



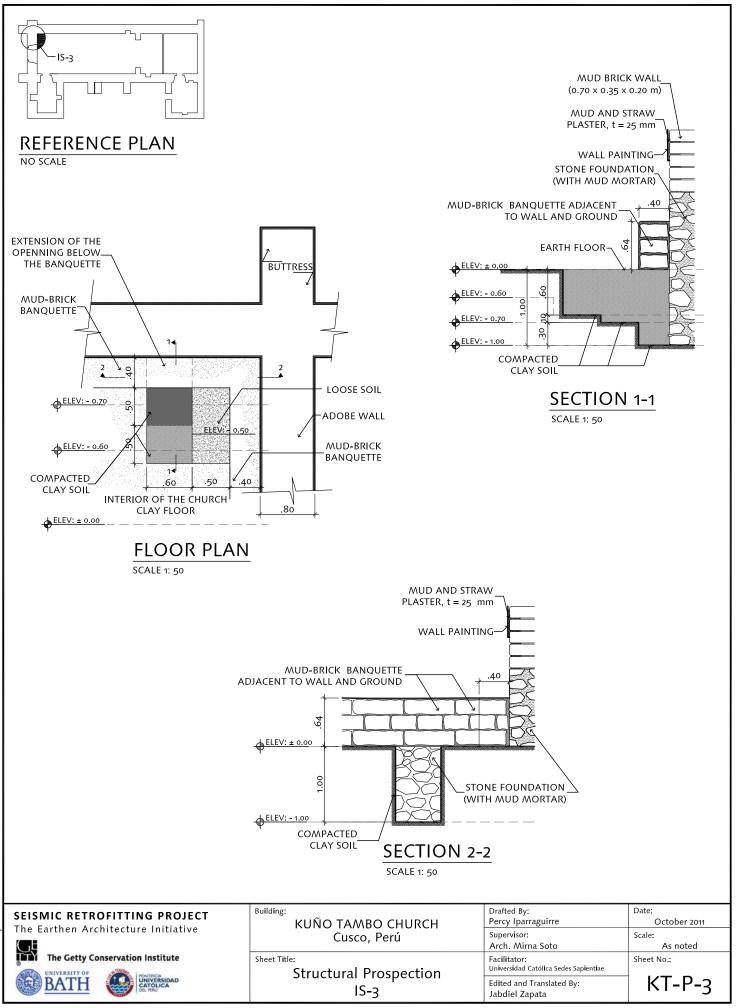


IS-1

## IS-1

THE OBJETIVE OF OPENNING IS-1 IS TO IDENTIFY THE CHARACTERISTICS OF THE FOUNDATION. AFTER REMOVING THE BRICK FLOOR AND SOME COMPATED SOIL, AT A DEPTH OF 0.25 m WE FOUND ROCKY SOIL CORRESPONDING TO THE SLOPE OF THE HILL WHERE THE CHURCH IS SITUATED. TAKING ADVANTAGE OF THE PARTIAL LOSS OF THE BANQUETTE, WE WERE ABLE TO EXTEND THE OPENNING TO THE LATERAL WALL OF THE CHURCH AND SEE THAT ON TOP OF THE ROCKY BASE RESTS A "SOBRECIMIENTO" CONSISTING OF ANGLED STONES WITH A CLAY-RICH MORTAR TO A HEIGHT OF 1.20 m. ON TOP OF THIS "SOBRECIMIENTO" THERE IS THE ADOBE WALL. THE MUD BRICK BANQUETTE IS CONSTRUCTED ADJACENT, BUT NOT CONNECTED, TO THE WALL.

SEISMIC RETROFITTING PROJECT The Earthen Architecture Initiative The Getty Conservation Institute	Building: KUÑO TAMBO CHURCH Cusco, Perú	Drafted By: Percy Iparraguirre Supervisor: Arch. Mirna Soto	Date: October 2011 Scale: As noted
	Sheet Title: Structural Prospection	Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.:
BATH CATCLICA	IS-1	Edited and Translated By: Jabdiel Zapata	KT-P-2







