



Report on the
Assessment of the Historic Murals
at the
R. Thornton Brodhead Armory
Detroit, MI

Executed by Historic Surfaces LLC
July 2022

Executive Summary

The following is a study on the four historic murals in the R. Thornton Brodhead Armory in Detroit, MI. This study was initiated by John Cox, Historic Architect with I.618 Interests LLC, and Tony Michaels, President and CEO of the Parade Company. The main purpose of this study is to understand as much about the historic murals in order to develop a treatment and removal plan. The four murals examined included the Fresco Mural by David Fredenthal in the Wardroom, the Canvas Mural by Edgar Yaeger in the Dining Room, the Fresco Mural by David Fredenthal in the Bar Area, and the Plaster Relief Mural by Gustav Hildebrand in the 1st Floor North Corridor.



Brief History

The R. Thornton Brodhead Armory was built in 1930 and was designed by the Detroit Architectural firm of Stratton & Hyde. The building was designed in the Art Moderne style. With the WPA (Works Progress Administration) being enacted in 1935, the Armory was able to obtain Federal funds to renovate and expand the building. Part of the

renovation work included enlarging the third floor to add an Officer's Wardroom, Enlisted Dining Hall, and Kitchen. An agency part of the WPA was the Federal Art Project (FAP). The purpose of the FAP was to decorate and embellish Federal and Municipal buildings with Art to keep artists employed and working. So, plans were made to introduce artistic elements to the Armory as part of the renovations. The artwork in the building was completed between 1936 to 1941. They included murals by David Fredenthal, Edgar Yaeger, relief plaster panels by Gustav Hildebrand, and wood carvings by John Tabuczuk.

Following the renovations, the building seemed to regularly have roof issues and so received some repairs in the mid 1960's. New roof issues that occurred in 1991 to 1992 caused water infiltration that damaged some of the murals, especially to the frescos in the Wardroom and Bar Area. The building stayed in use until 2004 when it was shut down. It appears that no repairs have been conducted since then.

Methodology

To obtain the information needed for this report, on-site examinations of the murals were conducted. This included examining the original construction methods, documentation of all the condition issues, examination of the original material composition and evaluation of options for the removal and treatment of the murals. On-site investigations were conducted by architectural conservator Anthony Kartsonas and Mata Kartsonas of Historic Surfaces LLC and historic masonry expert Simon Leverett of Leverett Masonry Consulting between February and June 2022. Conservators Flavia Maria Benato and Adele Trazzi of Verona, Italy have been consulted and provided information on the frescos.

Documentation and written sources used for this report included archival documents and photographs provided by the I.618 Interests.

The process to document the current conditions and provide the information on the original finish materials included the following:

- The review of all archival data provided.
- Examination of the current conditions to document the material and surface defects. This included photo documentation of most the finish defects.
- Laser Scanning of the murals to document the current conditions in three dimensions together with digital imagery.
- Examination of the original construction methods.
- Explorations to determine possible causes of deterioration.
- Laboratory analysis to determine the material composition and make-up of the original materials. The full report on the material analysis can be found in Appendix A.

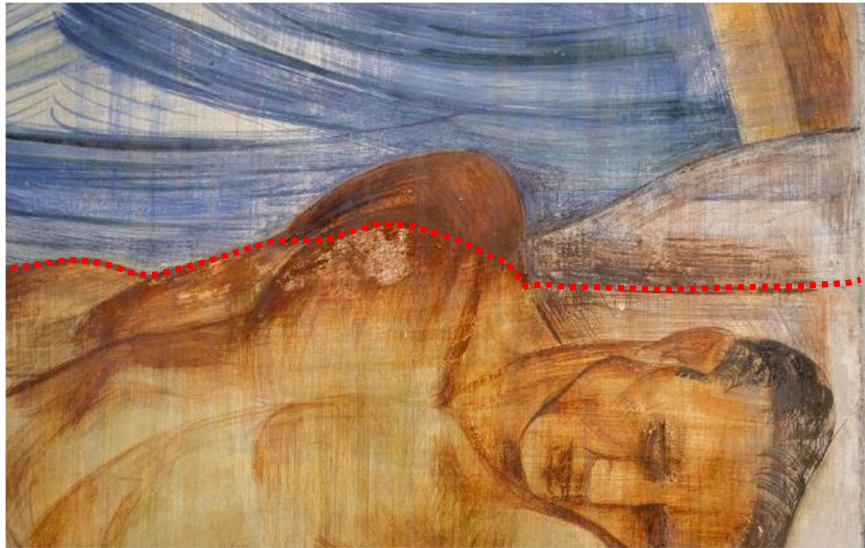
Below is a written summary of the conditions which are followed by diagrams recording all the surface defects with detailed photos illustrating the issues. Following the report on the condition issues are initial recommendations for treatment and mural removal.

The full lab analysis report from Catherine Matsen of Winterthur (Appendix A), diagram from Leverett Masonry Consulting (Appendix B) and report on fresco removal project by conservator Adele Trazzi (Appendix C) can be found in the Appendices.



Wardroom Mural Condition

The mural in the Wardroom was completed by David Fredenthal, a young artist who had studied at the Cranbrook Academy of Art. The mural in the Wardroom was executed as a Fresco. Fresco is a technique where paint is applied onto a wet lime plaster. Lime plaster is created by adding water to quicklime, which is kiln fired limestone, creating what is referred to as Lime putty. Lime putty has the consistency of very thick yogurt. Base coats of Lime plaster typically had sand added to strengthen the plaster. The final coat used in Fresco painting, called the 'intonaco' was typically applied as pure lime putty with no sand. In traditional fresco work, only a limited amount of lime putty was applied that could be painted within the same day. This application of plaster to be used for the day is called the 'giornato', Italian for 'a day's work'. Once the giornata had been applied and reached the correct consistency, the artist would then paint the mural or design with lime fast/resistant dry powder pigments ground in water directly on top of the uncured plaster. Sometimes, limewash paint made by adding water to lime putty, was added to the pigment.



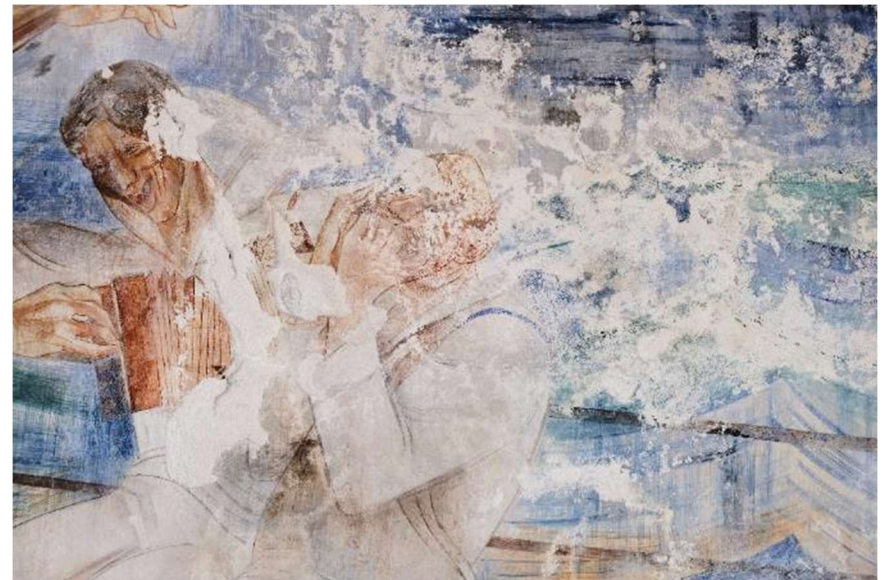
Red line indicates the edge of the 'giornato'

Written documentation of the Wardroom mural describes Fredenthal using traditional techniques to create the fresco where he applied a total of three coats of plaster with the final being used for the painting within the same day (giornato). The original gironato line in the plaster can be seen on most of the panels. This layer appears generally between one-fourth and three-eighths of an inch. It appears that the plaster base coats were applied directly onto the concrete block wall and not on any lath or secondary support, except at the edges where a metal corner guard was used. The two base coats are approximately an inch thick. The plaster layers in fresco are also commonly referred to as 'renders'.

He likely learned about fresco techniques while traveling to France and Italy on a study scholarship. The fresco mural consists of 5 panels depicting the life of sailors aboard a ship. It was done in a slightly abstracted expressionistic style, common during this time period for contemporary artists. Most panels are 68 inches in height and the total width of all five panels is 34 feet 10 inches.

Select samples of the fresco paint and plaster were sent to the Conservation Lab and the Winterthur Museum in Delaware for analysis. The examinations were conducted by Conservation Scientist, Catherine Matsen. The analysis verified that the paint and plaster was a Lime with small amounts of Gypsum. The full Lab analysis report can be seen in Appendix A.

The current condition of the fresco is overall fair except for the eastern panel which is poor. Amazingly, the actual paint finish of the fresco is mostly stable with limited areas that are loose or flaking except for the eastern panel. The biggest issue with the fresco mural is the structural stability of the plaster. The documented water infiltration from the early 1990's clearly caused some issues, most of which are concentrated on the eastern panel but also at the top of the western panel.



Detail of the significant water damage on the East fresco panel (WN5)

There are significant areas of plaster delamination on the eastern panel. The delamination is mostly between the finish coat (intonaco) and the

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second base coat. This can especially be seen on the upper and lower right corners of the east panel (WN5) where the finish coat has detached itself that a large void can be seen. A small portion of the finish coat has popped off and is completely detached along the bottom edge. There is also significant paint loss on this panel. The other panels also have some minor areas of delamination.



Detail showing the loss at the bottom of panel WN5.

The water infiltration has also caused some plaster decay and efflorescence, which is the creation of salt crystal that eventually breaks the plaster down to a powder. This has caused some losses in the paint in those areas as well as some mold growth.

