State of Palestine

State of Conservation Report

For

Birthplace of Jesus:
Church of the Nativity and the Pilgrimage Route, Bethlehem

Ref. 1433, Palestine

Bethlehem, Palestine

February 2016

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In response to the World Heritage Committee decision no. (39: COM 7A.28 item no.12), Bethlehem Municipality prepared the State of Conservation Report for the World Heritage Site, **Birthplace of Jesus: Church of the Nativity and the pilgrimage Route**, in close cooperation with the Ministry of Tourism and Antiquities, Presidential Committee for the Restoration of the Church of the Nativity and the Centre for Cultural Heritage Preservation.

1 Executive Summary

Birthplace of Jesus: Church of the Nativity and the Pilgrimage Route, Bethlehem (Ref. 1433) was inscribed at the World Heritage List emergency on the basis of criteria (iv) and (vi); the inscription on the Danger List was due to the lack of repair of the roof structure of the Church of the Nativity and the consequent threat to the roof timbers, roof covering, and the interior wall surfaces from water ingress.

In light of previous submitted technical Reports, it is worth mentioning that comprehensive investigations and documentations were prepared in 2011; and before the nomination file was prepared further investigations were conducted during the restoration works which started in 2013. This report in particular highlights the historical data concerning the roof, for which dendrochronological analysis was performed on the Nativity Basilica roof wooden members in order to date the wooden elements of the structure and to identify possible re-used or substituted wooden elements and, eventually, the different phases of the construction.

The roof structure can be considered the result of continuous changes occurred over the centuries. It was impossible, on the base of the available survey and historical data, to localize the various interventions made over the centuries. Therefore, it was decided to preserve as much as possible the existing materials, in particular the wooden components of the roof for which the interventions of restoration were limited to the most damaged parts of the structure. The methodology adopted in executing the restoration works was based on following as much as possible: the international charter; minimum intervention, respecting the historical monument, reversibility and respecting the authenticity of the place in addition to considering seismic improvement for the historical structure.

It is worth mentioning that the roof restoration works were completed in March 2015 with installation of the new windows, a new life line and new crosses. Accordingly by this date the property is ready to be removed from the List of the World Heritage in Danger. The attached annexes contain complete documentations for 2- Archaeological aspect of the roof, 3-Technical report for the inspection of roof timber structure, 4-Design method statement for timber trusses, 5-Decay mapping for the roof timber trusses, 6-Summary of the replaced timber trusses elements, 7-Trusses documentation (state of conservation, analysis / design reports and as fitted drawings), 8-Verification of the Church structure against seismic action, 9-Grading certificate for the imported timber elements, 10-Fire rating check for roof timber structure, 11-Roof layers details, 12-Roof life line details, 13-Roof drainage system, 14-Crosses at roof and 15-Wooden windows.

Concerning the Narthex roof; the structure of the Narthex is today strongly deformed. The façade wall exhibits a rotation towards the Manger Square, more pronounced in the central part and starting approximately from the architrave of the door of Humility, about one meter above the ground. A steel structure is currently under construction above the present vault system. It bears the new floor, connects the two opposite façades to improve the seismic response of the whole structure and absorb the thrust coming from the vaults. For greater safety, the vaults are connected to the overlying steel beams by means of thin tie rods which enter into action only in the event of incipient collapse. The works are expected to be finished by the end of June 2016.

More recently other restoration works have been commenced in 2015. According to a list of priorities and the available funds, it included the restoration of the external stone surfaces of the North and South corners and of both aisles which were completed in October 2014; in addition to wooden & metal doors of the basilica which were completed in March 2015.The restoration of the internal plaster and wall mosaics are progressing very well and will be completed by mid of 2016. Please refer to Annex 1- Progress report for more details.

Currently further investigations and preparation works are being performed in order to start as soon as possible with the restoration of the wooden architraves above the colonnades, capitals and columns, paintings on columns, the remaining external stone surfaces, stone floor, floor mosaics, lighting, microclimate and smoke detection systems. The schedule of these packages will depend on the list of priorities and fund availability.

Concerning the Pilgrimage Route, all stakeholders are involved in the revitalization and preservation , in order to preserve the Outstanding Universal Value (OUV), by encouraging the inhabitants to reopen their closed property within the Street, hoping to optimize the physical and spiritual (OUV) of the Site. Moreover, these interventions aim at providing benefits for both visitors as well as inhabitants, and to encourage them in the preservation and adaptation of the cultural heritage resources. This process will lead towards the fulfilment of the raising standard of living.

In addition to the Pilgrimage Route , several proposed concept ideas were nominated in order to address the urban pressure and the traffic congestion within the historic town that effect the authenticity and integrity of the property,

such as; Manger Square Tunnel and Manger Square Village "multi-purpose parking and commercial Building".(see annex 16), taking into account that these proposed concept ideas will be submitted to the World Heritage Centre for evaluation and examination before implementation .

Other activities were conducted by Bethlehem Municipality and the involved stakeholders during the year 2015 within the Buffer Zone and the surrounding corridors to address the threats that have adverse impact on the property. Those activities are classified under many categories.

2 Response from the State Party to the World Heritage Committee "Decision 39 COM 7A.28 (Bonn, 2015)"

2.1 Background on Restoration of the Church of the Nativity

It is essential to emphasize the general methodology adopted in all phases of the project, to highlight the main achievements under the leadership of the Presidential Committee and also to provide a general overview of the completed, on-going and future restoration works related to the Nativity Church restoration project.

The restoration works implemented are direct interventions on the church components aimed at maintaining the integrity of the material and assuring the conservation and protection of its historical, cultural and religious values. They are achieved by following as much as possible the principles of restoration, stated in the various Charters of Restoration, ICOMOS and UNESCO documents, and by choosing and applying the most appropriate restoration techniques in the full respect of the importance and uniqueness of the monument.

Therefore, the Outstanding Universal Value and authenticity of the Nativity church was deeply considered in all work stages, as a heritage to be preserved and transferred to future generations.

More in detail, the interventions are meant to be not invasive and reversible, at least within an acceptable threshold, consistent with the actual needs of conservation and restoration of the artifact. Even in the improvement of the structural behavior of the Church in the case of an earthquake, and therefore in the reduction of its seismic vulnerability, a great attention was paid in choosing intervention procedures able to exploit as much as possible existing architectural components of the Church (e.g. the roof structures, some masonry walls) rather than additional heavy devices. In this way, a considerable seismic improvement was achieved without making any significant change to the main characteristics of the Church.

Works accomplished so far since 2010, started with the onsite investigations activities, including the roof and all the other components of the Church. They were commenced in Sept. 23rd 2010 and were divided into three stages: stage I (surveys and documentations – on site investigations), stage II (studies and assessment – data processing), stage III (recommendations – conservation and restoration proposals and technical guidelines).

The roof and its wooden structures were the parts of the Church in more precarious conditions and in more need of strong interventions of conservation and restoration that could guarantee the stability and the stoppage of further damages to wall mosaics and plasters in consequence of rainwater infiltration. Accordingly, all tender documents were prepared and included: general conditions, particular conditions, bill of quantities, scope of works, technical specifications … etc.

As an emergency action, the Presidential Committee decided to consider the restoration of roof and windows as (Phase I) and an International Contractor was appointed for the execution of the related works after an international bidding process where contractor's proposal got the higher scores in both technical and financial offers. The works commenced on September 15, 2013 and were completed on March 2015.

The roof structure can be considered with no doubt as the result of continuous changes occurred over the centuries. It was impossible, on the base of the available survey and historical data, to localize the various interventions made over the centuries. Therefore it was decided to preserve as much as possible the existing materials, in particular the wooden components of the roof. An accurate diagnosis of all trusses was carried out by visual and instrumental inspections which allowed defining with a high level of accuracy their state of conservation, the most damaged parts of the structures and the most appropriate interventions of restorations.

More recently other restoration works have been entrusted to the same Contractor as additional works, in accordance to a list of priorities and the available funds, such as the restoration of the external stone surfaces of the

North and South corners of both aisles, the restoration of the internal plasters, wall mosaics, narthex and wooden & metal doors of the basilica.

Currently, further investigations and preparation works are being performed in order to start as soon as possible with the restoration of the wooden architraves above the colonnades, capitals and columns, paintings on columns, the remaining external stone surfaces, stone floor, floor mosaics, lighting, microclimate and smoke detection systems. The schedule of these packages will depend on the list of priorities and fund availability.

2.2 Developments relevance to the Accomplishment of the corrective measures

2.2.1 Roof Restoration Works

This section represents the answer to the following corrective measures:

- Complete a full investigative survey of the historic timbers and lead work of the roof, identifying the age and historical significance of the various component parts. **Time table: July 2011** Develop a Conservation Plan that synthesis the conclusions of the detailed investigative survey into a clear statement of the significances of the various elements of the roof within a comprehensive conservation philosophy for the roof restoration project. **Time table: July 2011**

- Prepare a detailed project specific for the roof repairs that allow a full understanding of which elements of the roof will be maintained, which will be repaired and which will be replaced. **Time table: March 2015**

A comprehensive on site investigation report was prepared in July 2011,that is before the inscription of the Church in the World Heritage list in Danger. The study was started in September 2010 by several research units in a Consortium led by CFR (Administrative project managing - Ferrara – Italy) and composed of SCDS Pro Inc. (Laser scanning survey – Canada), LAP&T – LAAUM (Historical and Archaeological Analysis – University of Siena – Italy), Benecon (Analysis of masonry structures – II University of Naples – Italy), CNR Ivalsa (Analysis of the roof structures - Italy), SadLab – UNIFE (Structural Analysis – University of Ferrara - Italy), SSBAP (Analyses of decorated surfaces, mosaics and paintings – University of Rome “La Sapienza”), CDG (On site assistance – Bethlehem – Palestine). The result of investigation stressed on the need of prompt intervention on many parts of the basilica especially the wooden roof based on the state of conservation which was deeply reported for all basilica components. The Dendrochronological analysis was performed on the Nativity Basilica roof wooden members to identify the age and historical significance of the various component parts. Also the report provides by each Unit of the team, specific guidelines for conservation, restoration and maintenance, containing the rules and methodology that a designer should follow in each field of intervention.

The investigative survey on the roof structures and their components was carried out in close relationship with the overall archaeological, historical and architectural analyses carried out on the whole Church of the Nativity. The general principles were laid down at the beginning, according to which the overall investigative surveys on the Church were carried out. At the same time, the plan of investigations on the roof was conceived in order to integrate the information provided by the global scale researches.

In the context of the international team for the survey, assessment study, and conservation plan for the Basilica of the Nativity, the research unit responsible for historical and archaeological analysis has been focused on the historical aspects and the gathering of written sources. The research work, coordinated by Prof. Michele Bacci (University of Siena), was developed on two different, yet strictly intertwined, grounds:

1) It aimed at providing the other units with historical information being useful for the current works of investigation of the roofs and other material parts of the buildings;
2) It provided some grounds for a thorough reassessment of the historical problems underlying the site and its architectural-artistic peculiarities, starting from an analysis of the different methodological approaches applied by past scholars to the interpretation of the Nativity Church.

In this Section only the historical data concerning the roof and the roof covering are reported. A more exhaustive and comprehensive historical and archaeological analysis of the whole Church, with the related references, can be found

in the “Restoration of the Roof of the Church of Nativity – Bethlehem (Phase 1) / Stage 3 – Final report” dated July 2011 submitted to WHC .
The history of the basilica after the Crusaders is still scarcely investigated, the main study being still that by Vincent and Abel (1914). The first references to the conditions of the roof date back to the 14th century. It can be said, in general terms, that in the 13th through the 19th century the building did not undergo significant alterations: according to both Ayyubid, Mamluk and Ottoman customary law, Christians were allowed to preserve their churches but they were prevented from both erecting new buildings and embellishing old ones. In order to make repairs, it was necessary to receive a special permission from the Sultan himself. Because of lack of maintenance the church started falling into a state of decay, as was frequently remarked, from the 14th century onwards, by those same pilgrims who never stopped manifesting their astonishment of the beauty of the church, its paintings, marble incrustations, monumental columns, and magnificent roof.