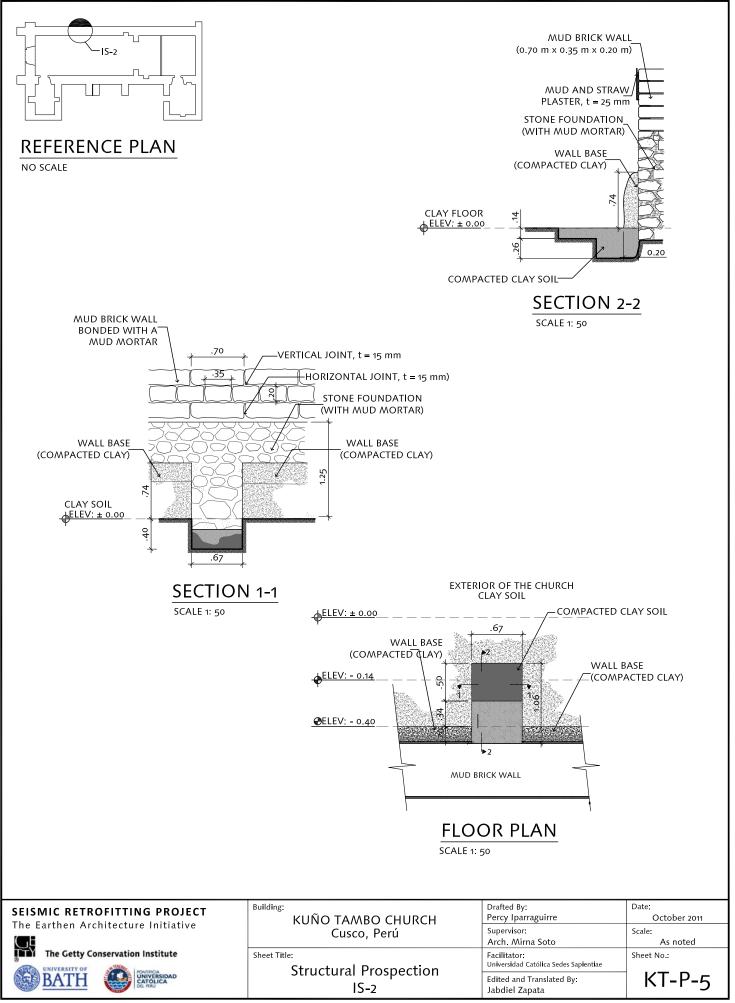
IS-3

## IS-3

THIS OPENING IS LOCATED AT THE FLOOR AT THE CORNER OF THE FRONT FAÇADE AND WEST LATERAL WALL, AND ITS OBJECTIVE IS TO IDENTIFY THE FOUNDATION CHARACTERISTICS IN THIS SECTOR. THERE IS AN "L"-SHAPED MUD BRICK BANQUETTE, 0.40 m HIGH BY 0.40 m WIDE, WHICH IS ADJACENT, BUT NOT CONNECTED, TO BOTH WALLS. UNLIKE PROSPECTION IS-1, THERE ARE NO BRICKS AT THE FLOOR, ONLY LOOSE EARTH. AT A DEPTH OF 0.50 m, HUMAN REMAINS WERE FOUND. BELOW THIS, THE SOIL IS MORE COMPACTED, AND THE COMPACTION INCREASED AS WE DESCENDED. BY EXTENDING THE OPENING UNDER THE MUD BRICK BANQUETTE ADJACENT TO THE MAIN FAÇADE, WE WERE ABLE TO SEE THE FOUNDATION. IT IS COMPOSED OF ANGLED STONES AND A CLAY MUD MORTAR, AND IT HAS A DEPTH OF 1.00 m AS MEASURED FROM THE FLOOR LEVEL IN THE CHURCH. UNDER THIS FOUNDATION THERE IS COMPACTED SOIL.

AS COMPARED TO PROSPECTION IS-1, THIS FOUNDATION IS DEEPER AND HAS A HIGHER LEVEL OF SOIL COMPACTION, WHICH WAS DIFFICULT TO EXCAVATE WITH THE TOOLS USED FOR THE INVESTIGATIONS. THEREFORE, WE CAN DEDUCE THAT THE CHURCH SITS ON A HILL, WITH THE HIGHEST PART IN THE ZONE OF THE ALTAR, WHICH HAS A ROCKY BASE (AS SEEN IN PROSPECTION IS-1); AND AT THE LOWER SLOPE OF THE HILL IS THE FACADE WALL, WHICH HAS A DEEPER FOUNDATION. THE LEVEL FLOOR INSIDE THE CHURCH WAS CREATED WITH A HIGHLY COMPACTED, CLAY-RICH SOIL.

