor for the implementation of this contract must be independent and free from conflicts of interest in the responsibilities accorded to them.

6.1.2 *Support Staff and Backstopping*

Any supporting staff and backstopping required for the implementation of the tasks assigned in this Contract will be carried out at the expense of the Contractor.

Secretarial/administrative roles as well as on-site assistants, etc., required for the completion of the contract, are considered part of the contract's global price.

6.2 - Accommodation

The Structural Engineer shall make use of his/her own office, office support and equipment. All office expenses including stationery and printing are to be covered by the global price quoted. Meetings may be held in premises supplied by the Contracting Authority at its offices in Floriana or at Santa Marija Church in Birkirkara as and when required by the Contracting Authority.

6.3 - Facilities to be provided by the Contractor

The Contractor shall ensure that experts are adequately supported and equipped. In particular it shall ensure that there is sufficient administrative, secretarial and interpreting provision to enable experts to concentrate on their primary responsibilities. It must also transfer funds as necessary to support its activities under the contract and to ensure that its employees are paid regularly and in a timely fashion.

All expenses such as transport, report production, equipment, office support, support staff, etc., must be included in the global price.

6.4 - Equipment

No equipment is to be purchased on behalf of the Contracting Authority / beneficiary country as part of this service contract or transferred to the Contracting Authority / beneficiary country at the end of this contract. Any equipment related to this contract which is to be acquired by the beneficiary country must be purchased by means of a separate supply tender procedure.

7. Reports

7.1 - Reporting Requirements

- The Contractor will submit an inception report which will include an updated 'Methodology & Organisation' report and must be submitted to and approved by the Contracting Authority by no later than two weeks from the order to start works. The Contractor is expected to modify the Inception report as necessary until it is approved by the Contracting Authority.
- The Contractor will submit a progress report as at the end of the 13th week of project implementation from the order to start works outlining the tasks carried out, the progress achieved thus far and the envisioned work to be carried out in the latter half of the implementation period in order to achieved the expected outcome of this contract. The report will be reviewed by the Contracting Authority and the Contractor will carry out changes that may be deemed necessary by the Contracting Authority who will approval the report.
- A final report must be submitted by the Contractor to the Contracting Authority upon completion of the tasks assigned in this contract. The report must contain all information on the work carried out as described in great detail in Section 4.2 of the Terms of Reference. The report will be reviewed by the Contracting Authority and the Contractor will carry out changes that may be deemed necessary by the Contracting Authority who will approval the report.
- All the above mentioned reports must be approved by the Contracting Authority prior to issuing the corresponding payment as specified in the Payment Schedule, Article 26 of the Special Conditions of the Contract. The Contractor must submit to the Contracting Authority, hard and soft copies of all reports and of the project deliverables required in this contract.

7.2 - Submission & approval of inception, progress and final reports

All reports are to be submitted to the Contracting Authority accompanied by the necessary supporting documentation which provides evidence of work conducted as assigned in this contract. The reports must be written in English. The Contracting Authority is responsible for approving the inception, progress and final reports following consultation with its Technical Consultant.

8. *Monitoring and Evaluation*

8.1 - Definition of Indicators

The Team Leader shall have his/her performance measure and evaluated against milestones and objectives set out in the project plan and/or its authorised revisions.

All reports, methodologies, etc., are also to be approved by the Contracting Authority and any other related authorities/entities as necessary.

SECTION 5 - SUPPLEMENTARY DOCUMENTATION

5.1 - Draft Contract Form

5.2 - Glossary

5.3 - Specimen Performance Guarantee

5.4- General Conditions of Contract

The full set of General Conditions for Service Contracts is attached with this tender.

It is hereby construed that the tenderers have availed themselves of these general conditions, and have read and accepted in full and without reservation the conditions outlined therein, and are therefore waiving any standard terms and conditions which they may have.

These general conditions will form an integral part of the contract that will be signed with the successful tenderer/s.