As mentioned, a good portion of the painted surface is stable, however it appears that the unstable interior environment has caused some migratory staining and mild discoloration on the paint surface as well as some areas of flaking paint. This typically occurs when there is cyclical moisture absorption and drying into porous surfaces. As moisture is

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drawn in and then dries, it draws dust and soot to 'suck' in. This regular introduction of moisture can also cause discoloration within certain colors, especially those less stable. The moisture build up on the surface has also caused visible tide marks on the paint. There are random areas of flaking paint found on all the panels. Most of these are not very large except for the east panel. It also appears that some of the paint has been abraded having a worn appearance. Aside from these issues, there are some minor losses of what appears to be small penetrations and abrasions and minor cracks, which appear stable. There are also some random touch-ups on all the panels, most are small and minor.



Bar Area Mural Condition

The mural on the west wall in the Bar Area is also a fresco completed by David Fredenthal. The fresco is approximately 5 feet by 13 feet and portrays sailors relaxing and enjoying themselves. It appears to have been completed utilizing the same techniques and construction. This fresco is in very poor condition. The previous water infiltration has caused significant damage to the paint and plaster. There is severe water damage and loss, especially on the left side (north) of the mural. There is also significant plaster delamination, efflorescence, flaking paint, losses and discoloration on other areas of the mural as well.



Enlisted Dining Room Mural Condition

The Dining Room is the largest room on the floor. The upper walls contain murals painted by Edgar Yaeger. The murals are 6 feet in height and cover all 174 linear feet of wall surface. They are oil painted on canvas which is applied onto a plaster substrate. At first glance, the canvas murals appear to be in fair condition with minimal loss or damage. It was quite surprising that given the age and exposure to the elements and moisture that no detached or rippled areas of canvas could be seen. An indication that a stronger more difficult adhesive was present. Normal adhesives used to apply canvases in this era were wheat paste or other water-soluble adhesives. These perform reasonably well but will typically fail over time especially with exposure to moisture causing areas of canvas to detach from the primary support and usual cause things like tenting or ripples in the canvas. The lack of these issues then led us to believe that the paste used for these canvases was not a typical water-based adhesive.

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During the initial site visit, a small section of the canvas had fallen off. Stuck to both the backside of the canvas and on the plaster was a heavy, very stiff composite material. We have come across other pastes over the years and another one used during this time period but not often were adhesives utilizing lead white paste. These adhesives used lead white in a protein or later, oil binder together with whiting/chalk as a filler with some type of drier, usually turpentine. This very thick paste would be troweled on, almost like a tile adhesive before placing the canvas on top. This technique is referred to as 'Marouflage'. The advantages of Marouflage over a wheat paste is the very hard and stable nature of the paste which is less susceptible to being compromised from moisture. This is easily illustrated in the current state of the canvas attachment. During one of our site visits, water from a roof leak was literally running down the face of the canvas on the west wall. This continual moisture has not compromised the adhesive yet. If the canvas had been applied with a wheat paste or other water-based adhesive, there would likely be significant amounts of detached and warped canvas.



Photo of the removed canvas section on the north wall. There is significant residue of the paste left stuck on the surface.

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A sample of the canvas with the paste was sent to the Winterthur lab for analysis where it confirmed that the adhesive consisted of lead white in a drying oil. It also verified that the original paint is an oil. The full Lab analysis report can be seen in Appendix A.

Most of the canvas sections are still well adhered but there are some random areas of loose canvas. The largest is an area of canvas delamination on the south wall on the western end. Given the exposure to constant moisture to the murals, there could be areas of mold growth behind the canvas but without removing sections, it is not possible to verify. The NE and SE corners have some damage and losses in the canvas where portions of the wall have been removed to gain access to something in the cavity of the bump outs. A small square of canvas from the north wall has fallen but has been retained.



Detail of flaking paint has exposed some of Yaeger's earlier design.

The regular moisture has also caused numerous areas of flaking paint. These are mostly occurring in areas that were overpainted/repainted

with the majority being seen on the west wall. In some areas there are figurative areas beneath a plainly overpainted area. These may be changes to the design made by Yaeger himself. It is known that he came back to carry out some touch-ups and repairs after the original installation. The moisture has also caused some dirt and soot to attach or suck into the paint and canvas surface. The west elevation also has a small rectangular piece of canvas that is an infill piece, maybe done as a repair. The moisture has also caused areas of minor paint discoloration throughout.



1st Floor Hallway Relief Panels

The first-floor corridor in the southern block of the rear building had plaster panels with incised lines create relief panels. These panels were carved by Gustav Hildebrand, who was one of Edgar Yaeger's assistants. Written documentation states the plaster was already in place and Hildebrand carved the lines into the finish plaster. No laboratory analysis was completed of the plaster, but it appears to be a standard gypsum plaster.

The decorative panels depict sailors conducting normal work activities. The carved lines create outlines around the figures and shapes rather than provide any real rendering with dimension or shadow. The relief mural is approximately 6 feet in height and wraps around most of the wall surfaces in the rear corridor for a total of 106 linear feet. It appears that the panels are a three-coat system with the plaster applied onto metal lath. The initial two base coats (brown and scratch) have a moderate amount of sand. These base coats are very grey in color, suggesting they could be more of a cement or hydraulic type plaster, but no analysis has been done yet to verify this. Behind the metal lath is

another thin layer of plaster on top of a block wall system. These blocks appear more like a terracotta style block versus the concrete block seen upstairs in the Wardroom. The finish plaster that was carved into appears to be a gypsum type plaster. The panel surfaces currently have multiple layers of paint, but it has yet to be determined if the original finish was exposed plaster or a painted finish. It is possible since remnants of a greyish blue paint can be seen where the door transom used to be.

Portions of the mural are in fair condition, with certain in poor condition. There are multiple areas with moderate to severe water damage. The majority of these occur in the northern corridor. The water infiltration has caused plaster decay and efflorescence. There is a large area of water damage on the north wall of the west corridor and a large loss at the pilaster in the east corridor where the plaster and lath are completely missing. The other areas of water damage are moderate with some exhibiting a fair amount of efflorescence. The numerous paint layers have begun to delaminate and have created large areas of cleaved and flaking paint throughout the entire mural.



Detail of the eastern wall where relief panel has been removed.

Recommendations

The current intent of the project is to relocate the murals. And while the demolition of the building is a part of the plan, the removal of the murals would be needed to preserve them. Listed below are recommendations to remove each mural based on what we now understand about the construction and their current condition.

The removal of the murals is possible but not without significant challenges. Once determinations are made for preservation and locations for display, recommendations can be verified and altered to work within these plans. The only way we can determine the most effective methods of removal and preservation is to test the recommended techniques. This is necessary and allows us to review all the procedures and work out logistical issues prior to full implementation.

It is important to note that since the building has not had a stable environment for 18 years, these defects have worsened and continue to do so daily. The longer the murals remain in the current conditions, the more damage will incur making it more challenging to preserve them. This could be seen when viewing pictures online of the Armory in 2014 compared to now. Not only was the building in better condition such as the collapsed roof section in the Drill room, but the condition of the murals appeared better in the photos from less than 8 years ago.

Wardroom & Bar Area Mural Recommendations

The removal of the frescos is possible however the application of the plaster directly onto the concrete block presents unique challenges. Even with these challenges, there are possibly two options for removal. The first is the traditional method for removing and detaching frescos called 'Stacco'. The other removal technique would be to cut the wall sections and remove the plaster with the wall block. Below is a description and some considerations for each technique to help in determining the best removal method. Another factor is the decision of

how much of the fresco is to be preserved. The majority of the fresco is in fair condition, but the eastern panel is severely damaged. If the intent is to save this panel, it would require significant work to stabilize it prior to removal. This would also be the case for the Bar area fresco if the intent is to preserve it.

Stacco is a technique that has been used to move and relocate frescos since the Renaissance that has been altered over time. There are two variations, 'Stacco' and 'Stacco a massello' where the principle is the same, the removal of the fresco together with the plaster substrate. The main difference is in Stacco, the fresco paint is removed with only the intonaco (first) layer of plaster and with Stacco a Massello, together with all plaster/render layers.

Stacco is done by first applying a protective barrier on the paint surface. This is typically done by applying a hide glue (rabbit skin) with a piece on canvas on the face. Multiple coats of the hide glue are applied to saturate through the canvas and create a rigid surface. This not only protects the paint surface but also provides some structural stability as the plaster is removed. Once the canvas facing with glue has cured, the piece is removed by carefully cutting through the plaster render with a special saw, parallel to the face of the fresco. Given that the sections are manually cut, sections removed are limited to manageable sizes, ranging from 4 to 6 square feet. The removal considers the original giornata and tries to utilize the original the original construction. The process is repeated until the entire fresco has been removed. Of course, during the process, each section is carefully documented to verify location. A report by conservator Adele Trazzi can be found in Appendix C. This report has been included to help illustrate the method of 'Stacco'.

The other traditional technique that is similar is called 'Strappo' where only the paint layer with the least amount of render is removed. These traditional techniques may be a possibility to use for the removal, but testing would need to be performed to verify this. We suggest that a

portion of the fresco or the one in the bar area is removed using the Stacco technique to see the feasibility of using the process for the entire fresco. The main advantage of this technique is that it is only moderately invasive since it will not disturb the concrete block wall or main structure. The main disadvantage is that the fresco will be in numerous pieces and if the intent is to put it back together in its original state, it will require more reconstruction.

The other technique to remove the mural is to remove the fresco and all the plaster together with the concrete block. This allows the fresco to remain more as a complete unit. After conferring with our historic masonry expert, Simon Leverett, we discussed options for removal of the wall unit. We determined that it may be possible by making cuts into the wall, perpendicular to the face of the fresco in order to insert a thin metal sleeve. Once you have cut all sides to make a rectangle, they would need diagonal straps and shelf angle welded on to make the metal frame rigid and a cohesive unit. This would allow the plaster and block to be removed in a complete section. And even though this sort of removal has been used on other mural projects, there are multiple obstacles in utilizing this method. The first being the wall block and whether they serve any structural purpose. If so, some engineering would be required to determine any additional support that would be needed. The second is the weight. Three coat plaster can weigh anywhere between 8 and 11 pounds a square foot and 4-inch-deep concrete block can weigh between 30 and 35 pounds for a total of close to 40 lbs. / square foot. A 4 by 5-foot section of the fresco could possibly weigh 900 lbs. without the frame. If you add the weight of a metal frame, you could easily be at 1000 lbs. per 20 square foot panel. At the end of the report in Appendix B is a brief summary with a diagram of the potential complete wall removal in sections.