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BATH WINIYERSIDAD	IS-3	Edited and Translated By: Jabdiel Zapata	KT-P-4





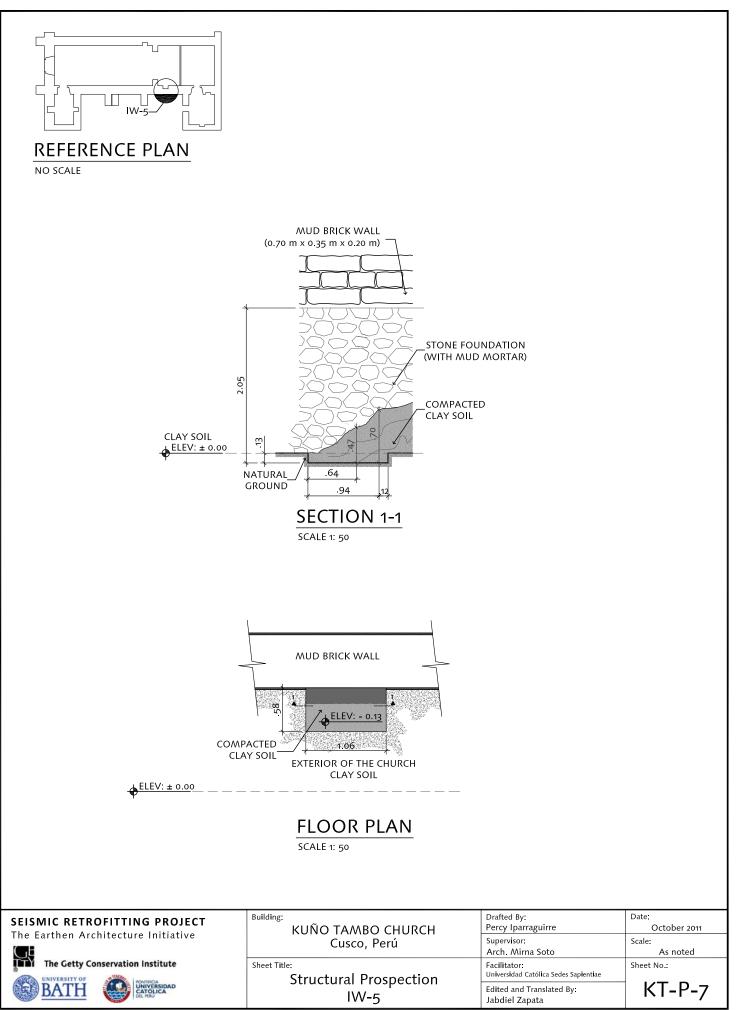


IS-2

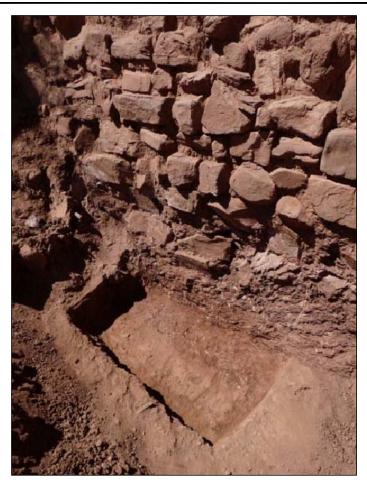
## IS-2

THE OBJETIVE OF THIS OPENNING IS TO IDENTIFY THE CHARACTERISTICS OF THE BASE OF THE WALL. THE "SOBRECIMIENTO" CONSISTS OF ANGLED STONES WITH A CLAY-RICH MUD MORTAR TO A HEIGHT OF 1.80 m., AND IT RESTS ON A VERY HARD CLAY MATERIAL. OVER THE "SOBRECIMIENTO" IS THE ADOBE WALL. THE EXTERNAL FACE OF THE WALL IS PROTECTED BY A CLAY BASE OR PLINTH, WHICH IS 1.00 m HIGH AND 0.25 m THICK.