The medieval roof, which was always described as made with several qualities of wood (cedar of Lebanon and cypress) and covered with lead, was by the late 15th century in such a bad state of preservation, that rain fell down from its many holes and the pavement was covered with birds’ dung, even if, according to some sources, a first restoration had been accomplished in 1435 under the auspices of the Greek Emperor of Trebizond Alexios Komnenos Doukas (Ioannides 1867: 45). Yet, the portion of roof overhanging the choir was going to collapse when the Italian pilgrim visited the church in 1474 and saw that the Franciscan friars had been obliged to erect a wooden structure to hold it up (Calamai 1993: 142). As we are informed by Fri Francesco Suriano (Golubovich 1900: 190), the Franciscan Guardian Giovanni Tomacelli obtained the Sultan’s permission for the thorough restoration of the roof; this fact is also witnessed by the original firman (Castellani 1922: 61) and Felix Fabri’s account (Hassler 1843-1849, I: 475-477). Tomacelli was an Observant friar and his efforts to restore the basilica’s ancient decorum manifested a radical change of attitude, implicitly contrasting that of the previous Conventual administration (as is implied by Suriano’s words). He was able enough to obtain sponsorships from the Duke of Bourgogne and the King of England; whereas the latter’s money was used for the lead covering, the former’s was invested for the making of the new wooden structure. Venetian carpenters and wood-carvers came to Bethlehem to take measurements and they subsequently made beams out of pine-woods from the Alps. The materials were then transported by ship to Jaffa and thence transferred to Bethlehem by means of camels and oxen; special machines were constructed in order to transport the hugest and longest beams.

Sources are silent about the roof in the 16th century; but as early as 1607 and later on in 1617 its condition had become precarious, and the Greek community was allowed to operate some substitutions of rotten beams. Yet, a much more efficacious intervention took place on the initiative of the Greek Patriarch Dositheos in 1672: thanks to the sponsorship of a rich Greek devotee, Manolakis of Kastoria, it was possible not only to renovate the roof with new beams from Mytilene and a new lead covering, but also to make new ornaments in the church. The windows, which had been previously closed with hard stones and glass, were substituyted glass and iron frames.

Only interventions for the building’s ordinary maintenance took place in the 18th century, except for the restoration, in 1775, of a wall, located close to the west entrance that was going to collapse (Ioannides 1867: 47). In 1834 the basilica was damaged by an earthquake and in 1842 the Sultan Abdul Mecit, answering to the official request of the Greek Patriarch Athanasius III, gave permission to work out a thorough renovation of the wooden roof and its lead coverings.

In 1842 the last significant intervention was made in the basilica. The historical data mentioned here are the only information available on the past history of the roof and their components.

The historic, archaeological and stratigraphic analysis of the whole masonry structure of the Church, including that part of the structure in direct contact with the roof, are in the Final Report delivered by the Consortium in 2011.

As is evident, the historical documentation only allows to date, sometimes very accurately, sometimes with large approximations, restoration or maintenance interventions on the roof, without any specific reference to their localization within the whole roof structure. Further information can come from the identification of the different wood species used, that can let suppose some provenances rather than others. And, sometimes, these additional details can allow some temporal connections with the historical records. An exact dating could only be accomplished by means of the dendrochronological analysis carried out on defined sectors of the roof, which, however, would require times and costs well above those afforded. The only dendrochronological analysis, so far accomplished, regards some wooden architraves of the South aisle, whose authenticity and whose belonging to the construction time of the

Church was demonstrated, as reported in the "Restoration of the Roof of the Church of Nativity – Bethlehem (Phase 1) / Stage 3 – Final report" dated July 2011 submitted and in the previous report "Answer to the request for specifications addressed by ICOMOS to the State Party" dated July 2014 submitted to WHC.
However, the stratigraphic architectural survey proves very clearly that the last layers of stones above the present wooden sleepers at the higher level (Figure 1) are not coeval with the rest of the Church but built in later periods; therefore, the present roof structure can be considered with no doubt as the result of continuous changes occurred over the centuries. Even the roof of the aisles were subject to changes, as proved by some archaeological findings, such as the holes excavated in the walls during Justinian's time (Figure 2) and used to support the purlins of the original roof, not at the same level as the present one.

In conclusion, as it was impossible to localize the various interventions made over the centuries, it was decided to preserve as much as possible the existing materials, in particular the wooden components of the roof. To this purpose an accurate diagnosis of each truss was carried out by visual and instrumental inspections (see previous Report "Answer to the request for specifications addressed by ICOMOS to the State Party" dated July 2014 submitted to WHC), followed by interventions of restoration limited to the most damaged parts of the structures. **These surveys allowed defining with a high level of accuracy the state of conservation of each wooden truss by means of four percentage ranges of physical decay, denoted by four different colors (and the ranges were 0-25%, 25-50%; 50-75%; 75-100%) (**Figure 3**).**

Figure 1: stones above the present wooden sleepers at the higher level

Figure 2: holes excavated in the walls during Justinian's time

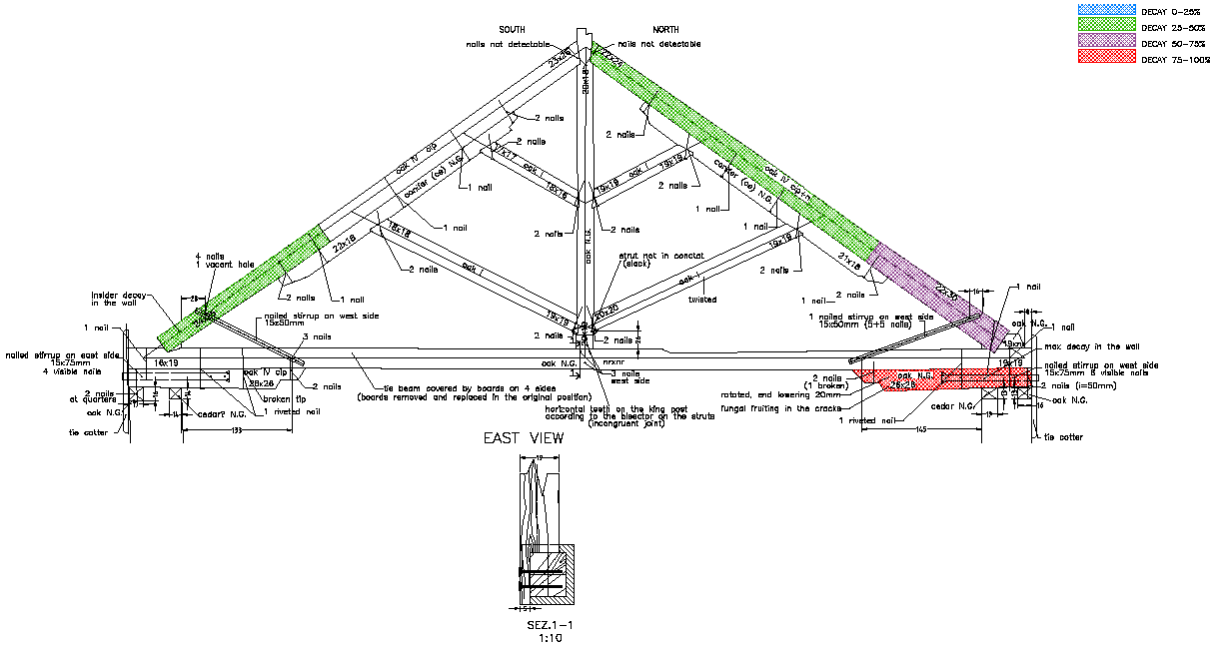

Figure 3: Sample of state of conservation of each wooden truss

The damaged elements (either rafters or tie beams, struts, king posts, cantilevers, sleepers) are represented in a plan view for nave and transept and for aisles and corners (Figure 4 & Figure 5).

The interventions of restoration consisted either in a replacement of entire structural elements (in a very small number) or in replacements of the only decayed parts by prosthesis. In Figure 6 & Figure 7 (S) indicates the total substitutions, all the rest are prostheses.

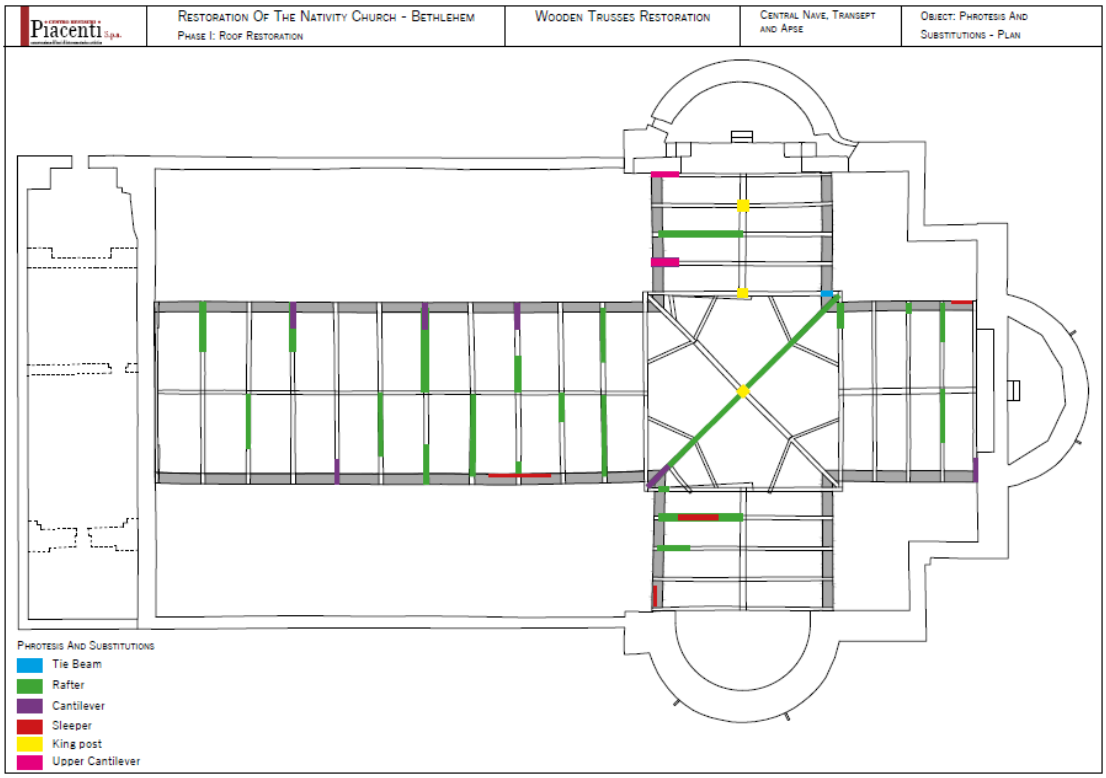

Figure 4: damaged wooden elements in the central nave, transept and apses.