These murals are on the third floor with no access to bring in a Bobcat or other lift, making it very challenging from a logistics standpoint. And

even if a manually operated hydraulic lift could be brought into the space, removing the individual panels from the building would be difficult.

Also, in order to stabilize the face of the mural, regular facing techniques in conservation would not work with panels this large requiring structural stability. To stabilize the face of each panel may require something like Cyclododecane, a volatile cyclic alkane that has carbon and hydrogen compounds. Cyclododecane can be applied to make a thick wax like surface that is very strong. It has the unique ability to slowly sublime (evaporate) from a solid into a gas. It has been used in conservation with good results but rarely, because of its significant cost. The main advantage of this removal technique versus the Stacco or other traditional techniques is that the panels would be in larger sections, likely requiring a little less reconstruction / restoration after removal. But given all the additional work and logistics required for removal, it's hard to say that the expenses would be offset with the lesser restoration work.

Regardless of the removal technique, if the intent is to display the fresco, some reconstruction and restoration work will need to be completed. The extent is dependent on the removal technique and desired final appearance. This is based on whether it is desired that after removal, the mural looks as close to the original as possible or maybe presented in a state closer to the condition of it after the sections had been removed. Once the removal technique and the display of the fresco has been determined, specific recommendations will be provided to provide stabilization treatment and any necessary reconstruction.

Enlisted Dining Room Recommendations

Canvas murals are typically easier to remove given that the paint finish is applied onto a flexible support in the canvas. Normal procedures for removing canvases are by gently forcing, usually by rolling, the canvas from the plaster or secondary support. Prior to removal the paint surface is typically faced with a wet strength tissue paper that is applied with a

consolidant. The most common consolidant used on oil paint surfaces is a diluted solution of Beva 371. Beva is an ethylene vinyl acetate that is heat activated and can be diluted and removed with Naphtha. The process to face a mural is done by cutting small squares of tissue, less than a square foot each, and applying them almost in a grid pattern over the entire paint surface. The tissue is so thin that it allows the Beva solution to absorb and adhere the tissue to the paint finish. The facing helps to stabilize the paint and minimize areas to flake or pop off while rolling the canvas. It also helps to protect the paint from abrasions as the canvas is rolled onto itself.

Some considerations prior to applying the facing are dirt and soot on the paint surface and extent of flaking paint. These can both present some challenges that will need to be addressed prior to the application of the facing. If the surface is heavily soiled, it may become necessary to clean the surface prior to the application of the facing. The reason being that even though the Beva solution is removable with a solvent, if the paint surface is a little porous, the Beva may lock down some of the dirt in these small cavities, making it difficult to remove later. The second item that may require intervention prior to the facing is excessive flaking paint. This is mostly because even though the Beva works to stabilize areas, it may not be strong enough to consolidate and lock down very loose or friable paint. So, for the facing to stay adhered, it may be necessary to stabilize these areas with a different consolidant.

Once the paint surface has been faced, the canvas can be removed. This is done by using a large diameter tube (16 plus inches in diameter) to slowly roll the canvas off the plaster. The roll would be supported by a stand or other mechanism that could be moved across the floor. It is important that the roll stays evenly on a vertical plane so the pressure against the canvas is even to remove it from the plaster.

Unfortunately discovered during our investigations was that the canvases were originally installed using a Marouflage technique with a white lead adhesive. This will make the removal process significantly

more challenging for multiple reasons. The first is that the removal with the tube will be much slower because of the tenacity of the lead adhesive versus canvas with a wheat paste or water-based adhesive. The second is that the removal team will have to wear protective gear to protect themselves from the loose and airborne lead. The third is that the canvas with paste will not be as pliable as it is being rolled, meaning that it may have to be removed in smaller sections. The last issue is that once the canvas has been removed from the wall, the backside of the canvas will have excessive amounts of the paste stuck on it. This will have to be removed prior to any reinstallation and restoration. If all 174 linear feet of canvas is to be removed, the removal would be an incredibly labor-intensive process. As with the other murals, once extent of canvas removal and final display is determined, other treatments can be provided to stabilize and restore the canvases.

1st Floor Hallway Plaster Panels

The plaster panels on the first floor may have an advantage over the over murals as the plaster appears to be applied onto a secondary support with the metal lath. This may make it possibly to remove the plaster together with this support and not disturb the block or other wall section. To remove the panels, they would require some sort of facing or support from the front. We recommend that each panel is faced using a mold making process as if the intent were to make a mold. First, this would require the application of a mold making material, most common of which are silicone. This would be evenly applied onto the entire surface but prior to application. Any loose paint would need to be removed prior to application. Once the mold making resin is applied, a thin metal or aluminum frame could be installed, like the one recommended for the frescos. The metal would be inserted into cuts to break the plaster and lath free. Once the frame has been inserted, a back mold of plaster should be applied to resin mold make it rigid. This plaster back mold will add some weight but would make the panel more stable. The hope is that since the panels are on the first floor, a Bobcat or similar vehicle could be brought in to assist with the removal. As it is

being removed, it may become necessary to add some additional support to the rear of the panel against the metal lath. This may be done by applying new coat plaster with metal tie rods to help stabilize the panels.

There is another possible option to preserve these pieces and that would be to replicate the panels in lieu of removing them. This would be done by making molds and casting new sections. This could be done on all or portions of the mural or together with the removal of certain areas. To perform this would be very similar to the procedures described above used in making a mold, where a mold making resin would be applied with a back mold. More of the paint would be to be removed in order to get a clean mold. The difference versus removing the panel is that it would not be necessary to be cut out the panels and insert a metal frame, however an external frame would likely be needed to go around the mold given the size. Once the molds are made, each piece would be recast using a similar gypsum type plaster.

Another option for replication would be using the information from the laser scan to reproduce the panels. This could potentially be done with a resin or other material.

Condition Assessment Diagrams

The following are diagrams that attempt to record all the material and surface defects on the murals. The diagrams are meant to graphically represent the quantity and extent of the different defects. The defects that were denoted include plaster delamination, canvas delamination, water damage, flaking paint, non-original paint and touch-ups, surface discoloration, losses, and cracks.





Material and Surface Defects

- Plaster Delamination
- Water Damage
- Flaking Paint

- Non Original Overpaint / Touch-ups
- Surface Discoloration / Staining
- Loss

- Cracks
- Giornato Line

Ward Room Mural – WNI

The first panel of the Wardroom fresco is in fair condition but does suffer from some issues. The upper left corner has some damage from water infiltration. There is a moderate amount of surface discoloration and staining throughout the panel. Likely caused by the continual absorption of moisture. In some areas it appears like a blanching of the paint. There are a few minor losses, most appear from a puncture. There is also a moderate sized area of flaking paint near a few cracks in the panel. Only one area of plaster delamination could be found. The panel has only a few minor non-original touch ups.



Detail Photo showing the water damage on the upper left corner of the mural. It has caused some losses, surface discoloration and blanching.



Detail showing the extent of the surface discoloration and blanching.







Detail showing heavy touch-ups above the two birds.

Ward Room Mural – WN2



Material and Surface Defects

-  Plaster Delamination
-  Water Damage
-  Flaking Paint
-  Non Original Overpaint / Touch-ups
-  Surface Discoloration
-  Loss
-  Cracks
-  Giornata

Ward Room Mural – WN2

This panel is in fair condition but does have some issues. There are three minor to moderate sized areas of plaster delamination, the two larger being along the right vertical edge. There are a few areas of surface discoloration but not as many as the previous panel. However, this panel has large areas of mildly visible tide marks (runs). Also, there is some smaller areas of flaking paint most of which appear at the transition line of the giornata and on the bottom right edge.




Detail photo of the area above around the line of the giornata. The area above the line is slightly darker and has some flaking paint.








Detail of the flaking paint along the bottom right edge.



Material and Surface Defects

-  Plaster Delamination
-  Water Damage
-  Flaking Paint

-  Non Original Overpaint / Touch-ups
-  Surface Discoloration / Staining
-  Loss

-  Cracks
-  Giornata Line

Ward Room Mural – WN3

The center panel of the fresco is in fair condition but does suffer from some issues. There are some losses and previous touch-ups along most of the bottom edge. There is a moderate to large sized area of surface abrasion on the lower right side. The plaster has one area of delamination. Also, there are numerous small losses going vertically in two rows near the center.



Detail Photo showing the water damage on the upper left corner of the mural. It has caused some losses, surface discoloration and blanching.



Detail showing the extent of the surface discoloration and touch ups along the bottom edge.











Detail showing some of the abrasions and losses along the bottom left corner.

Ward Room Mural – WN4



Material and Surface Defects

-  Plaster Delamination
-  Water Damage
-  Flaking Paint
-  Non Original Overpaint / Touch-ups
-  Surface Discoloration
-  Loss
-  Cracks
-  Giornata

Ward Room Mural – WN4

This panel has more issues related to moisture exposure. A majority of the surface has blanching and very visible tide marks. The bottom portion also has these dark marks within the field. The paint also appears very light and more transparent as if the constant moisture has compromised the binder of the paint. There is also a moderate sized vertical crack on the right side of the panel. The panel has only some non-original touch ups along the top edge.