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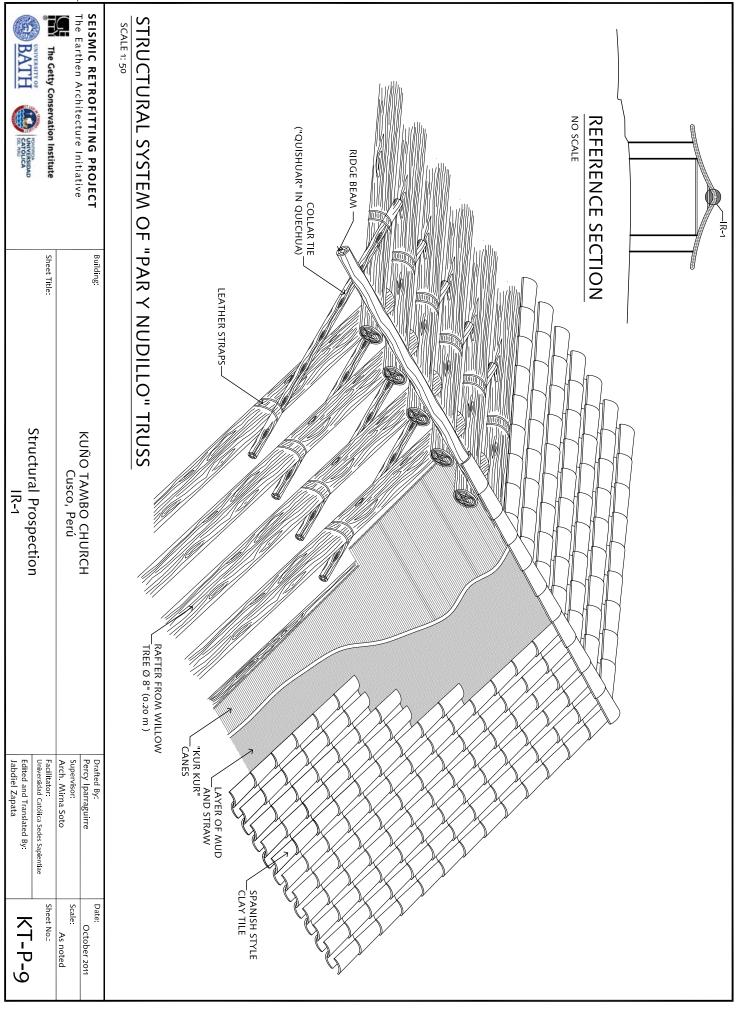


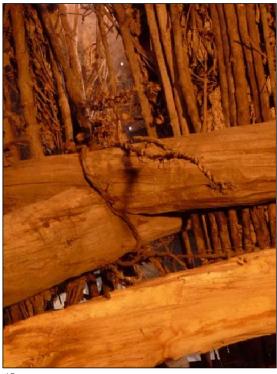
IW-5

# IW-5

THIS OPENING IS LOCATED AT THE EXTERIOR OF THE EAST LATERAL WALL. THERE IS A STONE "SOBRECIMIENTO" OR BASE COURSE BONDED WITH A MUD MORTAR TO A HEIGHT OF 1.65 m. UNDER IT THERE IS VERY HARD CLAY SOIL THAT PREVENTED US FROM DIGGING DEEPER.

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BATH WINVERSIDAD	IW-5	Edited and Translated By: Jabdiel Zapata	KT-P-8
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WALL PLATE





COLLAR TIE AND RAFTER JOINT



WALL PLATE

## IR-1

THIS ROOF DETAIL ILLUSTRATES THE HIGHEST PART OF THE "PAR Y NUDILLO"-TRUSSED ROOF. THE RAFTERS ARE JOINED BY HALF LAP CUTS AND ARE TIED TOGETHER WITH LEATHER STRAPS AND WROUGHT IRON NAILS. THE RAFTERS ARE MADE OF WOOD FROM THE WILLOW TREE AND ARE 8" (0.20 m) IN DIAMETER. AT THE TOP IS A RIDGE BEAM.