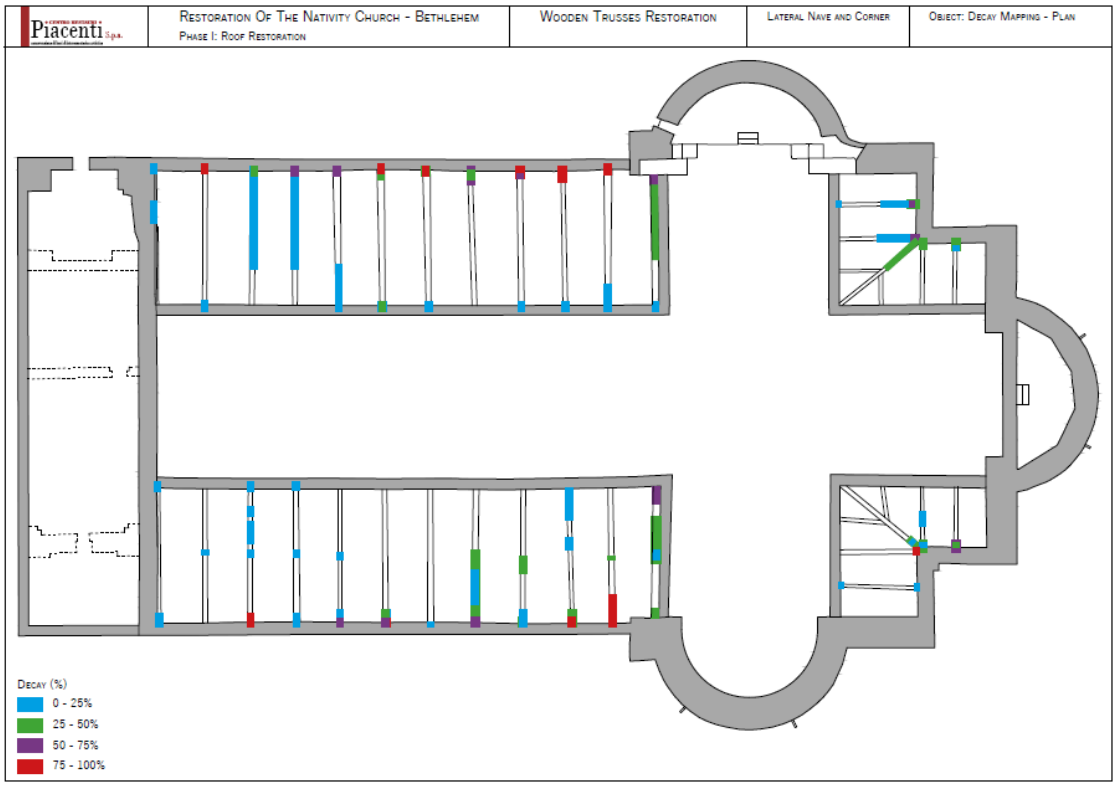

Figure 5: damaged wooden elements in the lateral nave and corners.

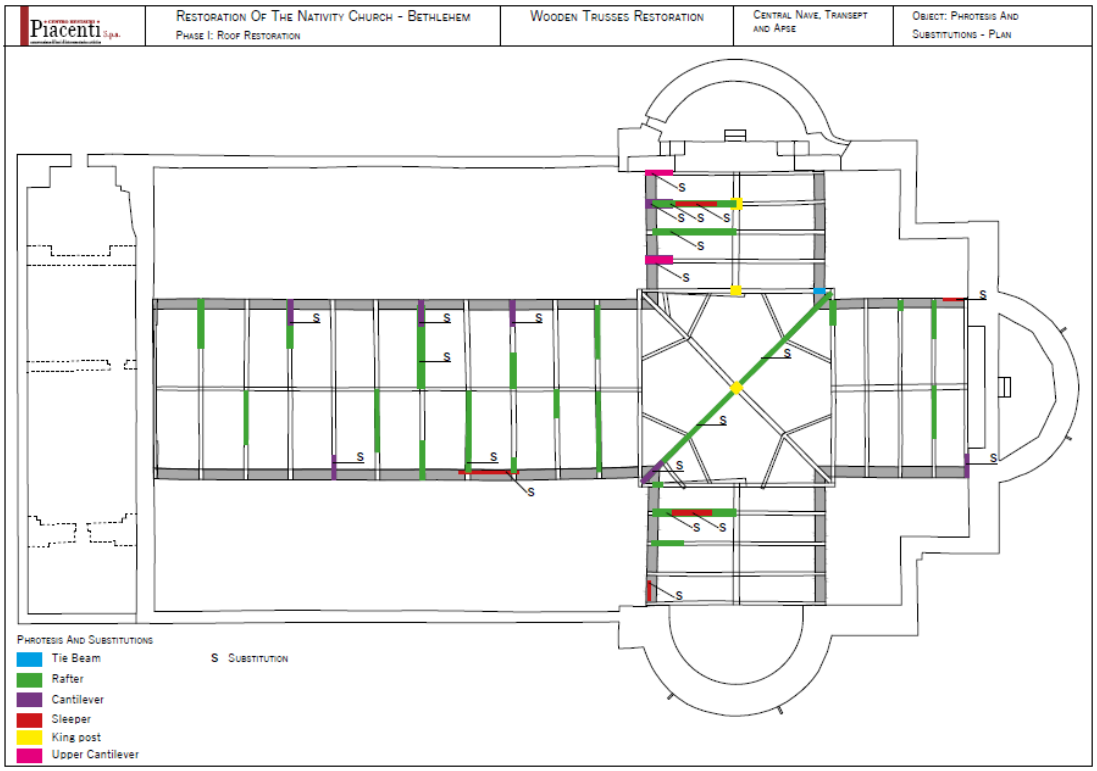

Figure 6: Interventions on wooden elements in the central nave, transept and apses.

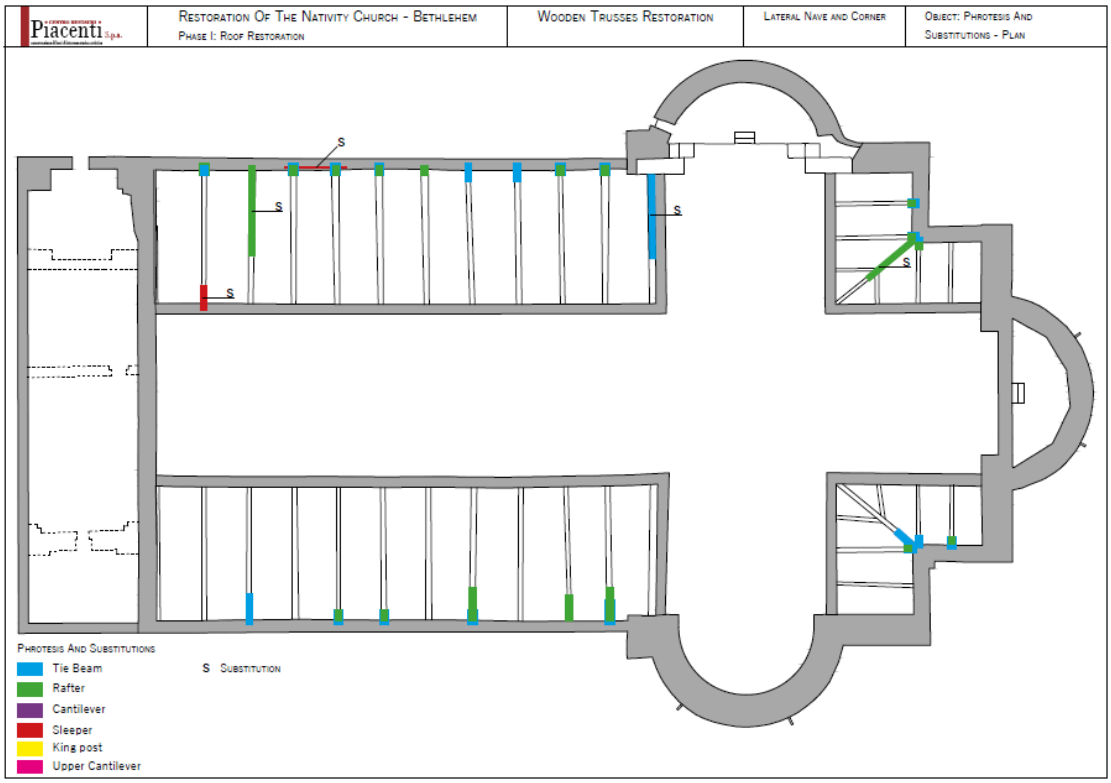

Figure 7: Interventions on wooden elements in the lateral nave and corners.

Table 1 shows in correspondence of each part of the roof the total length of the existing timber elements, the total length of the replaced elements, either by total substitution or prosthesis, the percentage of replaced elements. The

highest percentage of replaced elements is in the crossing area where both rafters of one diagonal truss have been totally replaced. However, it is worth noting that less than 8% of all existing truss elements have been replaced.

AREA	Total length of existing timber elements (m)	Total length of replaced timber elements (m)	Percentage of replaced timber elements (%)
CENTRAL NAVE	604,71	54,47	9,01
NORTH TRANSEPT	240,22	21,73	9,05
SOUTH TRANSEPT	240,22	12,79	5,32
APSE	240,22	10,66	4,44
CROSSING AREA	115,43	28,15	24,39
NORTH CORNER	95,24	9,35	9,82
SOUTH CORNER	95,24	4,81	5,05
NORTH AISLE	327,96	27,79	8,47
SOUTH AISLE	327,96	10,02	3,06
	Total 2287,20 m	Total 179,77 m	Total 7,86 %

Table 1: Summary of the wooden quantities for existing and replaced.

In Annex (7) the state of conservation of each wooden truss is reported together with the corresponding intervention of restoration (whenever present).

As for the truss elements, most of the wood used for total replacements and prostheses is ancient wood, four-five hundred years old and taken from some abandoned Italian sites. Such a choice allows to have now inside the Church the majority of the wooden truss elements of nearly the same age. From a technical point of view, this choice has allowed to avoid, in the replaced wood, shrinkage, fungi and insect attacks, typical of a young wood. It made it possible also to use glued-in-rod prostheses (impossible to be used with young wooden elements) which allow preserving a greater amount of existing material, if compared with more traditional mechanical prostheses. The technical procedures followed to make such prostheses are described in detail in the previous Report “Answer to the request for specifications addressed by ICOMOS to the State Party” dated July 2014 submitted to WHC.

Additionally, fire resistance check was made according to EN 1995-1-2 Design of timber structures part.1-2: General-Structural fire design. The “reduced cross-section method” was performed in order to check the fire resistance of the main timber structure, please refer to Annex (10) for more details.

Also boards and purlins were checked, and a suitable criterion, applicable even in different contexts, was defined and followed to distinguish what was to be replaced from what was to be preserved.

In particular, the survey carried out showed a state of conservation better than the one previously thought: less than 9% of the boards were replaced in the nave and transept (Figure 8), and only 6% in aisles and corners (Figure 9).

The number of purlins replaced at the level of nave and transept and at the level of aisles and corners was very small indeed, just a couple of dozens in total for both levels.

Figure 8: Replaced boards in central nave, apses and transept.

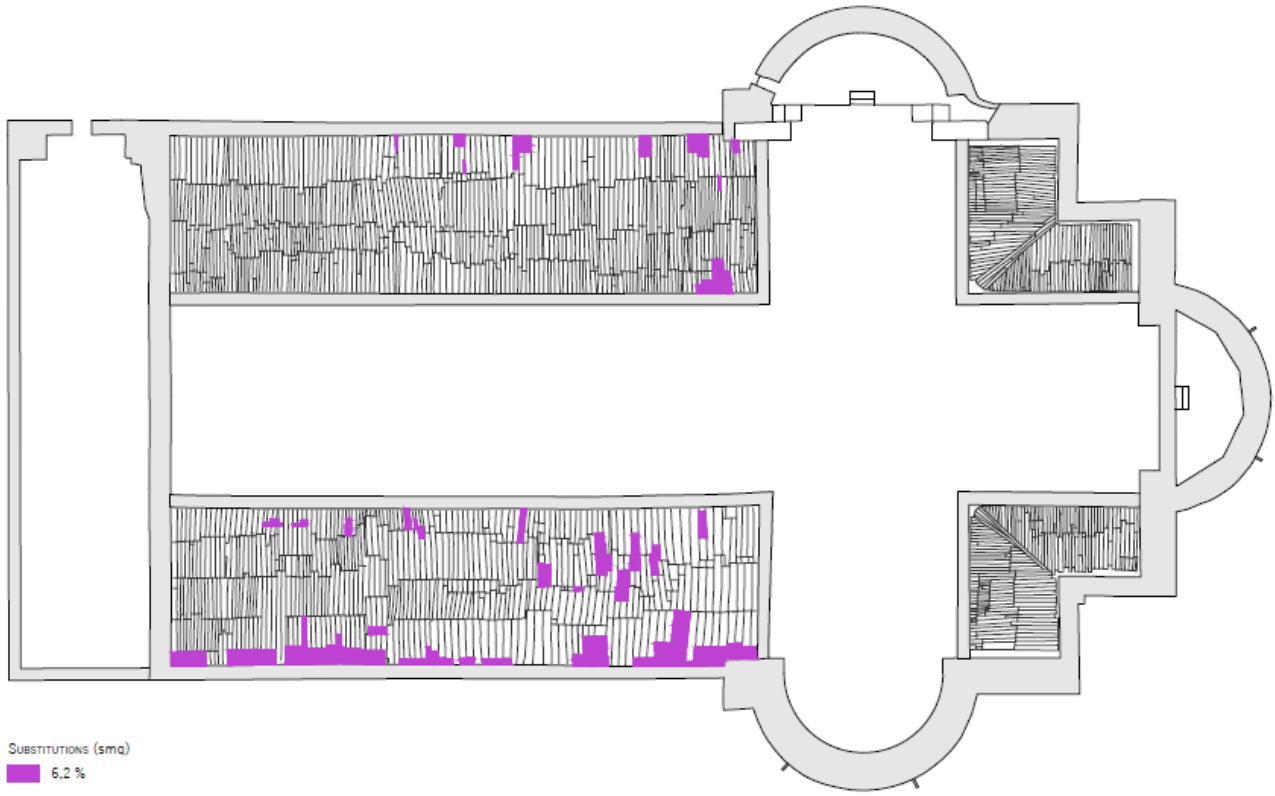

Figure 9: Replaced boards in lateral naves and corners.