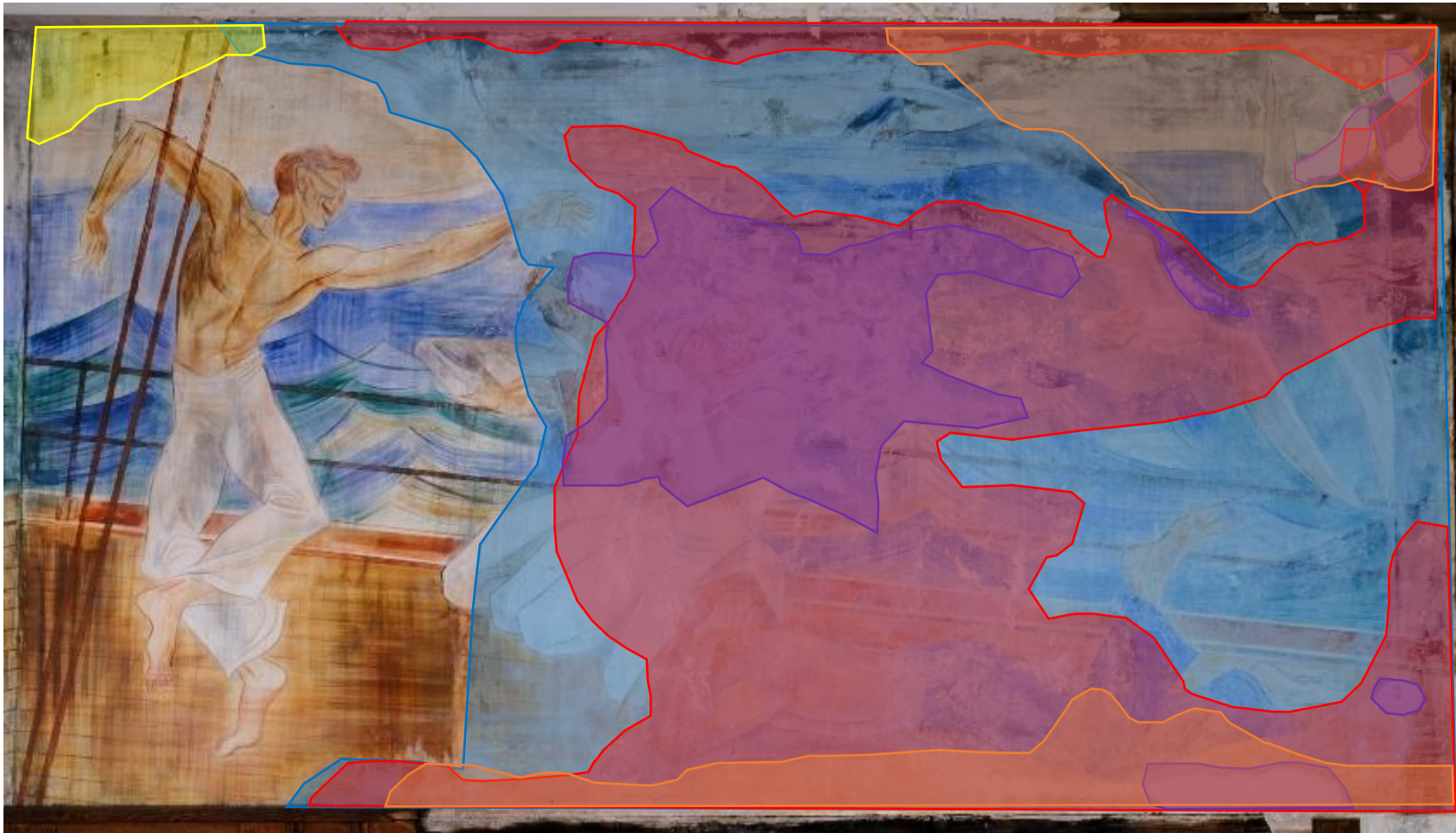
Detail photo of the top edge showing the blanching, tide marks, and excessive touch-ups.



Detail showing the extent of the surface blanching and tide marks.



Detail showing heavy blanching, discoloration and dark marks.



Material and Surface Defects

Plaster Delamination

Water Damage

Flaking Paint

Non Original Overpaint / Touch-ups

Surface Discoloration / Staining

Loss

Cracks

Giornato Line

Ward Room Mural – WN5

This panel has significant damage from direct water infiltration. Almost three quarters of the panel suffers from heavy flaking paint, losses, blanching, and some mold growth. The moisture appears to have broken down the paint binder, leaving it chalky and faint in appearance. There are two large areas of delaminating plaster, some of which are so severe that a large void can be seen between the plaster layers. It is in very poor condition and is unstable.



Detail photo of the top edge showing the blanching, losses, and mold.

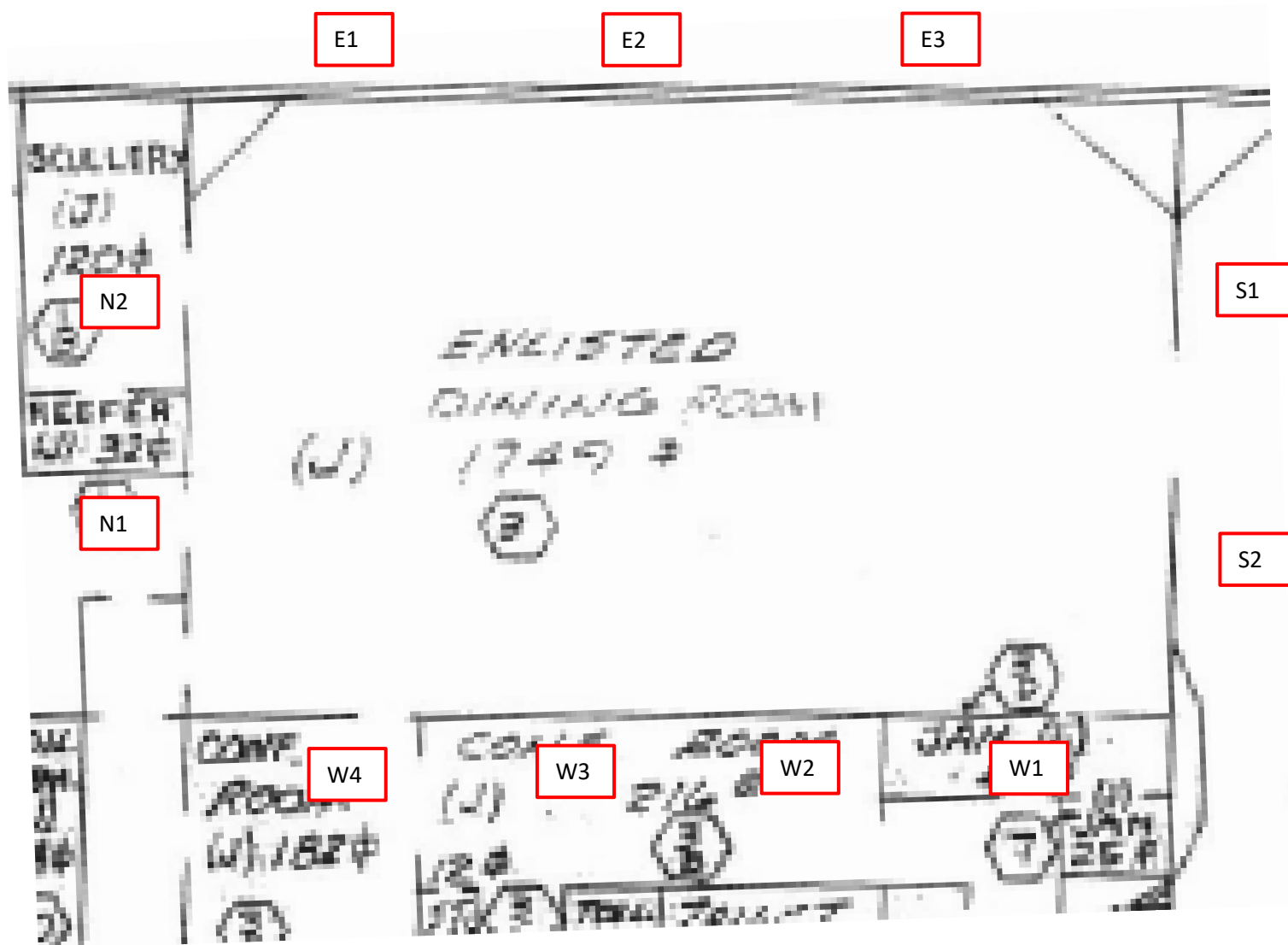


Detail showing the extent of the delamination and losses.










Detail showing the extent of the water damage, causing significant flaking paint and losses.







Material and Surface Defects

- | | | | | | |
|---|---------------------|---|------------------------------------|---|---------------|
|  | Canvas Delamination |  | Non Original Overpaint / Touch-ups |  | Original Seam |
|  | Water Damage |  | Surface Discoloration / Staining | | |
|  | Flaking Paint |  | Loss | | |