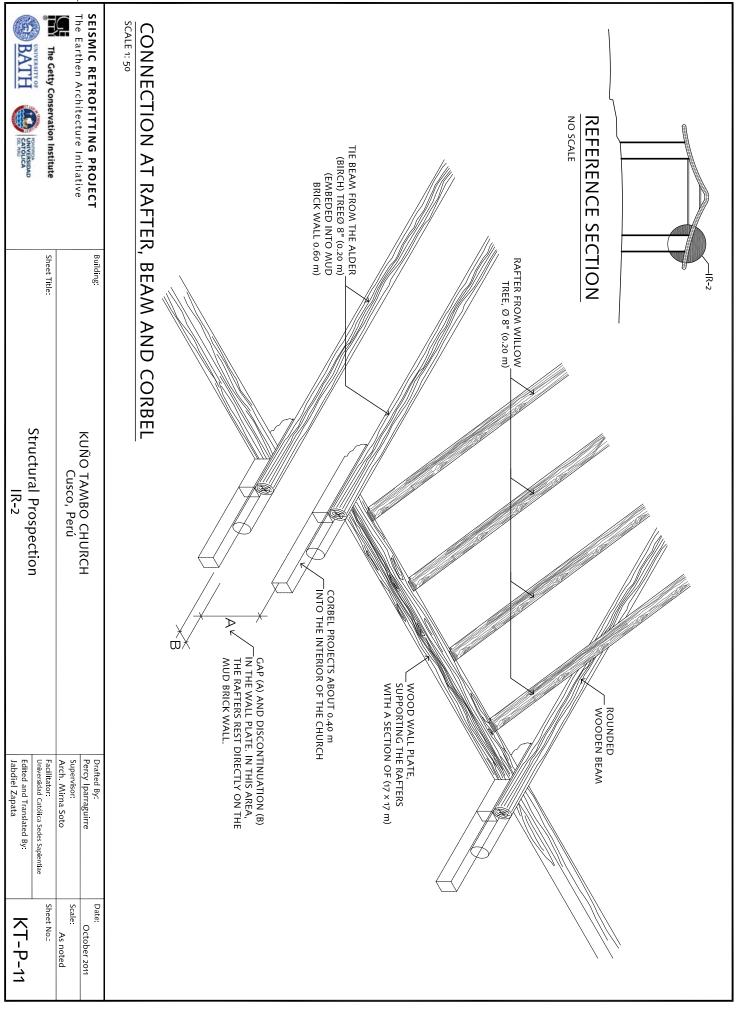
THE COLLAR TIE IS NAILED AND STRAPPED WITH LEATHER, SIMILAR TO THE RAFTERS, BUT IT IS NOT JOINED BY HALF LAP CUTS.

ABOVE THE RAFTERS ARE THE "KUR KUR" CANES (THIN CANES, WITHOUT VOIDS IN THE CENTER), WOVEN AND TIED TOGETHER ROPE, AND ALSO TIED TO THE RAFTERS WITH ROPE. ABOVE THIS IS A LAYER OF MUD AND STRAW THAT SUPPORTS AND ADHERES THE CLAY ROOF TILES.

IT IS IMPORTANT TO MENTION THERE IS NO TRANSVERSE BRACING, EXCEPT FOR THE WOOD WALL PLATE, THE "KUR KUR" CANES, AND THE RIDGE BEAM.

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BATH W INVESTIGAT Structural Prospection IR-1 Edited and Translated By: Jabdiel Zapata	KT-P-10









IR-2



IR-2



TRIUMPHAL ARCH AT THE CHURCH OF RONDOCAN, WITH THE SAME CHARACTERISTICS OF THE TRIMPHAL ARCH THAT IS MISSING IN THE CHURCH OF KUÑO TAMBO