Even more difficult it was to identify the date of previous interventions on the lead sheets of the covering structure. In this case the interventions of replacement have followed over time with even greater frequency and, most of the times, without leaving any historic record of the intervention made. But, unlike the wooden structures, most of the lead sheets were seriously damaged and far below any acceptable standard of reliability, so as to make advisable their total replacement. Before their removal, however, all sheets were marked and a detailed plan of their location within the entire covering was drawn. Moreover, after the removal, the sheets and most of the nails used for connections were stored in appropriate spaces.

It must be underlined that the roof was covered by a lead sheet dated back to year 1672 AD with a layer of bitumen applied to year 1990 which is not suitable any more to guarantee the waterproofing of the roof. In fact, in occasion of the rain, the water leaks from the roof through the areas not covered any more by the bitumen due to the existence of holes in the lead and along many intersection lines between roof and wall, which is definitely could not be repaired and has to be replaced totally. Also it is worth mentioning that the average thickness of old lead sheets is 3.5 mm but in some parts it is nearly 7 mm which definitely was applying unnecessary weight on the timber structure. The new roof is lighter, introduces horizontal stiffening considering possible seismic excitation and also it provides a gap in between layers for natural ventilation.

The composition of the new roof covering, described in the last Report “Answer to the request for specifications addressed by ICOMOS to the State Party” dated July 2014 submitted to WHC meets all requirements of functionality; and at the same time allows preserving the external appearance of the original roof. Moreover, this new covering, strongly connected to the wooden trusses below and the additional steel connections between such trusses and masonry walls allow to transfer most of horizontal seismic loads to the shear walls, so as to reduce considerably the seismic vulnerability of the whole building.

Regarding the windows, in many cases the wooden frame of the windows was not well anchored to the wall due to the mortar detachment also from the openings between the wood and the wall thus, the rain can enter the church, creating dangerous conditions for the internal mosaic. Also it was observed severe fungal decay in most of the wooden windows placed at the high level and the grey paint was often detached from the wood. The windows are not considered ancient, as this is obvious from the type of the method of hinges and handles so the decision was to replace all windows with new ones to be manufactured from a good wood. The new windows are made of cypress wood coated with a dark brown color, with double glasses of UV protection, window rubber seals and weather proof.

The restoration of the roof was completed in March 2015 (Figure 10) with the positioning of the new windows (Figure 12), a new life-line (Figure 13) and new crosses (Figure 11).

All technical checks which were carried out to verify the water resistance of the new roof covering had been successful. Moreover, the rainfalls which had occurred since the completion of the roof had left no traces inside.

Figure 10: General View of the completed works

Figure 11: New crosses installation

Figure 12:View of the completed windows

Figure 13:Installed life line at the roof

2.2.2 Narthex Restoration Works

This section presents the answer to the following corrective measure:

- Undertake the roof repair project, including stabilizing the vaults of the Narthex, and document its interventions. **Time Table: June 2016**

The roof repair project is clearly and exhaustively illustrated in the previous submitted SOC report in February 2015 and briefly reported, in its main features, also in Section 2.2.1. Therefore, the reader is kindly invited to refer to the previous Report for details and in particular for guidelines, criteria, and choices that have led the project throughout its evolution until its completion.

In this Section 2.2.2, the main characteristics of the intervention of restoration in the Narthex are described.

Very little is known about the history of the transformations of the Narthex since its construction. The Narthex that we see now, or at least that we can imagine on the basis of the actual volume and of the traces of some ancient, still visible openings on the walls, replaced in the second half of the sixth century AD a larger cloister of the former Church built by Queen Helena, mother of Emperor Constantine. From the archaeological excavations made in the thirties of the last century by R.W. Hamilton [1] and the studies that have followed [2] it was possible to go back to the original form of the Narthex that, unlike as it is now, was composed of a single volume, had in the wall facing the square a front door flanked by two smaller side doors and two windows placed symmetrically to the front door, Figure 14.

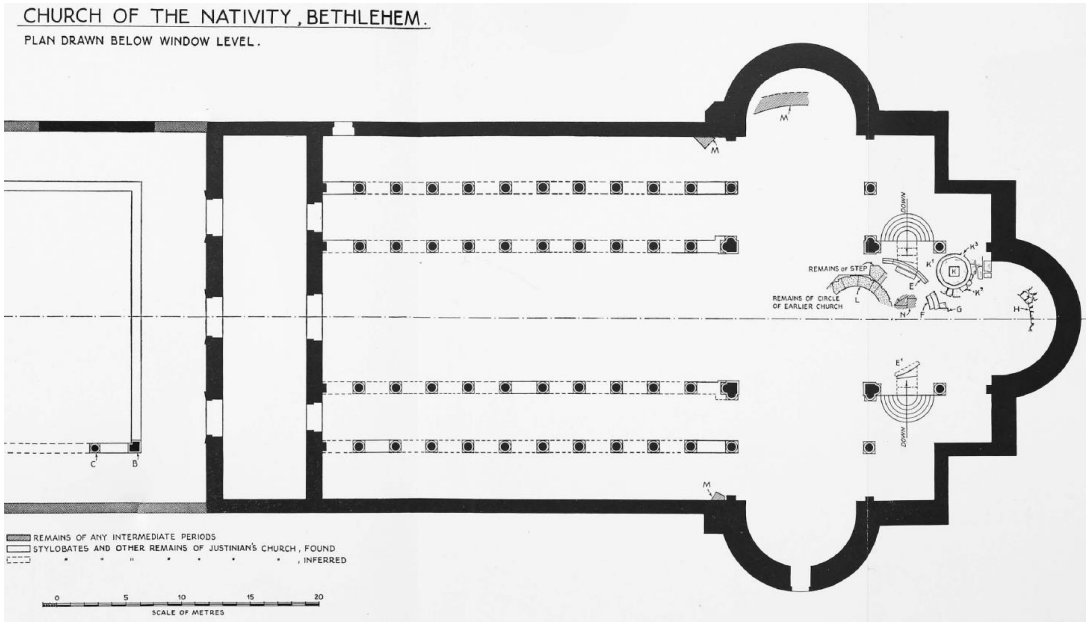

Figure 14: Original Narthex of the Church of the Nativity

From some traces found in the walls during the restoration works still in progress, it was possible to deduce that the original roof of the Narthex was made of timber, with a single pitch, as in almost all the early Christian and Byzantine basilicas with Narthex. The typology of this wooden roof is still unclear, although the traces left on the walls suggest that it was a series of simply supported beams arranged according to the slope of the roof. Anyhow it was a light roof. Over the centuries, especially during the middle Ages, the Church increasingly took on the appearance of a fortress equipping itself with walls and towers for defense. Some traces of these additions are visible today even in the Narthex, in particular in a small protective wall above the front wall and in two thick interior walls, perpendicular to the front, that probably formed the basis of two outer towers, Figure 15 and Figure 16. Probably, in order to allow these transformations for protective purposes the original timber roof was replaced by a system of masonry cross vaults and some openings were infilled or reduced in size. The two orthogonal interior walls are made of lower quality masonry than that of the original walls and are not clamped to the façade walls of Narthex and Church.

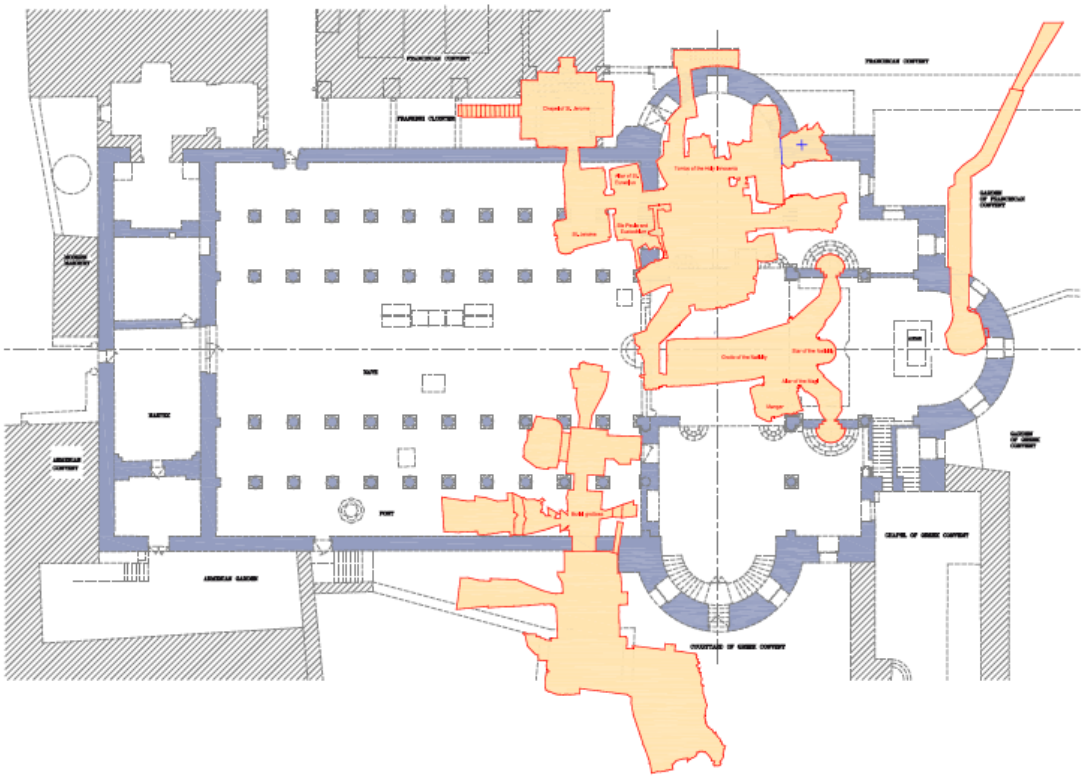

Figure 15: Plan of the Church with the current Narthex

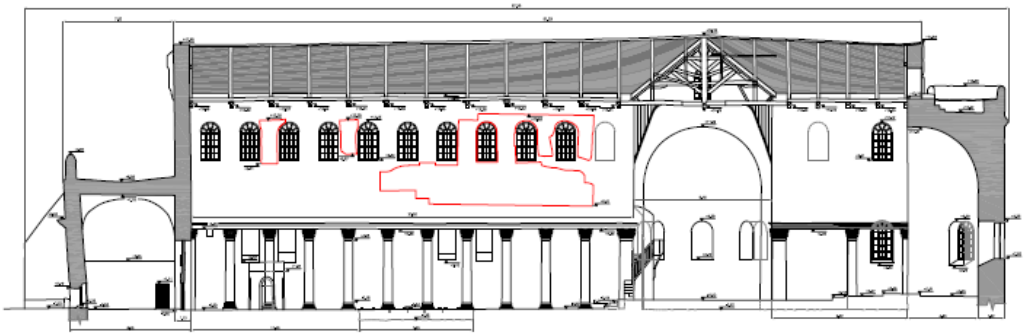

Figure 16: Longitudinal section of the Church

Also the vaults, made of irregular and roughly cut stones are connected to the façade walls of both Narthex and Church only in correspondence of the corbels at the base of the arches and for a height of about 1,10 – 1,30 m. Instead, such vaults are well connected with each other in the direction North-South by means of arches, orthogonal to the façade and built with greater and more regular stones; such stones have two different lengths which alternate so as to allow a greater clamping with the vaults. Also the diagonal arches of the vaults are made with more regular stones, although not as the ones of the arches mentioned before. The thickness of the vaults is not constant everywhere and it varies between 35 – 40 cm. Before starting the restoration the space between the external paving and the extrados of the vaults was filled with sand and remains of a medieval paving. Some inspections made on site have shown that the walls of the Narthex continue downwards with a constant thickness up to a depth of 94 cm from the floor; they have an enlargement of 20 cm on each side up to a depth of 141 cm and then they continue with a compact layer of stones and mortar for other 150-165 cm before reaching the bedrock. The two side walls of the Narthex are 1,00 m thick and have an inner core of undefined thickness; the façade wall, like the façade of the Church, is 1,15 thick, made of regular stones and with limited or null inner core. On the North and the South the

Narthex is connected for centuries with the monasteries of the Franciscans friars and the Armenians priests respectively Figure 15, which, together with the Greek-Orthodox priests, manage the activities in the Church according to the current status quo. On the external front facing the Manger Square there is a big buttress probably built after the XVI century AD : some drawings by Fr. Bernardino Amico [3], dating back to 1609, shows in fact the facade of the narthex still without the buttress Figure 17.