Dining Room Mural – W1

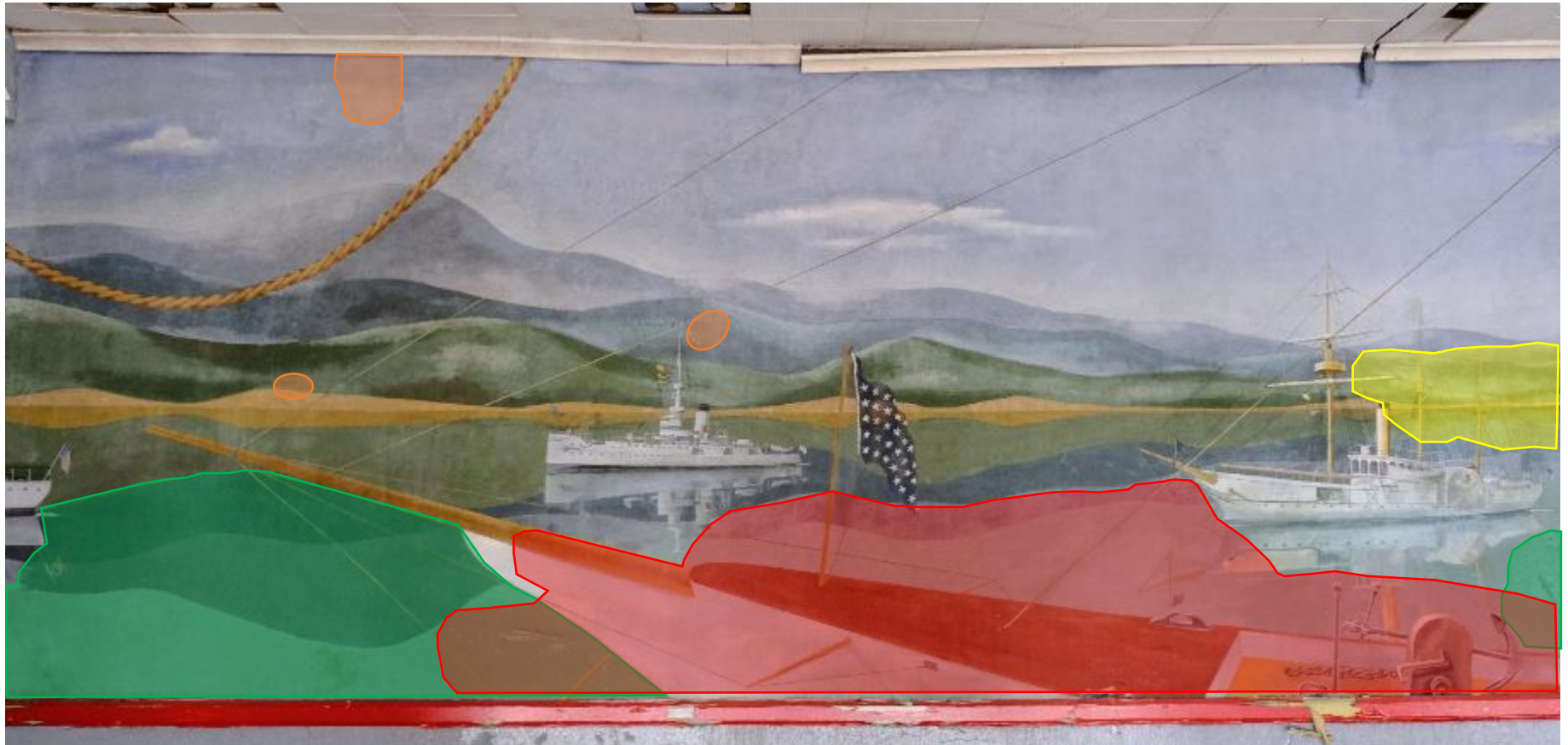
This panel is in fair condition but does have some issues. There is moderate amount of surface discoloration. There are a few areas where portions of the field areas have been repainted. Some of the repainted areas are flaking. Also, there is a small tear into the canvas on the left hand side that has caused a loss.






Detail of the right hand portion of the canvas where the dark grey, grey and green field areas are repainted.







Closer detail of the repainted area.



Material and Surface Defects

-  Canvas Delamination
-  Water Damage
-  Flaking Paint

-  Non Original Overpaint / Touch-ups
-  Surface Discoloration / Staining
-  Loss

-  Canvas Seam

Dining Room Mural – W2

This panel is in fair condition. A large portion of the lower field areas have been repainted. Some of the repainted areas are flaking and have exposed some of the earlier design. Also, there is some minor surface discoloration on the right hand side.

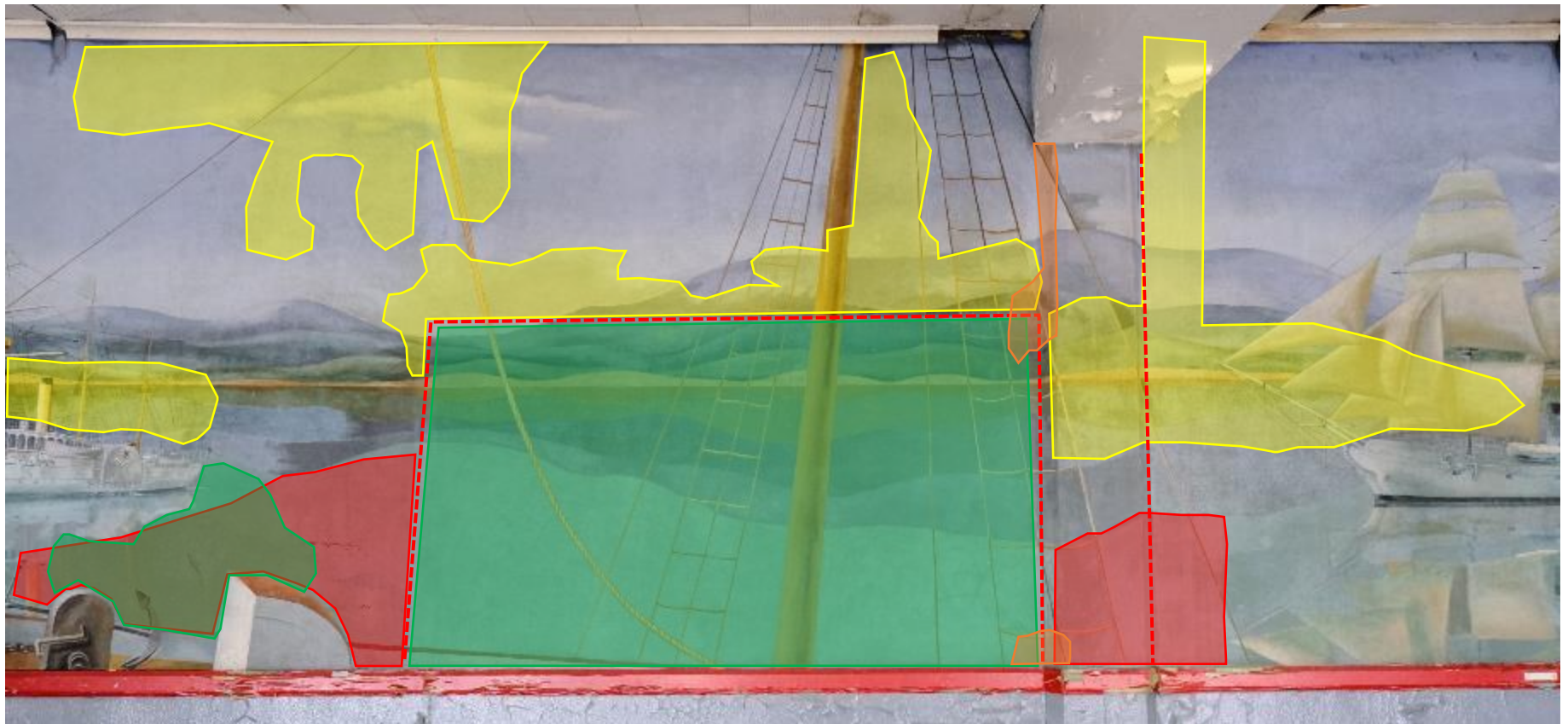


Detail of a repainted area along the bottom of mural. The overpaint is flaking and has exposed some of the earlier design.










Detail of an area on the right-hand side of the canvas. There is moderate surface staining and discoloration.

Dining Room Mural – W3

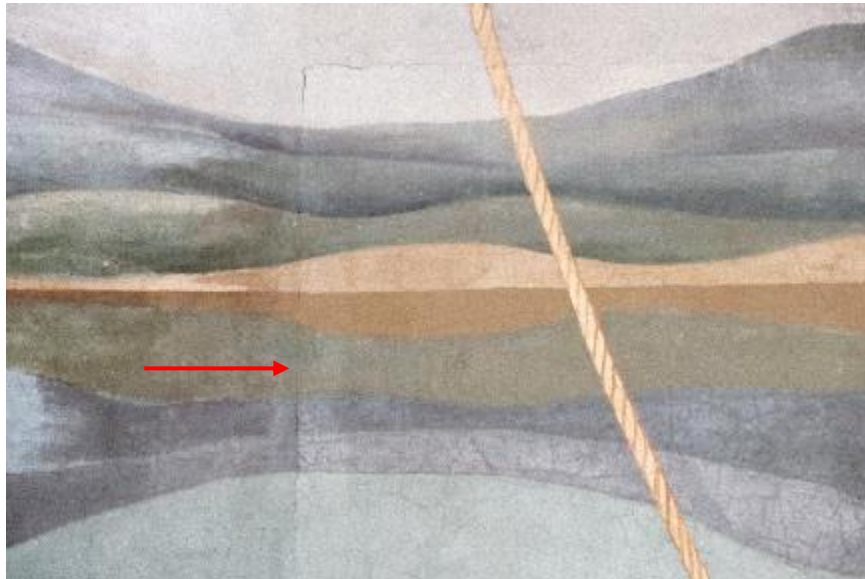


Material and Surface Defects

- | | | | | | |
|---|---------------------|---|------------------------------------|---|-------------|
|  | Canvas Delamination |  | Non Original Overpaint / Touch-ups |  | Canvas Seam |
|  | Water Damage |  | Surface Discoloration / Staining | | |
|  | Flaking Paint |  | Loss | | |

Dining Room Mural – W3

This panel is in poor condition. It is apparent that this section has had more direct water infiltration. A large portion of the lower center is repainted on an infill piece of canvas. This could have possibly been completed as an earlier repair. There are numerous larger areas of surface discoloration. Also, there is some moderate flaking paint along the lower portion of the mural as well some small areas of canvas delamination.



Detail of the canvas infill on the mural. The red arrow shows the canvas edge.



Detail of the lower right portion of the mural. There is some moderate to heavy surface discoloration.




Detail of the center right portion of the mural. There is some moderate to heavy surface discoloration.



Material and Surface Defects

 Canvas Delamination


 Water Damage

 Flaking Paint

 Non Original Overpaint / Touch-ups

 Surface Discoloration / Staining

 Loss

 Canvas Seam

Dining Room Mural – W4

This panel is in poor condition. It is apparent that this section has had similar water infiltration as in the adjacent area (W3). This has caused moderate to severe water damage including surface discoloration, some flaking paint and losses. The water infiltration is active as we noticed water running down the surface during a site visit. This is creating additional tide marks, efflorescence on the surface, and mold growth. Interestingly, this area does not appear to have any repainted or overpainted areas as found on the other areas on the west elevation.