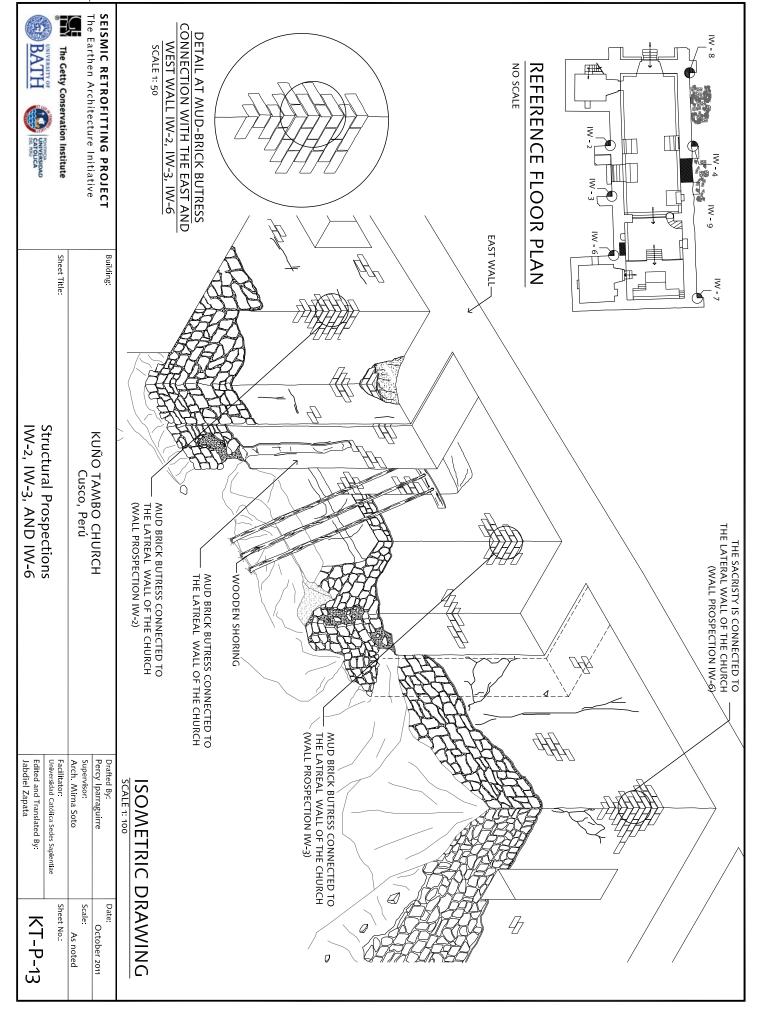
# IR-2

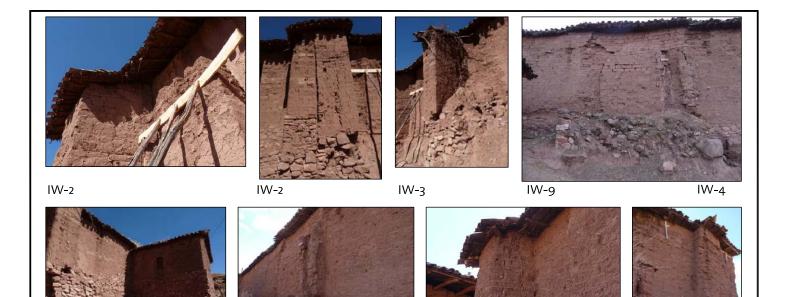
THIS STRUCTURAL DETAIL SHOWS THE CONNECTION BETWEEN THE EAST AND WEST LATERAL WALLS AND THE "PAR Y NUDILLO" TRUSSES. ON TOP OF THE ADOBE WALLS THERE ARE PIECES OF WOOD (WALL PLATES), NEITHER CONTINUOUS NOR TIED TOGETHER, WITH HORIZONTAL AND VERTICAL GAPS BETWEEN THEM. THUS, THEY ARE NOT REALLY BOND BEAMS - THEIR ONLY FUNCTION IS TO SUPPORT THE ENDS OF THE ROF RAFTERS. THE ENDS OF THE RAFTERS HAVE A 90 DEGREE CUT, ALLOWING THEM TO REST ON THE WALL PLATES.

THE ROOF IS FRAMED WITH "PAR Y NUDILLO" (RAFTER AND COLLER TIE) TRUSSES. THERE IS EVIDENCE OF RECENT INTERVENTIONS AT THE ROOF. ORIGINALLY, THE ROOF OVER THE ALTAR SHOULD HAVE BEEN HIGHER TO ACCOMMODATE A TRIUMPHAL ARCH BETWEEN THE NAVE AND PRESBYTERY / ALTAR. THE ROOF HAS SINCE BEEN RECONSTRUCTED AT A LOWER LEVEL, GIVING IT THE SAME HEIGHT AS THE REST OF THE NAVE. THIS WAS MADE POSSIBLE BY THE DESTRUCTION OF THE UPPER PART OF THE TRIUMPHAL ARCH, ORIGINALLY CONSTRUCTED OUT OF QUINCHA, AND ITS WALL PAINTINGS DEPICTING STONE MASONRY VOUSSOIRS.