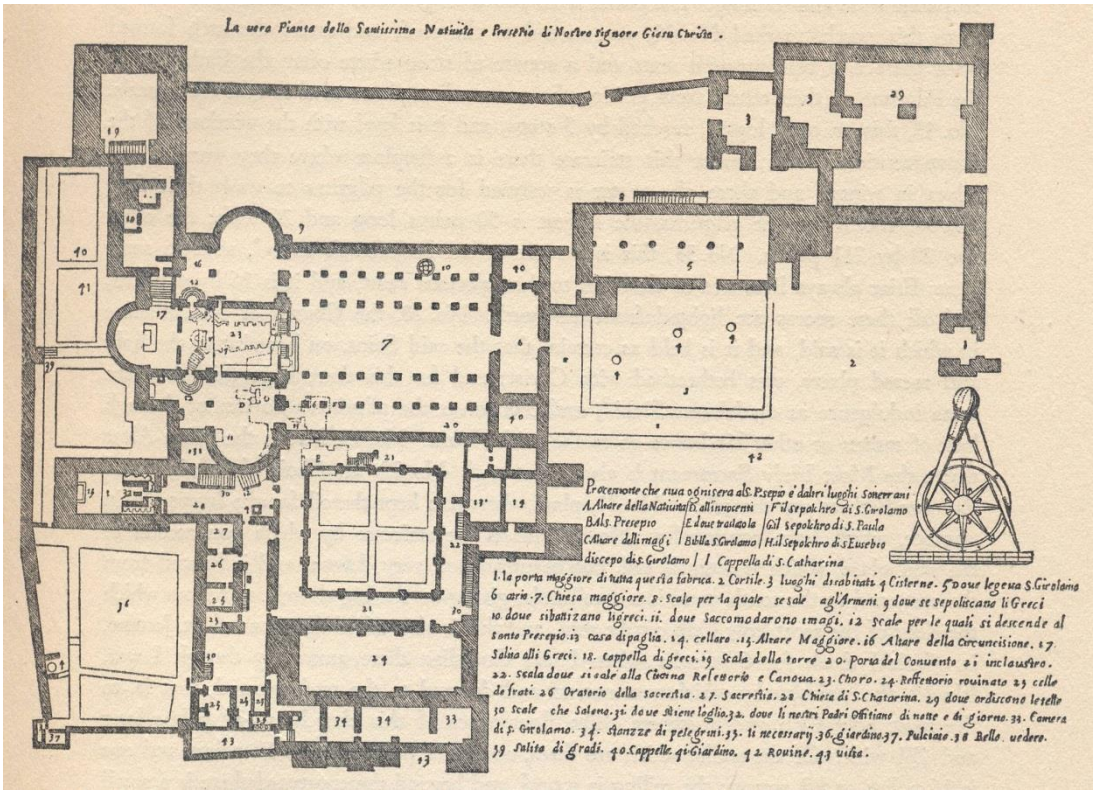

Figure 17: Plan of the Nativity Church (1609)

The structure of the Narthex is today strongly deformed. The façade wall exhibits a rotation towards the Manger Square more pronounced in the middle and starting approximately from the lintel of the door of Humility, about one meter above the ground. In consequence of this rotation, the façade wall has undergone a maximum horizontal displacement at the top, approximately in the middle of the free part of the wall, of about 40 cm. It is a very high value when compared with the height of the wall, about 10 meters measured at the top. If some fractures have occurred in the past, these are now closed due to local interventions of cleaning and consolidation made over the centuries, which shows that the damage evolution is now over and that it was probably over even before adding, from the sixteenth century AD, the external buttress which is still perfectly vertical. The façade of the Church, opposite to the one of the Narthex, exhibits a light out-of-plane deformation which starts from the roof of the Narthex and achieves 10 cm at the top of the tympanum. In consequence of the rotation of the façade of the Narthex the cross vaults, in particular the three most internal, have lowered in the central zones, detached from the façade walls and cracked both at the extrados and the intrados. Especially the central vault, propped since the thirties of the last century AD, exhibits detachments of 17-19 cm from the Narthex façade and 10-11 cm from the Church façade. Moreover big cracks, parallel to the façades, are visible at the extrados Figure: 18.

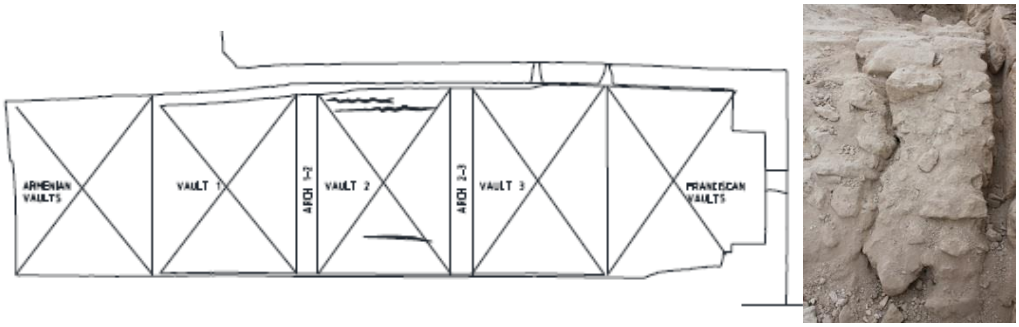

Figure: 18: Cracks at the extrados of the central vault

The arches connecting the vaults to each other and also the ones along the diagonal planes of the vaults are strongly deformed. The causes of these damages have never been clarified. The replacement of the original wooden roof with a system of thrusting masonry vaults, probably gave a significant contribution to the rotation of the façade towards the Manger Square. It is believed, however, that such thrusts alone cannot have been able to cause maximum horizontal displacements as large as those measured. Therefore, because Bethlehem is in a seismic area, which over the centuries underwent several earthquakes, some of them even severe, it is very probable that a seismic event, probably occurred from the XVI century AD onwards, was one of the main causes of damage. The external buttress, added in the last centuries as mentioned above, shows no sign of rotation or differential vertical displacements.

The intrados of the vaults, which had suffered also water infiltrations because of the numerous cracks and gaps and also for the absence of any maintenance at the extrados had been propped in the central part during the British Protectorate. Before the beginning of the restoration works however also the two adjacent cross vaults were propped for safety reasons (Figure 19 & Figure 20)

Figure 19: Central propping

Figure 20: Lateral propping

<u>The following main criteria are at the basis of the structural project:</u>

1. **The existing medieval cross vaults, although cracked, partially detached from the walls and made of roughly cut stones and poor quality mortar, are preserved. However they will bear only their self-weight.**
2. **As a consequence, all the unnecessary filling material is removed.**
3. **A steel structure bears the new floor and connects the two opposite façades to improve the seismic response of the whole structure**
4. **For greater safety, the vaults are connected to the overlying steel structure by means of thin tie rods which enter into action only in the event of incipient collapse**

The works have started with the removal of the existing floor and of the filling material. All tiles, although quite recent and missing in large portions of the floor, were numbered and stored. Traces of a previous medieval floor, made of a conglomerate of lime mortar and small aggregates, were found.

Among the filling material many other archaeologic remains were found, like original tesserae of the internal mosaics, pieces of stone decorations and crockery. Everything was inventoried and stored.

The actual restoration works were preceded by an accurate campaign of on-site investigations on the quality of masonries and mortars in walls and vaults, and on their state of conservation by means of visual inspections, thermal camera, sonic tests, and analyses in the Lab.

The investigations included also the analysis of the foundations and of the quality of the subsoil.

The on-site analyses on masonries have allowed to know the position of the original openings (doors and windows), later closed, parts of masonry re-made over the centuries, the presence of some internal voids, the internal composition of the walls (only stones or masonry with internal fillings), areas weakened by the occurrence of some cracks or by the decay of the material properties of the masonry. Moreover, tests on site and in the Lab have provided useful information on the material properties of mortars, stones and masonry that have been used to design the intervention of consolidation of the vaults and for the numerical simulations. Wherever necessary, stones, masonries and mortars joints have been consolidated before any intervention on the vaults.

The vaults are reinforced at the intrados by using a consolidating mortar injected into the vaults though predrilled holes (Figure 21). Moreover a net of glass fibers immersed in a cement matrix is applied to the extrados. The use of masonry reinforcement system with glass fiber mesh, carbon and basalt, put into inorganic concrete matrix, is one of the latest and the most innovative system of reinforcement and consolidation about masonry both vertical and horizontal (arches, vaults and floors generally).

Unfortunately, the achievable mechanical characteristics improvement of the masonry with injection and grouting have a small effect on arch stability geometric checks which remains very close to the collapse condition. To avoid this, additional safety margin other than those relating to the walls consolidation was a must to be introduced. The design also considered seismic improvement to the structure; in this context a significant improvement is already obtained with altitude masses reduction due the filling elimination. In order to improve the structure seismic behavior, extrados tie beam was included with the aim of reducing the vault stresses on the perimeter walls. Also a steel ring beam was designed to bind the Narthex perimeter walls while the roof, made with lightweight plate and lightened concrete, will be placed on metal beams, which in turn load the frontage walls of the Church and of the Narthex, in order to further reduce masonry stresses.

Additional system was also introduced as an extra safety for unexpected and unpredictable events. It is a system of hanging of the vaults that can support these ones also if we are in presence of a total structural failure. The system consists of a series of threaded rods connected to the metal structure of the roof slab that, passing into the interior of the vaults, are connected to them at the intrados with metal plates hidden in the plaster.