Detail of the area above the door surround. The water infiltration has caused heavy tide marks, efflorescence, and some mold growth.



Detail of the upper right-hand corner. The water infiltration has caused heavy tide marks, efflorescence, and some mold growth.



Detail of the lower right-hand portion of the mural. The water infiltration has caused some surface discoloration and active flaking paint.

Dining Room Mural – NI



Material and Surface Defects

 Canvas Delamination


 Water Damage

 Flaking Paint

 Non Original Overpaint / Touch-ups

 Surface Discoloration / Staining

 Loss

 Canvas Seam

Dining Room Mural – N1

This panel is in poor condition. This section has had some water infiltration as in the adjacent areas (W3 & W4). This has caused moderate water damage including surface discoloration, some flaking paint and delaminated canvas. The upper right hand section of the mural on the face of the beam is missing.



Detail of the upper left-hand portion of the mural. The water damage has caused some surface discoloration, flaking paint, and losses.



Detail of the center top portion of the mural. The water damage has caused some surface discoloration, flaking paint, and losses.



Detail of the lower right-hand portion of the mural. The water damage has caused some surface discoloration, flaking paint, and losses. There also may be some mold growth.



Material and Surface Defects

- Canvas Delamination
- Water Damage
- Flaking Paint

- Non Original Overpaint / Touch-ups
- Surface Discoloration / Staining
- Loss

----- Canvas Seam

Dining Room Mural – N2

This panel is in poor condition. This section has had some water infiltration as in the adjacent area (N1). This has caused minor to moderate water damage including surface discoloration and delaminated canvas. A square portion of the canvas has been completely removed from the wall. It allows a view at the original lead based paste and how it adheres to the original plaster. Also, the right hand section of the mural has been cut and a portion is missing.



Detail of the center wall where a portion of the canvas has been removed. The piece was found and is in storage.




Detail of the damaged canvas on the right side of the mural.



Material and Surface Defects

 Canvas Delamination


 Water Damage

 Flaking Paint

 Non Original Overpaint / Touch-ups

 Surface Discoloration / Staining

 Loss

 Canvas Seam

Dining Room Mural – E1

This panel is in fair condition. This section has had some mild water infiltration as seen in the tide marks on the surface. The moisture has created a few areas of delaminated canvas creating a crease in one section on the left hand side and loose edges. There is also some surface discoloration throughout.



Detail of the left hand portion of the canvas between the windows. The moisture has left tide marks and caused a horizontal crease in the canvas.


Dining Room Mural – E2



Material and Surface Defects

 Canvas Delamination

 Non Original Overpaint / Touch-ups

 Canvas Seam

 Water Damage

 Surface Discoloration / Staining

 Flaking Paint

 Loss

Brodhead Armory – Mural Assessment

June 2022

Dining Room Mural – E2

This panel is in fair to poor condition. This section has had some water infiltration causing some damage on the upper right side. There are also tide marks on the surface. The moisture has created a few areas of delaminated canvas creating some loose edges close to the windows and at the original seams. There is also some mild surface discoloration throughout.






Detail of the left section of the mural. It shows the minor discoloration and tide marks.







Detail of the upper right-hand section above the window. The water infiltration has caused some surface discoloration. The canvas along the original vertical seam is delaminated.



Material and Surface Defects

-  Canvas Delamination
-  Water Damage
-  Flaking Paint

-  Non Original Overpaint / Touch-ups
-  Surface Discoloration / Staining
-  Loss

 Canvas Seam

Dining Room Mural – E3

This panel is in fair to poor condition. This section has had some mild water infiltration as seen in the tide marks on the surface. The moisture has created a few creases in the canvas. A large portion of canvas at the bump out has been cut and removed. There is also some surface discoloration throughout.



Detail of the lower center portion of the mural. The moisture has caused some creases on the canvas.

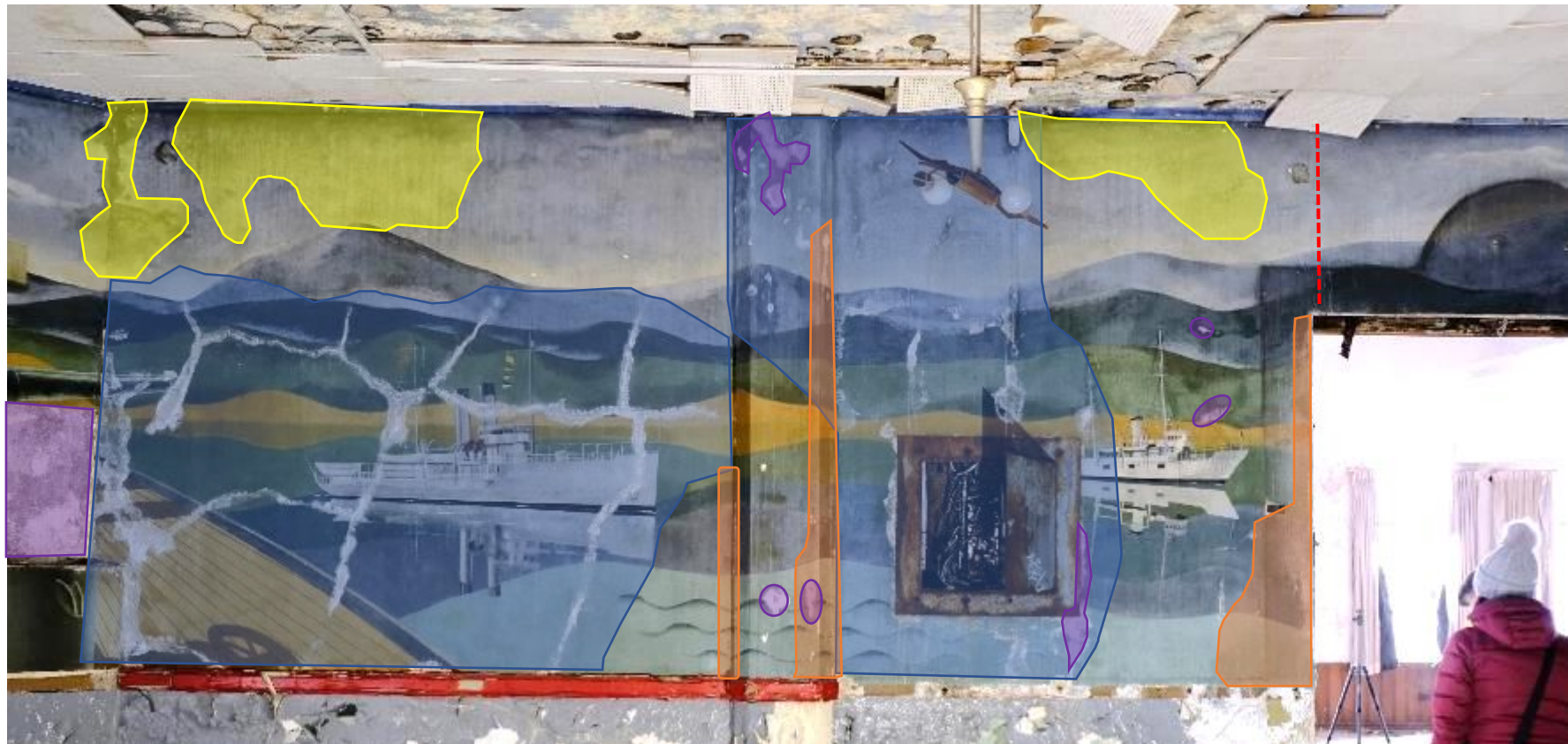


Detail showing the canvas that was cut and removed.




Closer detail of the canvas loss. It also shows the loose edges of the remaining canvas.

Dining Room Mural – S1



Material and Surface Defects

 Canvas Delamination


 Water Damage

 Flaking Paint

 Non Original Overpaint / Touch-ups

 Surface Discoloration / Staining

 Loss

 Canvas Seam

Dining Room Mural – S1

This panel is in poor condition. This section has severe water damage. The moisture has caused numerous creases in the canvas. The creases have paint losses. There are two moderate sized areas of canvas delamination. There is also some heavy staining and surface discoloration throughout.



Detail of the left hand portion of the mural. The moisture has caused numerous creases with losses and efflorescence staining.



Detail of the right hand portion of the mural. There is moderate water damage and efflorescence from the moisture.




Closer detail below the metal hatch showing the extent of water damage.

Dining Room Mural – S2



Material and Surface Defects

 Canvas Delamination


 Water Damage

 Flaking Paint

 Non Original Overpaint / Touch-ups

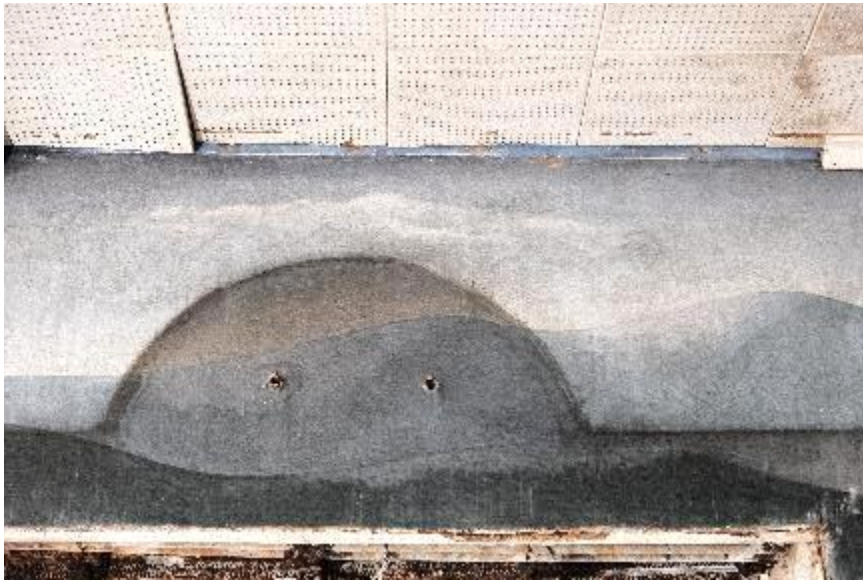
 Surface Discoloration / Staining

 Loss

 Canvas Seam

Dining Room Mural – S2

This panel is in poor condition. This section has had water infiltration. A large canvas section on the right hand side of the mural has become loose. There are a few other smaller areas of canvas delamination. The upper left portion of the mural has moderate amounts of tide marks and surface discoloration.