PAIRS OF TIE BEAMS RUN TRANSVERSALLY ACCROSS THE NAVE. THEY ARE EMBEDDED APPROXIMATELY 0.60 m INTO TO THE EAST AND WEST WALLS AND ARE SUPPORTED BY CORBELS PROJECTING 0.40 m INTO THE NAVE. IN THE SPACE BETWEEN EACH PAIR OF TIE BEAMS, THERE IS AN INCLINED RAFTER WHICH RESTS DIRECTLY ON THE ADOBE WALL.

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IW-7

IW-8

### IW-3

IW-6

IW-2

TWO BUTRESSES ARE LOCATED IN THIS SECTOR - BOTH ORGINALLY HAD STONE BASES BONDED WITH A MUD MORTAR. ONE OF THEM IS ON A STABLE CONDITION AND THE OTHER ONE HAS COMPLETELY COLLAPSED. IT IS IMPORTANT TO MENTION THAT THE REMAINING BUTTRESSES IS CONNECTED TO THE EAST WALL, WHILE THE OTHER (COLLAPSED) ONE WAS NOT.

IN THIS SECTOR THERE ARE TWO BUTTRESSES CONSTRUCTED OVER A STONE MASONRY AND MUD MORTAR BASE. ONE OF THESE IS CONNECTED TO THE EAST WALL. THE OTHER ONE IS NOT CONNECTED TO THE EAST WALL - IT IS JUST CONSTRUCTED ADJACENT TO IT. THE STONE BASE AT THIS

NEXT TO THESE BUTTRESSES IS AN OPENNING WHICH HAD BEEN COVERED WITH AN ADOBE WALL. CURRENTLY THIS WALL IS INSTABLE AND

IW-7

SECOND BUTTRESSES IS DETERIORATING AND LACKS STABILITY.

EXHIBITS VERTICAL DISPLACEMENT, AND AS A RESULT IT HAS BEEN SHORED UP.

#### IW-4

THIS OPENNING IS LOCATED AT ONE OF THE BUTTRESSES IN THE CENTER OF THE WEST LATERAL WALL, BORDERING THE ORIGINAL OPENNING FOR THE LATERAL DOOR (SINCE INFILLED).

APPROXIMATELY 80% OF THIS BUTTRESS HAS BEEN DESTROYED, WITH ONLY THE STONE BASE AND THOSE MUD BRICKS THAT WERE CONNECTED TO THE LATERAL WALL REMAINING. THEREFORE WE WERE ABLE TO DEDUCT THAT THIS BUTTRESS WAS CONNECTED TO THE WALL IN THE PAST, AND THAT ITS COLLAPSE MAY HAVE BEEN CAUSED BY THE INSTABILITY OF THE STONE BASE SET WITH MUD MORTAR. THE REMAINING STONE BASE IS CURRENTLY COVERED BY BRUSH AND GRASS.

#### IW-6

THIS OPENNING IS LOCATED IN BETWEEEN THE EAST LATERAL WALL AND SACRISTY WALL. THESE WALLS ARE CONNECTED, PROVIDING BRACING FOR THE CHURCH WALLS.

#### IW-7

THIS OPENNING IS LOCATED AT THE INTERSECTION OF THE WEST AND NORTH WALLS. ONE CAN SEE THAT THE BUTRESSES AND WALLS ARE CONNECTED. IT IS IMPORTANT TO MENTION THAT THIS BUTRESSES IS IN GOOD CONDITION, AS COMPARED TO THE OTHERS.