The same treatment is applied to the intrados (Figure 22)

Figure 21: Consolidating mortar

Figure 22: net of glass fibers immersed in a cement matrix

The new steel structure covers only the three central spans, or vaults, and consists of four main beams, above the stone arches bearing the vaults, and ten secondary beams. They all rest on the two opposite facades and are interconnected by a steel curb placed along the perimeter (Figure 23, Figure 24, Figure 25)

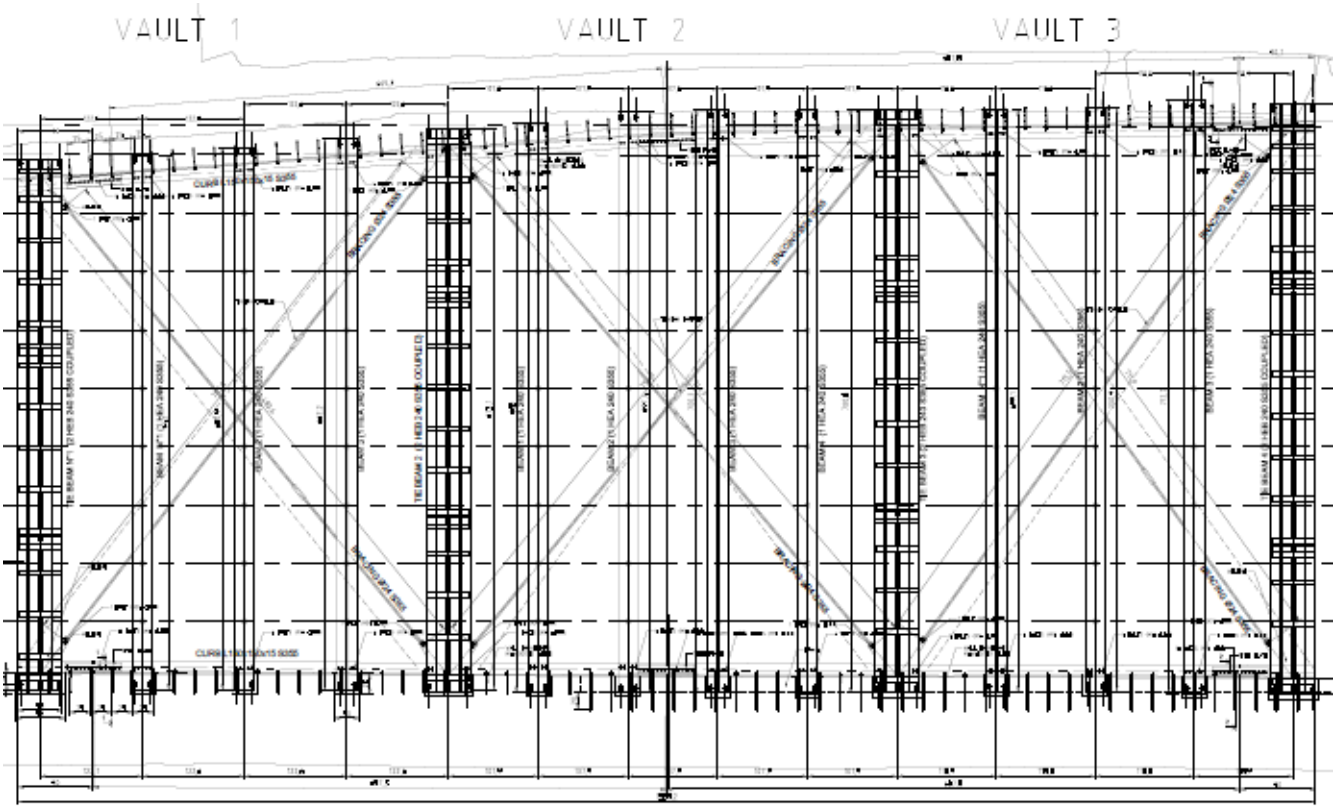

Figure 23: Plan of the added Steel structure

Figure 24: Beams connecting both facades

Figure 25:Bracing system

Both types of beams are also strongly connected to the façade walls by means of couples of inclined bars. The longest ones, in correspondence of the main steel beams, transfer the thrust of the stone arches to the beams above and transform this thrust into stabilizing vertical loads on the masonry walls. The connection between the two façades, by minimizing the differential horizontal displacements in the E-W direction, will reduce considerably the risk of collapse of the whole structure in the case of an earthquake (Figure 26).

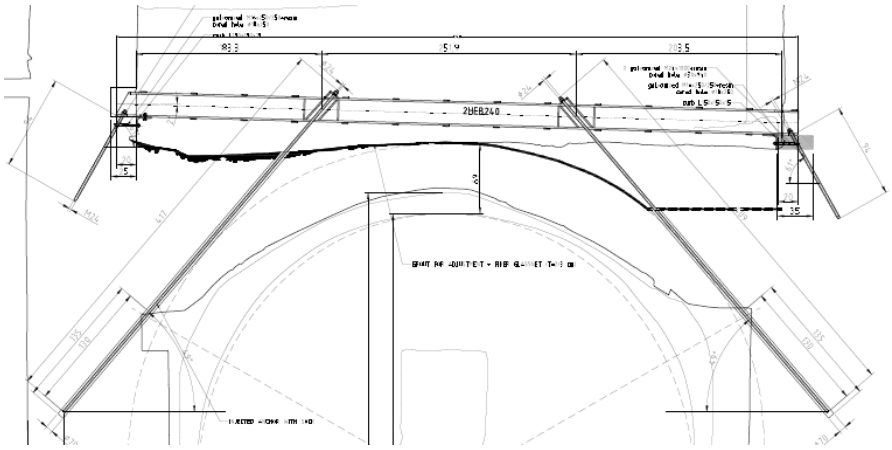

Figure 26: Cross section showing the anchoring system

The vaults are also connected to the intrados of the beams by means of vertical thin tie rods which, as said before, should prevent the occurrence of a collapse of the vaults for some uncontrolled and unexpected causes. Therefore this connection is a further security measure in addition to the actual seismic reinforcements, i.e. Consolidation of the vaults, reduction of horizontal differential displacements, reduction of the arches' thrust (Figure 27,Figure 28,Figure 29).

Numerical simulations with 3-D FEM models were carried out and advanced nonlinear computer codes were used to check the stability of the Narthex and the stability of its structural components before and after the consolidation, under static and dynamic loads. All numerical checks have given satisfactory results (Figure 30,Figure 31,Figure 32)

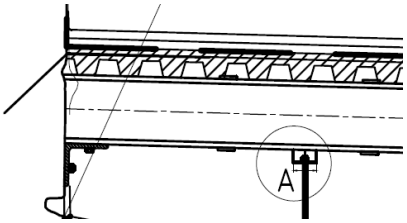

Figure 27 Section in the Deck Slab

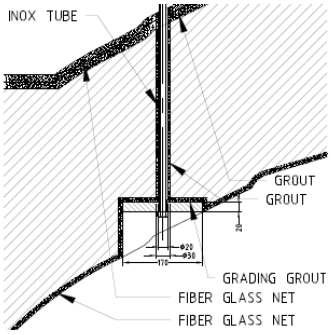

Figure 28 Bottom Plate of the hanging system

Figure 29 Hanging rods

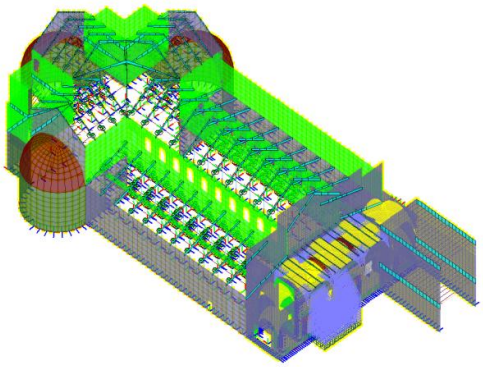

Figure 30 3D structural model for the entire Church

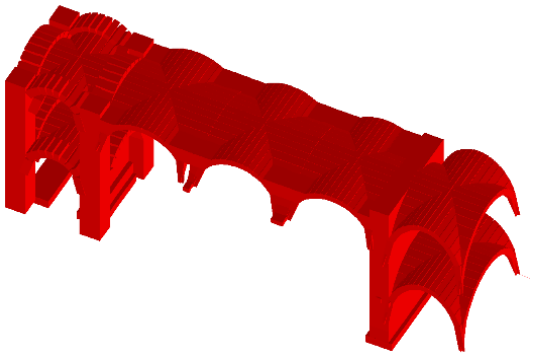

Figure 31: 3D structural model for the vaults

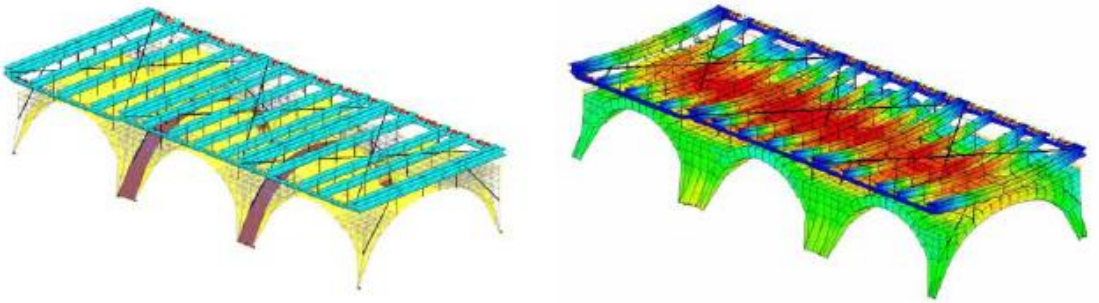

Figure 32: stresses on the structural system and the vaults

References

[1] Hamilton R.W. (1934). Excavations in the Atrium of the Church of the Nativity, Q Depart Antiq Palestine 3 1–8.

[2] Harvey W. (1938). Recent Discoveries at the Church of the Nativity, Bethlehem, Archae-ologia 87 7–17.

[3] Fra Bernardino Amico (1609). Trattato delle piante et imagini dei sacri edificii di Terra Santa, Franciscan Press, Jerusalem 1953

[4] Bacci M, Bianchi G, Campana S, Fichera G (2012). Historical and archaeological analysis of the Church of the Nativity, Journal of Cultural Heritage 13, pp. 5–26.

[5] Alessandri C, Mallardo V. (2012). Structural assessments of the Church of the Nativity in Bethlehem. Journal of Cultural Heritage 13, pp. 61–69.

2.3 Completed and on-going of other restoration works

2.3.1 Stone Wall

The work on the stone walls was limited to the two corners and the lateral naves facades prior implementing the new proposed lead roofing in order to avoid any damages during stone restoration works at those areas. The works were started on July 2014 which included; cleaning works, replacing the cement pointing with lime pointing and stone substitution where the existing stones already eroded or severely deteriorated.

This work was completed in October 2015; the rest of the stone facades restoration works have been postponed to concentrate on priority tasks while waiting for other funds.

2.3.2 Plasters

The restoration works on plaster started in June 2014 with the thermographic survey which was made to check the existence of mosaics under the plasters. Then a survey of the state of conservation was performed which was highlighted; by means of suitable mappings, the damage pathologies and the modifications over time.

The plastered surfaces dating back to the XIX century AD were affected by an incoherent and partially coherent, superficial deposit of atmospheric particulate also due to the redeposit of the material carried by the percolation of rainwater coming from the old roof, on which it was possible to see the leakages. Other principal deterioration morphologies are the complete detachment of one or more plaster layers or of the whole plastering layers. In addition a phenomenon of salt efflorescence was detected.

Accordingly, for each surface, different types of interventions have been defined and shop drawings for the restoration works have been prepared, which included the consolidation of the existing plastering layers, replacing the cement patches with a lime plastering and filling the damaged or missing parts of the plastering layers. Special mortar of lime base with high porosity will be applied to the areas of possible high humidity.

Visual interference reduction of the plaster surface in the presence of abrasions, shooting gaps, stains, and / or discontinuity of old paints made from milk of lime with water colours will be applied to all plastered surfaces.

The plastering restoration work is expected to be completed by mid of 2016.

2.3.3 Wall Mosaics

The restoration works on the wall mosaics started in March 2015; a group of specialists in mosaics started the survey of the wall mosaics in the nave and performed preliminary evaluations and tests. During the survey, a new fragment of angel on the north wall between the fourth and the fifth window was discovered.

The wall mosaics, or at least what remains of the ancient mosaics covering the surfaces of nave and transept, were made mostly in the XI-XII century AD and show clear signs of physical and structural decay. Mappings of the different types of decay were made with reference to; detachment from the masonry support, organic coherent deposits, incoherent deposits, lacunae with or without synopia, filling with gypsum and cracks.

The preliminary cleaning works on all mosaics of the central nave is completed as well as considerable progress was made in their consolidation. The mosaic restoration in the nave is expected to be completed by the end of year 2015 whereas the one in the transept by mid of year 2016.

2.3.4 Restoration of the three terraces (the two transepts and apse):

The works aims to insure a perfect waterproofing system to prevent any water leakage that could reach the restored plaster inside the church. The works includes the dismantling of the existing stone tiles after numbering preparing for re-installation in the same location after the completion of the waterproofing layers.