Detail of the upper left hand portion of the mural. The moisture has caused some surface discoloration.



Detail of the right hand side of the mural. The small portion of canvas on the bump out and the entire section of below has delaminated and is loose.

Bar Area Mural



Material and Surface Defects

- Plaster Delamination
- Water Damage
- Flaking Paint

- Non Original Overpaint / Touch-ups
- Surface Discoloration / Staining
- Loss

- Cracks
- Giornato Line

Bar Area Mural

The fresco mural in the bar area has significant water damage and is in very poor condition. The majority of the paint surface is impacted by efflorescence, flaking paint, losses and surface discoloration. A significant amount of the plaster has some level of delamination



Detail of the left-hand portion of the fresco. Water damage has caused significant damage and loss.



Detail of the center-left portion of the fresco. There is a significant amount of flaking paint and losses.



Detail of the center right portion of the fresco. There is a significant amount of flaking paint and

1st Floor Hallway Relief Panel 1



Material and Surface Defects



Water Damage



Loss

This section is in fair condition. There is some minor water damage along the center bottom edge. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 2



Material and Surface Defects



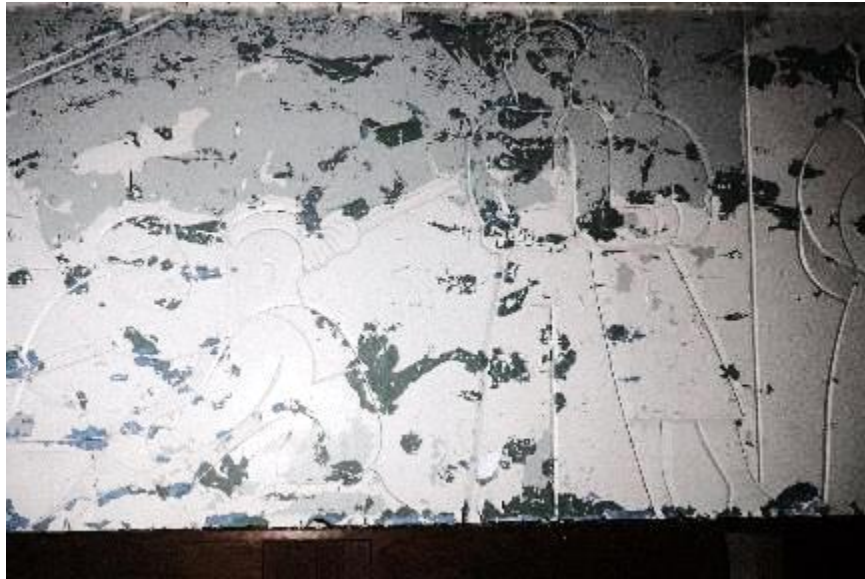
Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 3



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 4



Material and Surface Defects



Water Damage



Loss

This section is in fair condition. There is some minor water damage along the right-hand bottom edge. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 5

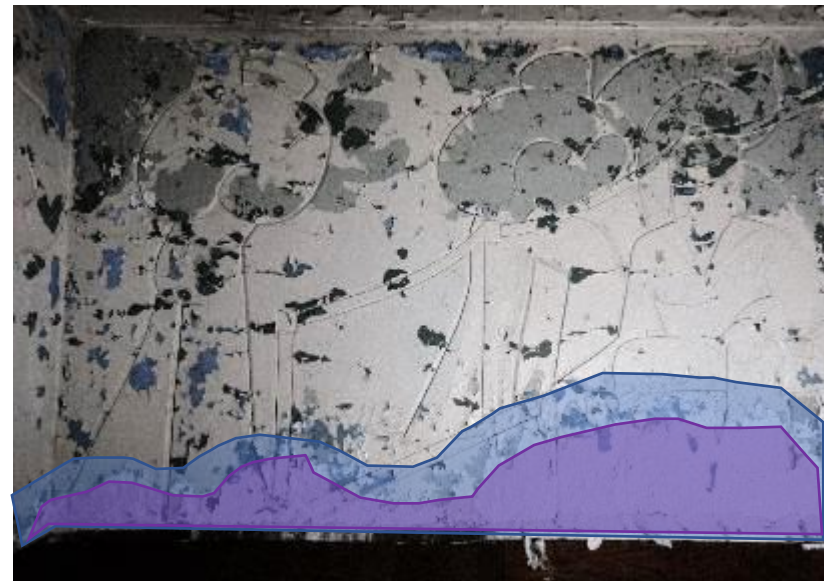


Material and Surface Defects



This section is in fair condition. There is some minor water damage along most of the bottom edge. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 6



Material and Surface Defects



This section is in poor condition. There is some moderate water damage along the most of the bottom edge. This has caused both efflorescence and some loss. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 7

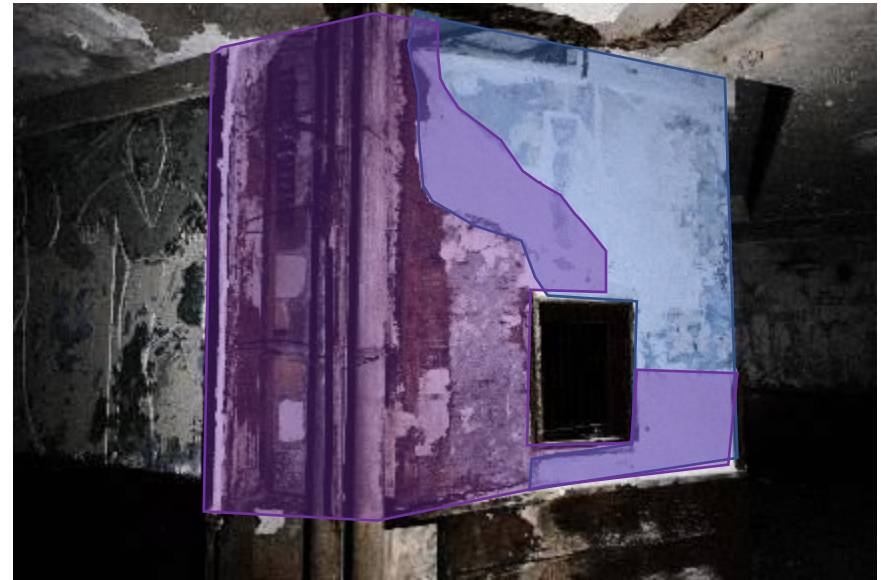


Material and Surface Defects

Water Damage
 Loss

This section is in fair to poor condition. There is some minor to moderate water damage along the left-hand bottom edge. This has caused both efflorescence and some loss. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 8



Material and Surface Defects

Water Damage
 Loss

This section is in poor condition. A majority of the plaster has been removed. The remaining section of plaster has severe water damage. This has caused both efflorescence and significant loss. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 9



Material and Surface Defects



Water Damage



Loss

This section is in fair to poor condition. There is some minor to moderate water damage along the left-hand vertical edge. This has caused both efflorescence and some loss. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 10



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 11



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 12



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 13



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 14



Material and Surface Defects



Water Damage



Loss

This section is in fair to good condition. There does not appear to be any real water damage. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 15



Material and Surface Defects



Water Damage



Loss

This section is in fair condition. There is some minor water damage along the right-hand bottom edge. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 16



Material and Surface Defects



Water Damage



Loss

This section is in fair condition. There is some minor water damage along the r bottom edge. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 17



Material and Surface Defects



This section is in poor condition. There is some moderate to severe water damage along the left and right sides of the panel. This has caused both efflorescence and significant loss. It has numerous paint layers with moderate amounts that are flaking.

1st Floor Hallway Relief Panel 18



Material and Surface Defects



This section is in poor condition. There is severe water damage on a majority of the panel. This has caused both efflorescence and significant loss. It has numerous paint layers with moderate amounts that are flaking.

Appendix A: Laboratory Analysis

Completed by

Catherine Matsen

Conservation Scientist

Winterthur Museum Conservation Lab

Date: May 23, 2022

Requestor: Anthony Kartsonas
Historic Surfaces LLC
1105 Maryland Street
Grosse Pointe Park, MI 48230
708 205 7164

Analyst: Catherine Matsen
2001 North van Buren Street
Wilmington, DE 19802

SAMPLE DESCRIPTION

Brodhead Armory Murals; Detroit, Michigan

Dining Room Mural

Mural by Edgar Yaeger

Media: Paint on Canvas attached to plaster

- Canvas Sample C1
- Canvas Sample C2

Ward Room Fresco

Mural by David Fredenthal

Media: Fresco on Lime Plater

- Sample W1; sample was extracted from damaged portion on bottom right corner.

PARTICULAR INTEREST

For the Dining Room Canvas Samples C1 and C2, to determine the composition of the original paint layer and to characterize the adhesive paste material applied to the back of the canvas to adhere it to the wall.

For the Ward Room Fresco, to determine the composition of the plaster substrate and first generation finish applied to the plaster.

EXPERIMENTAL

Fourier-transform Infrared (FTIR) microspectroscopy

Target layers from the samples were analyzed by FTIR (Fourier-transform infrared) microspectroscopy, an instrumental technique that permits the general classification of natural organic materials (such as waxes, proteins, oils, polysaccharides, and resins) and the more specific identification of synthetic resins, inorganic pigments, and natural minerals. Sample material was acquired with a stainless steel scalpel and the aid of a stereomicroscope and then

placed directly on a diamond cell. The material was rolled flat on the cell with a steel micro-roller to decrease thickness and increase transparency. The sample was analyzed using the Thermo Scientific Nicolet 6700 FT-IR with Nicolet Continuum FT-IR microscope (transmission mode); data was acquired for 128 scans from 4000 to 650 cm^{-1} at a spectral resolution of 4 cm^{-1} . Multiple scrapings of the sample were taken from the bulk sample and multiple spectra were taken from different areas within each scraping. Spectra were collected with Omnic 8.0 software and analyzed in this program with various IRUG and commercial reference spectral libraries.