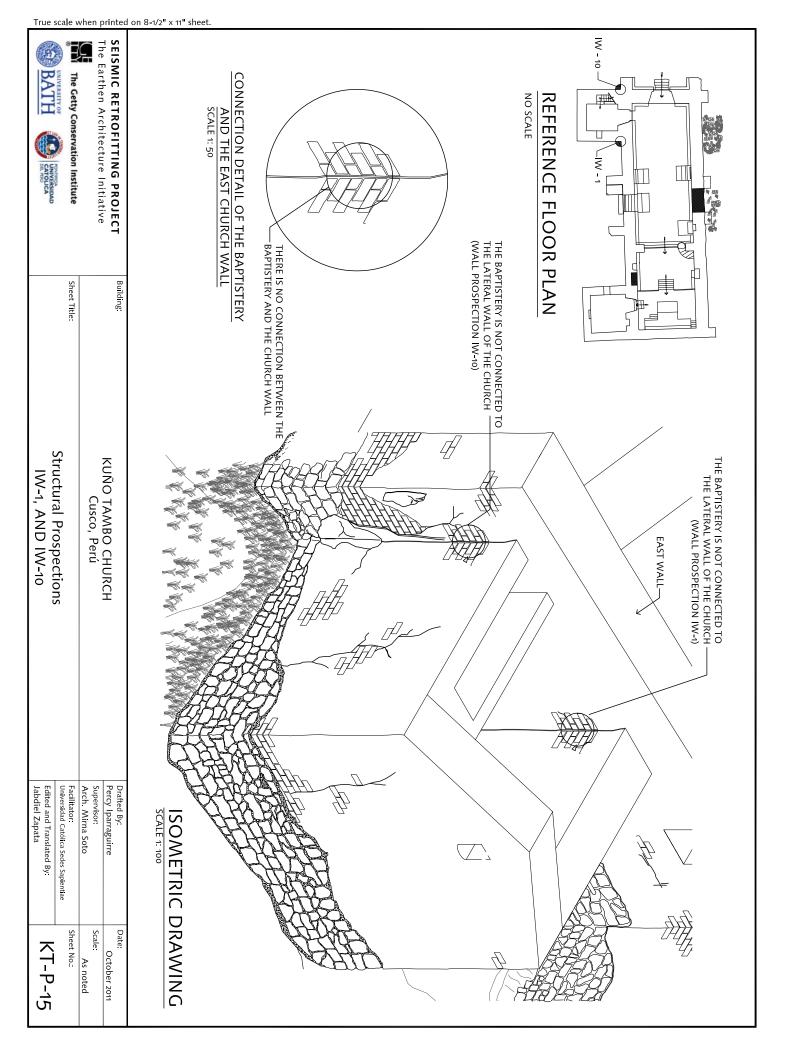
#### IW-8

THIS OPENNING IS LOCATED AT THE EXTERIOR CORNER OF THE WEST LATERAL AND FRONT FACADE WALLS. IT SHOWS THAT THE BUTTRESSES IS CONNECTED TO THE WEST LATERAL WALL. AT THE OUTSIDE FACE OF THE BUTTRESSES, THERE IS EROSION AND LOSS OF THE MUD BRICKS, WHICH REDUCES THE WALL THICKNESS.

#### IW-9

THIS OPENNING IS LOCATED AT THE SECOND BUTTRESSES NEXT TO THE INFILLED LATERAL DOOR OPENING ON THE WEST WALL. IT HAS TOTALLY COLLAPSED, WITH ONLY THE STONE BASE REMAINING. THIS GIVES AN INDICATION OF HOW THE REMAINING BUTTRESSES WILL CONTINUE TO DETERIORATE IN THE FUTURE IF THEY ARE NOT MAINTAINED.

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IW-10

IW-10

## IW-1

THIS OPENNING IS LOCATED BETWEEN THE BAPTISTERY AND EAST LATERAL WALL AND SHOWS THERE IS NOT A CONNECTION BETWEEN THOSE ELEMENTS. THIS MEANS THAT THE BAPTISTERY WALL IS SIMPLY CONSTRUCTED ADJACENT TO THE CHURCH

### IW-10

THIS OPENNING IS LOCATED IN BETWEEN THE BAPTISTERY AND FRONT FAÇADE WALLS AND SHOWS THE LACK OF CONNECTION BETWEEN THOSE ELEMENTS. IT CONFIRMS THAT THE BAPTISTERY IS CONSTRUCTED ADJACENT TO THE CHURCH.

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BATH UNIVERSIDAD	IW-1 AND IW-10	Edited and Translated By: Jabdiel Zapata	KT-P-16