2.3.5 Basilica Doors

2.3.5.1 Narthex eastern wooden door

The restoration works for the narthex eastern wooden door started in June 2014 by performing high-resolution digital photographic documentation and diagnostic research. They continued with a careful consolidation and a treatment process carried out by wood restoration specialists.

During the works, a major finding was made as the original upper part of the door on the eastern side (internal side of the Church) was hidden by wooden boards. On the west side the restoration allows to fully appreciate the beauty of the original marquetry. The work was completed in December 2014 and both visitors and pilgrims can now admire the door in its original form.

2.3.5.2 Wooden and Iron Doors of the Basilica and Narthex

The works included the restoration of the humility iron door; narthex southern iron door; lateral nave northern iron-wooden door; lateral nave southern iron door and lateral nave north iron window. The surfaces showed in many cases erosions and exfoliations due to the oxidation of the iron and degradation of the wooden elements of the lateral nave northern door. The restoration process included accurate photographic documentation, before, during and after restoration, tests execution for the various phases of the operation, stratigraphic tests for identification of the finishing coats sequence of the varnishes, mechanical removal of incoherent deposits, chemical removal of superficial coherent deposits, treatment aimed to stop the oxidation and to protect metallic surfaces, visual and aesthetic interference reduction of the surfaces and protective surface treatment as final operation of the restoration. The works were completed in March 2015.

2.4 Future restoration Phases

The following proposed restoration works will be implemented as part of the master plan for basilica restoration which is based on the comprehensive restoration works.

2.4.1 Architrave (Trabeation)

Trabeation is located above the capitals of the columns and under the walls separating the two aisles, both on the North and South side and along the whole aisles. Considering their position, such architraves play an important structural role, because of the role it plays in bearing the weight of the masonry above. They also have a great value because of the inlaid works still visible nowadays. Sophisticated analyses prove that they date back to the VI century AD.The diagnostic survey in 2010 evidenced two decay problems in the architraves: one located in the North side and the other in the South side.

2.4.2 Capitals and Columns

The capital and column surface is uniformly affected by an incoherent and partially coherent, superficial deposit of atmospheric particulate, while cracks, micro-cracks and lacks appear in specific places, previous interventions – which is not appropriate - for restoration consisted of filling with mortar, stone reconstruction of missing parts by using the same constituent limestone and repainting of the carved stony capitals.

2.4.3 Paint on Columns

After the restoration of capitals and architraves, intervention plan is to continue with restoration of the stone columns. Coherent and incoherent deposits will be removed, the surfaces cleaned and the unsuitable fillings replaced by more appropriate fillings. In the end the paint films will be consolidated and subjected to proper interventions of restoration.

2.4.4 Stone Floor

The stone floor surface is affected by an incoherent and partially coherent, superficial deposit of atmospheric particulate. In the basilica there are cracks and lacks, while in the north transept area some marble slabs appear widely cracked due to the anthropic damage.

2.4.5 Floor Mosaic

The restoration works will include the removal of superficial incoherent deposit from the mosaic surface, blocking of loose tesserae, pre- consolidation of the tesserae and of the bedding mortar followed by the consolidation of preparatory mortar layers. The disinfection and the removal of unsuitable fillings will be applied. Each phase of restoration will be documented by graphic and photographic documentations of the works.

According to the archaeological investigations carried out in the twenties of the last century a considerable part of Constantine's floor mosaics are still present under the floor of the nave. The idea of exposing the extraordinary mosaic floor still hidden below the modern floor is currently under evaluation in order to make the hidden mosaics visible to visitors and scholars especially in the nave where a suitable glass floor specially designed to replace marble slabs and wooden covers.

2.4.6 Lighting, Microclimate and Smoke detection systems

A new study and assessment took place in May 2015 for preparing designs for Lighting, Microclimate and Smoke detection systems. The study included the preliminary locations of the main cable ducts to run the necessary cables, number and position of the microclimate sensors (Lux, UV, CO2, CO and Temperature), linear smoke detection barriers and optical fiber, type and location of lighting system) in addition to the definition of the communication strategy among devices (wireless-wired).

2.5 Management Plan for the World Heritage Site

The first priority for preserving the World Heritage Site in Bethlehem is preparing the management plan, because the property is one of the most unique places on our world; that is for sure the range of unique cultural features and Outstanding Universal Value that it contains. The site provides a mean of passing on the world's unique cultural heritage values to future generations, which needs to be protected and cared for responsibly.

In accordance with the Operational Guidelines issued by the World Heritage Committee that all States Parties have adequate management frameworks, a documented management system and appropriate legislation in place to protect the World Heritage Site.

This plan will provide a framework for the proactive management of the site, helping to ensure that its Outstanding Universal Value will be sustained and preserved for future generations.

Moreover, Bethlehem Municipality has been working diligently with all stakeholders; Ministry of Tourism and Antiquities, The Presidential Committee for the restoration of the Church of the Nativity and the Centre for Cultural Heritage Preservation, in order to control diverse issues associated with the "Site";

The management plan will include:

- Legislative, and contractual measures for protection.
- Boundaries for effective protection.
- The Buffer Zone, and management system.
- Sustainable use
- Outstanding Universal Value of the property and its authenticity and integrity.
- The information on the state of preservation , potential threats , monitoring , science and research, financial resources, the number of employees and their qualifications , participating institutions , training offers, awareness raising and promotional efforts , numbers of visitors , visitors guidance , as well as tourism and traffic concepts.

It is worth noting as a first step forwards that a guidelines were delineated by Centre for Cultural Heritage Preservation in order to prepare the plan. Constantly with the recommendations of the Heritage Unit meeting that took place in the Municipality in August 2015, that all stakeholders who are currently involved in the project should prepare the activities under the supervision of the Centre that is the coordinator for preparing the plan.

Unfortunately, there are many challenges and obstacles hindering the development of implementing the Plan. mainly preparing the Plan needs various activities such as carrying out real and updated surveys, studies of the Site, all the above are steps that require specialized skill in the various field, efforts, qualified human resources and funding, some of these resources are not accessible to the Municipality, as well as a financial international assistance was requested by the Ministry of Tourism and Antiquities and Municipality from the World Heritage Centre to complete the mission of finalizing the management plan.

The work on it shall commence as soon as the fund are secured for the work.

In summary, Management plan for World Heritage Site is therefore a tool to protect the property improving communication, monitoring and evaluating management activities. Most of all, helps reduce and even overcome conflict, by enabling local people to understand and become more involved in the management of the "Site", it is also a useful instrument to help State Party implement the World Heritage decisions smoothly, as a result all the efforts are focused on the commencement of the plan

3 Implemented Conservation issues identified by the State Party

Currently, Bethlehem Municipality striving with all the stakeholders involved in the World Heritage Site (mentioned before) to secure a high level of protection for the property and controlling all the issues related to the "Site ".

The following deliverables demonstrate the actions that took place for the conservation of the "Site":

3.1 Addressing the interventions within the Buffer Zone and the immediate vicinities.

Bethlehem Municipality has undertaken a step towards the fulfilment of the World Heritage Committee decision. The first step of protection is delineated to conserve the physical expression of the Outstanding Universal Value, integrity and authenticity inside the Property, especially against the external threats, as well as the unsystematic expansion of the building. However, the Municipality commenced working with the ratified "*Regulatory Bylaws for the conservation of the Historic Centre in Bethlehem and the individual Traditional buildings* "; simultaneously the establishment of the Heritage Unit in the Municipality. All the construction and conservation works are controlled by various charters that provide a framework for the proposed interventions those directly associated with the secure of the architectural attributes and urban fabric of the historic town.
It's worth mentioning that these Bylaws were welcomed by the World Heritage Committee in its session no. (39COM7A.28) in 2015.
The future actions include "Regulatory Bylaws "for the Buffer Zone for a 70- meter wide that surrounded the same boundaries of the historic town , in order to ensure adequate impact for the historic town, and to achieve the different required levels of protection.

The work on this project will commence immediately after the funds are secured.

By the completion of these Bylaws Bethlehem Municipality will be able to manage all the interventions within and out of the Buffer zone, and will put an end for the growth and future negative expansion that will mostly arranged the historic fabric, and ensure proper conservation for the Heritage Site.

3.2 Improve access to services within the historic town of Bethlehem.

Under this category many projects were conducted in order to provide facilities for the inhabitants and the visitors in the city, and contributed forward to conserve the significant attributes of the historic town.

These accomplishment are included:

No.	project	Description	Completion date	Donation
1.	**Rehabilitation of the Morcos Nassar stairway**	It is a link between an area specified for the southern public transportation and Anatreh Street that located near the Church of the Nativity and provides a network for the inhabitants and also visitors.	May,2015	Swesish international Development Cooperation Agency (Sida) through UNESCO office in Ramallah.

3.3 Preservation of Cultural Heritage resources

In order to meet the requirement of the modern life style, many projects were conducted by Bethlehem Municipality and the involved stakeholders; these resources are considered an important tool for the economic and social development.

These activities included:

No.	project	Description	Completion date	Donation
1.	**Rehabilitation of Bethlehem Old market (phase I)**	Rehabilitation of the public space located within the historic town that provides the locals with adequate services. The project included maintenance of the infrastructure and control the services provided by the Municipality to the inhabitants.	September,2015	American Near East Refugee Aid (ANERA)
2.	**Rehabilitation of the Syriac hosh**	A traditional complex adapted as a hotel located in the heart of the historic town within pilgrimage Route. In order to revive the abandoned buildings, the rehabilitation works included minimum intervention that respected the authenticity and the setting of the site. This project contributed toward the conservation of the physical attribute of the buildings that are enhancing directly to the revitalization of Pilgrimage route.	January,2015	Palestinian Municipalities Support program (PMSP)
3.	**Rehabilitation of Qattan Square**	Rehabilitation of an open space located within the historic town that contributed to provide the local inhabitants with a public garden.	October,2015	United State Agency for International Development(USAID)
4.	**Rehabilitation of the Manger Square**	This comprehensive project aimed to make the Manger Square more accommodating to the needs of the locals and tourists , it encompassed	December,2015	Consolidated Contractors Company

	(phase II)	rehabilitation of the Bethlehem Municipality and the Peace Centre buildings that included; cleaning and greening the roof, installing special lights for the facades surrounding the manger square; cleaning the manger square tiles, lighting the square and the surrounding buildings by special lights that enhance the authentic values and the visual impact of the Site, and installing electronic sign boards for visitors that enhancing the easier orientation within the property. Also installing hydraulic garbage containers that enhancing proper environment for the Site.In addition to the Rehabilitation of the exit square near " Afteem Falafel Restaurant " to facilitate access for the pedestrians to reach the Manger Square and providing road for vehicles coming from the Star Street. Moreover, rehabilitation of the open spaces and the stairway (behind the Bethlehem Municipality old building). This project provides proper access to the inhabitants and the visitors to reach the Manger Square from the Wadi Ma'ali quarter. This project included minimum interventions that respected the values of the World Heritage Site.		(CCC) through Bethlehem Development Foundation

4 Future issues identified by the state party

4.1 Rehabilitation of Star Street "Pilgrimage Route"

(See annex 16)

4.1.1 Introduction

Star Street-is a very significant historical street in Bethlehem. Located in the eastern end of the traditional Route from Jerusalem into Bethlehem leading to the Church of the Nativity. It is believed that this is the way Mary and Joseph were coming to Nativity Grotto in Bethlehem. To commemorate this happening, all Christmas processions follow this street in their way to the Church of the Nativity.

4.1.2 Current Condition of Street and Revitalization Project

In 2012, the Pilgrimage Route was inscribed on the World Heritage List due to its Outstanding Universal Value, that is directly associated with the Birth of Jesus. This Route includes buildings that testify to the significant and breathtaking style of architecture.

Most of the commercial shops within Star Street are currently closed and neglected by their owners. This development began with the outbreak of the Al- Aqsa Intifada at the end of the year 2000, which had a severely adverse impact on the infrastructure and the urban fabric of the historic town, and was further exacerbated by the current economic crisis. As a result, most of the shop owners along Star Street closed their property to invest in other places, a development that has converted Star Street into a ghost street. Today, it is merely a road that lets vehicles reach their destinations and allows for inadequate parking.

Bethlehem Municipality vision is to attract the inhabitants to reopen their neglected property residences and shops, also the stimulation of tourism hoping to increase the time they spend inside the heritage town while simultaneously aiming to revive other interesting sites that exist within walking distance of the Church of the Nativity. In order to convert the street into a place vibrant with activities and relevant facilities, as well as to boost the flow of foreign cash

in the city that contribute forward to rise the standard of living for the inhabitants as well as to preserve Palestinian Cultural Heritage resources, protect their identity, and improve the quality of life for the Palestinian people.

To achieve this vision Bethlehem Municipality established an Advisory Committee in close cooperation with the Ministry of Tourism and Antiquities, Ministry of Local Government, the Centre for Cultural Heritage Preservation and local presentative of technical local sectors. The main purpose of the Committee is to ensure that the project proceeds as smoothly as possible. A follow up provides proper advice in diverse issues relevant the project; this will require engineering experts that follow up the project. Therefore, the Municipality appointed two specialized experts in order to initiate their work simultaneously with the beginning of the project. Their main role is to follow up the monitoring and implementing of the different tasks related to the project, as well as preparing the periodic reports for an overall activities.

A step forward was taken by the Municipality and the Ministry of Tourism and Antiquities is opening an Information Centre in Star Street; and a local tour guide was employed. His primary role is to provide information and assist visitors in their tour in the historic town further information is provided to them through information panels located within the Route.

The Russian Federation has pledged a total budget of the equivalent of four million dollars over the duration of two years to address cultural heritage development at the levels of implementation of construction, repair, and revitalization work, raising of public awareness, research, and training.

The rehabilitation and revitalization of Star Street will divide in to three categories that encompass:

- Providing accessibility to Star Street.
- Conservation of build-up heritage.
- Providing services for the inhabitants and visitors.

4.1.3 Providing accessibility to Star Street.

The first layer of conservation is delineated to protect the physical and intangible expression of the Outstanding Universal value of the Site, while rehabilitation of the access associated directly with the Pilgrimage Route that contribute to revitalize the *Route* with inhabitants while simultaneously prevent traffic within the Route and meeting the requirement of the inhabitants within the historic town, by creating alternative trail for the vehicles.

This table shows the activities under this category:

No.	Activities	Brief Description
1.	Rehabilitation of Al- Wardieh street a stairway	These roads and stairways directly connect the Pilgrimage Route; the project aims to provide a pedestrian network for the inhabitants and the visitors, as well as contribute forward to reduce the traffic within the "Route" and to revive the walking trail inside the historic town, in addition to providing a proper environment for the neighborhood within the historic town. And to provide alternatives that enhance the revival of the Site. The works will include paving the existing roads and stairways.
2.	Rehabilitation of Al- Juljul street and stairway	
3.	Rehabilitation of the Orient Star Street	
4.	Rehabilitation of Hanania stairway	

4.1.4 Build-up heritage

The purpose of this category is to rehabilitate buildings and open spaces in order to adapt them for the use of the inhabitants and the local community who constitutes the major element that should be involved in the preservation of the cultural heritage resources. Minimum interventions should be done which respect the Outstanding Universal Values of the Site.

This table shows the activities under this category:

No.	Activities	Brief Description
1.	Rehabilitation of Dar -Ghazzawi	Rehabilitation the building will contribute forward to preserve the physical attributes of the Route. Adapting it based on the requirements of the local inhabitants who are the integral part of the developing historical buildings and the decision makers of the proposed function of the building considering that all the interventions must respect the authenticity and integrity of the Site.
2.	Rehabilitation of Bethlehem Municipality building	The building (constructed in 1976) needs a complete renovation and rehabilitation. In order to meet the requirements of the local community and the employees by facilitating services to them, taking into account minimum visual and physical impact that respect the setting of the Site.
3.	Rehabilitation of Star Street	The historic buildings and also the monuments within the Street suffer from deterioration and exacerbated by the lack of rest and green areas. Garbage bins and unifying the colors of the signs that contribute to provide environment for locals and visitors that respect the authenticity of the urban fabric of the heritage area.
4.	Rehabilitation of Wells	Most of the wells inside the Buffer Zone are abandoned and suffering from deterioration, so rehabilitation of ten wells will contribute to reduce the severity of the water crisis in the historic town , simultaneously removing the water tanks above the historic buildings
5.	Rehabilitation of the facades of the stores.	Rehabilitation of the physical condition of the stores contribute to conserve the integrity and authenticity of the buildings within the Route; most of the stores are abandoned by their owners; it converted the Route to a road for vehicles and inadequate parking area.
6.	Improvement of residential conditions.	Rehabilitation of the residences is an urgent need due to most of the building suffering from many problems such as humidity, cracks, salt efflorescence and growing of plants within the outer surfaces; these effect the integrity of the historical structure. These eliminate the external additions such as sanitary facilities and kitchens and will contribute to conserve the authenticity of the historical buildings.
7.	Preparation and Implementation of Management and Marketing plan for the Historic Town.	setting up a strategic plan that will ensure the proper management for the property that include • Developing Marketing Policies. • Promotional Activities. • Public awareness

4.1.5 Providing services

This category aims to provide proper services for both inhabitants and visitors in a more efficient manner, taking into consideration minimum intervention in order to conserve the Route that is enriched by significant and breathtaking architectural style of the building.

This table shows the activities under this category:

No.	Activities	Brief Description
1.	Rehabilitation of the sanitary facilities of the Peace Center.	Rehabilitate the sanitary facilities in the center to accommodate the requirements of the visitors and locals visiting the center.
2.	Installation of Interpretation Panels throughout the Property	The project aims at providing information for the visitors and tourists within the Street.

The rehabilitation and revitalization of the Pilgrimage Route involves a series of interventions to preserve the physical attributes of the World Heritage Site while developing the social, economic, and cultural environment in order to improve the quality of life for the local inhabitants who constitute the major part for developing the cultural heritage.

Modern interventions that adapt this site to the needs of today's living standards aim to simultaneously ensure the protection of the tangible and intangible heritage ideals of the historic landscape and the reviving of the historical and spiritual values that Star Street embodies. However, a preliminary heritage impact assessment was made by Bethlehem Municipality to evaluate the potential impact of proposed development and maintenance interventions on the Outstanding Universal Value of the World Heritage Site, and was submitted to the World Heritage Committee.

It is worth mentioning that the project will be submitted to the World Heritage Centre (WHC) for evaluation before its implementation according to the advice of the WHC.

4.2 Manger Square Tunnel & Manger Square Village "Multi-purpose parking and commercial building" (please see annex no.16)

In accordance with the World Heritage committee (*39 COM 7A.28, item 11)* Bethlehem Municipality has pointed out the adverse impact of the sharp increase in the number of vehicles and inadequate parking especially within the pilgrimage Route and the Manger Square.

Bethlehem Municipality has a vision of protecting the World Heritage Site for future generations, and also aims at accommodating the needs of the pilgrims and local inhabitants in a more efficient manner while respecting the Outstanding Universal Value of the Site.

The Municipality and the stakeholders have initiated studies to provide alternative solutions aim to convert the pilgrimage Route and the Manger Square from vehicles to pedestrian areas, this vision achieved through tow proposed concept ideas associated with each other; however the success of the commercial building and multipurpose parking depends on the sustainability of the underground tunnel, also funding is not secured for these projects.

The table displays the proposed projects under the category of free the Site from the vehicles:

No.	Proposed project	Brief description
1.	**Manger Square Tunnel**	The tunnel will start at the intersection leading to the Manger Square near the Peace Centre, and will end at the intersection leading to the Milk Grotto with length of the underpass segment is about 70m, some parts of the tunnel will be opened while and the others will be closed specially along the Nativity Square .It will have two lanes (width 3.5m each) as well as raised shoulders and small emergency lane (1.2m each), with a total Height of 4.5 m under the ground .the main aim of the project is to address the traffic congestions in the manger square and boosting the safety measurements for the pedestrians.
2.	**Manger Square Village**	The project will consist of ten floor multilevel complex, the bottom three levels (underground) will include automated

		parking facilities, and the other seven commercial levels include many facilities for both tourist and local community. This project aims to encourage locals and visitors from the manger square and immediate vicinities to flow into the proposed building that has diverse facilities. It's worth mentioning that the success of the project based on the establishment of the underground tunnel.

It is worth mentioning that concept ideas for these projects will be submitted to the World Heritage Centre for examination before the implementation.

4.3 Preparing the Comprehensive traffic and transportation plan for Bethlehem

Aims to find alternatives and detours in order to address the problem of urban pressure especially in the historic town and to ensure a complete conservation for the Site. Taking into account respecting the attributes of the critical Site, also securing safety measurement for the pedestrians.

This project needs to be strengthened by any adequate technical staff such as Transport Planners, Traffic and Civil Engineers, etc.in order to ensure that the traffic schemes are properly planned and implemented with better results.

However, rapid growth in population and economic and tourism activities increasing traffic and transportation problems due to the gap between demand and supply of transport system, In order to look for a solutions to the traffic problems, several studies should be done to reduce the trouble to an acceptable level .

The proposed budget for the project is about 250,000 €

5 Documents submitted to World Heritage Centre

- Restoration of the Church of Nativity – Bethlehem / Stage 1: Survey and Assessment Report (November 2010)
- Restoration of the Church of Nativity – Bethlehem / Stage 2: Study and Assessment Report (January 2011)
- Restoration of the Church of Nativity – Bethlehem / Stage 3: Final report (July 2011)
- Restoration of the Church of Nativity – Bethlehem/ Phase 1: Roof and Windows / Appendix D "Scope of works, Drawings and Technical Specifications" (April 2013)
- Restoration of the Church of Nativity – Bethlehem/ Phase 1: Roof and Windows / Tender documents (April 2013)
- Restoration of the Church of Nativity – Bethlehem / General Approach to the Interventions of Restoration and Guidelines (November 2013)
- Brief report on the investigations carried on 2010 and progress to current restoration works for roof and windows (January 2014)
- SOC report (February 2014)
- Restoration of the Church of Nativity – Bethlehem / Answers to the request for specifications addressed by ICOMOS to the State Party (July 2014)
- Restoration of the Church of Nativity – Bethlehem/ Annexes (1,2,3 &4) to The Brief Report Dated (January 2015)
- SOC report (February 2015)

6 Removal the property from the danger list

Church of the Nativity was inscribed on the World Heritage in Danger due to the lack of repair of the roof structure of the Church of the Nativity and the consequent threat to the roof timbers, roof covering, and the interior wall surfaces from water ingress.

As the Desired State of Conservation and its related Corrective Measures developed for the removal of the property from the List of World Heritage in Danger, are successfully achieved, the State of Palestine would request to remove the property from the List in Danger.

It is worth mentioning that according to the project schedule the scaffolding will be dismantled by end of June 2016; accordingly the State of Palestine would like to invite an advisory mission to Bethlehem because the date in which the scaffolding will be removed is before the World Heritage Committee takes place in July 2016.

7 Conclusion

Restoration of the roof of the Church of the Nativity was completed on March 2015 including timber structure in addition to installing new windows, lifeline and crosses; by this date the property is ready to be removed from List of the World Heritage in Danger. Other works were completed related to the external stone facades at the two corners and lateral naves in addition to all internal basilica doors. Ongoing works are also progressing well which are related to internal plastering, wall mosaic, upper three terraces at transepts ends and the eastern apse in addition to the Narthex. Future restoration works are also under study and evaluation which will be related to the wooden architraves, stone columns, column paints, column capitals, stone floor, floor mosaic, as well as lighting and low voltage systems in order to assure full protection for all church existing elements.

Concerning the Pilgrimage Route various activities were implemented during the year 2015 by all stakeholders involved in the World Heritage Site in order to preserve the property and attracting the local community in the preservation of the cultural heritage resources as well as many concept ideas are under evaluation in order to address the traffic pressure due to the urban expansion especially in the historic town.