Raman Spectroscopy

The target layer material was analyzed in situ on the bulk material submitted by the requestor with Raman spectroscopy using the Renishaw Invia Raman spectrometer (785nm diode laser) in conjunction with WiRE 3.4 software with extended scan from 200-1800 cm^{-1} , 20 \times /50 \times objective lens, exposure time of 10/60 seconds/scan for one accumulations, and 1% laser power.

RESULTS

FTIR spectra of Sample C1 with reference spectra are provided in Figures 1-3; FTIR spectra of Sample C2 with reference spectra are provided in Figures 4-6.

Sample W1 FTIR are provided in Figures 7 and 8; Raman spectra are provided in Figures 9 and 10.

DISCUSSION and CONCLUSIONS

Dining Room Canvas Samples C1 and C2

The adhesive paste on the back of the canvas is composed of lead white in a drying oil as determined with FTIR analysis (Figures 1 and 4). The binding medium of the original paint layer is a drying oil (Figures 2 and 5). Additional components of the paint detected with FTIR are zinc stearate, talc, Prussian blue and ultramarine pigment (Figures 3 and 6).

Ward Room Fresco Sample W1

FTIR analysis detects the presence of primarily lime (calcium carbonate/lime/chalk) with a small amount of gypsum in the plaster substrate (Figure 7); Raman spectroscopy detects only the presence of lime (calcium carbonate/lime/chalk) with direct analysis of the bulk plaster material. The first-generation finish applied to the plaster is composed of both lime and gypsum as detected with both FTIR and Raman analysis.

Figure 1 FTIR spectrum of Dining Room Canvas Sample C1 paste on back of canvas (red spectrum) overlaid with reference spectrum for lead white in linseed oil (green spectrum).

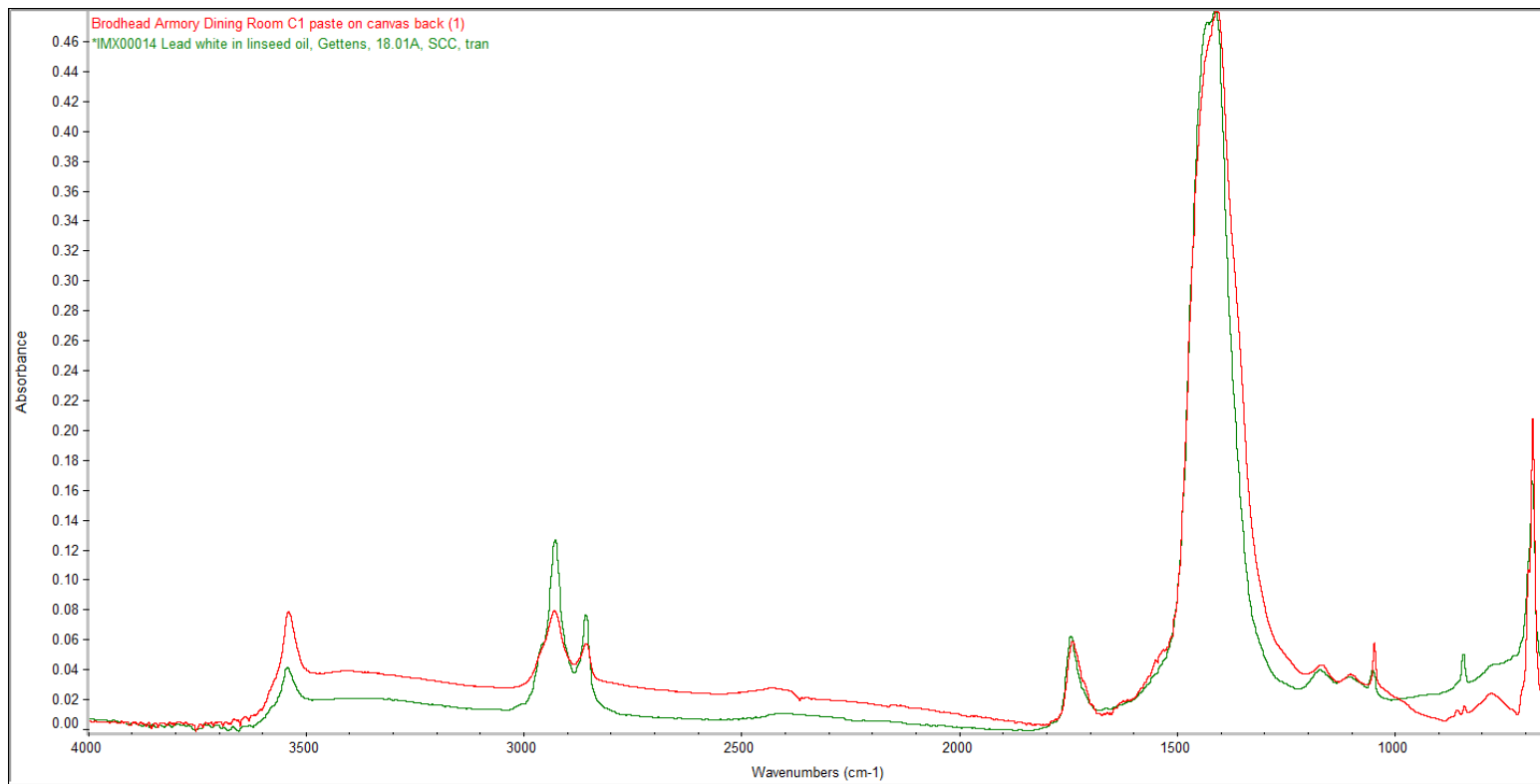


Figure 2 FTIR spectrum of Dining Room Canvas Sample C1 paint (red spectrum) overlaid with reference spectrum for linseed oil (green spectrum).

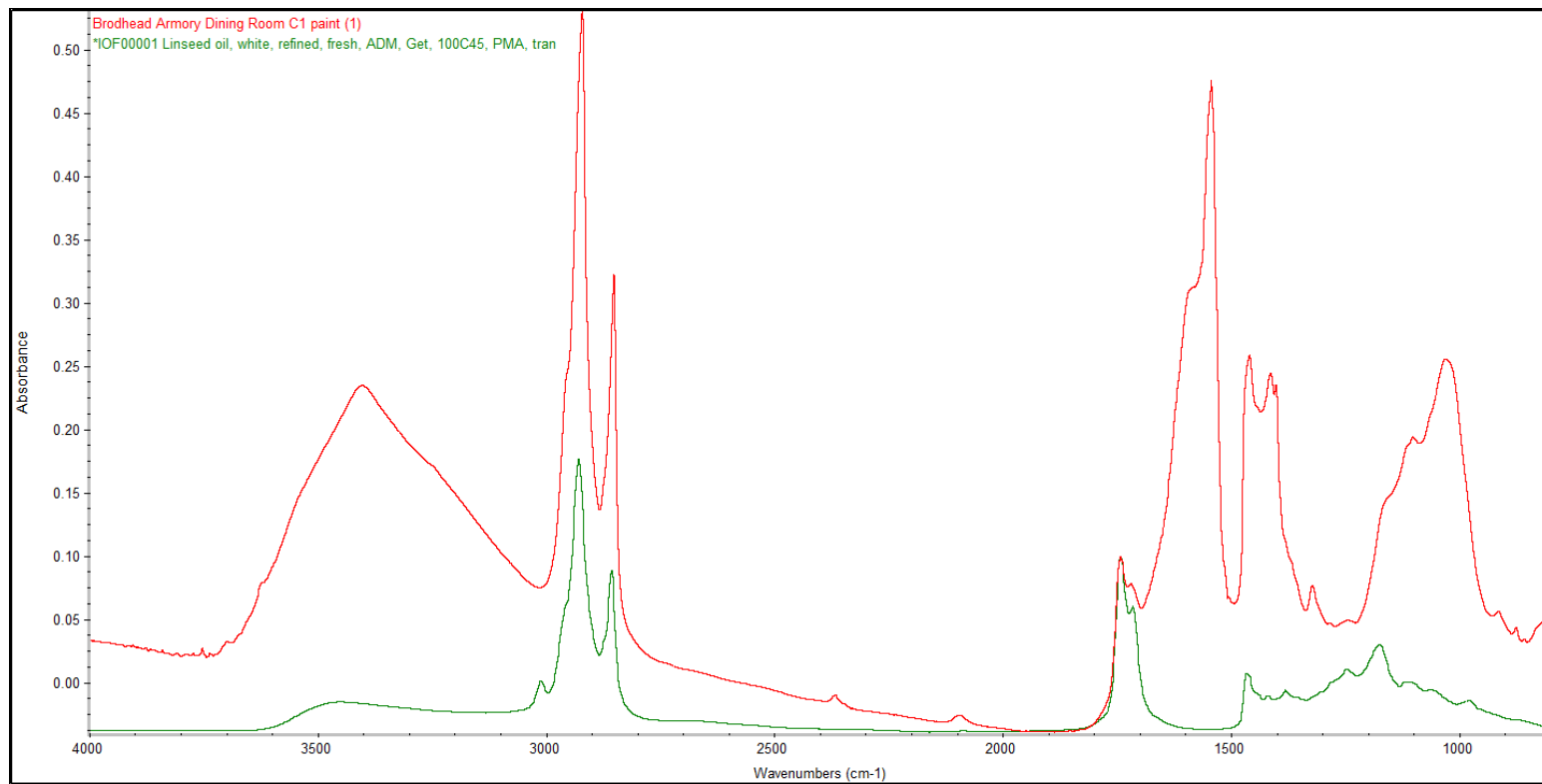


Figure 3 FTIR spectrum of Dining Room Canvas Sample C1 paint (red spectrum) overlaid with reference spectra for zinc stearate (green spectrum), ultramarine (purple spectrum) and Prussian blue (blue spectrum).

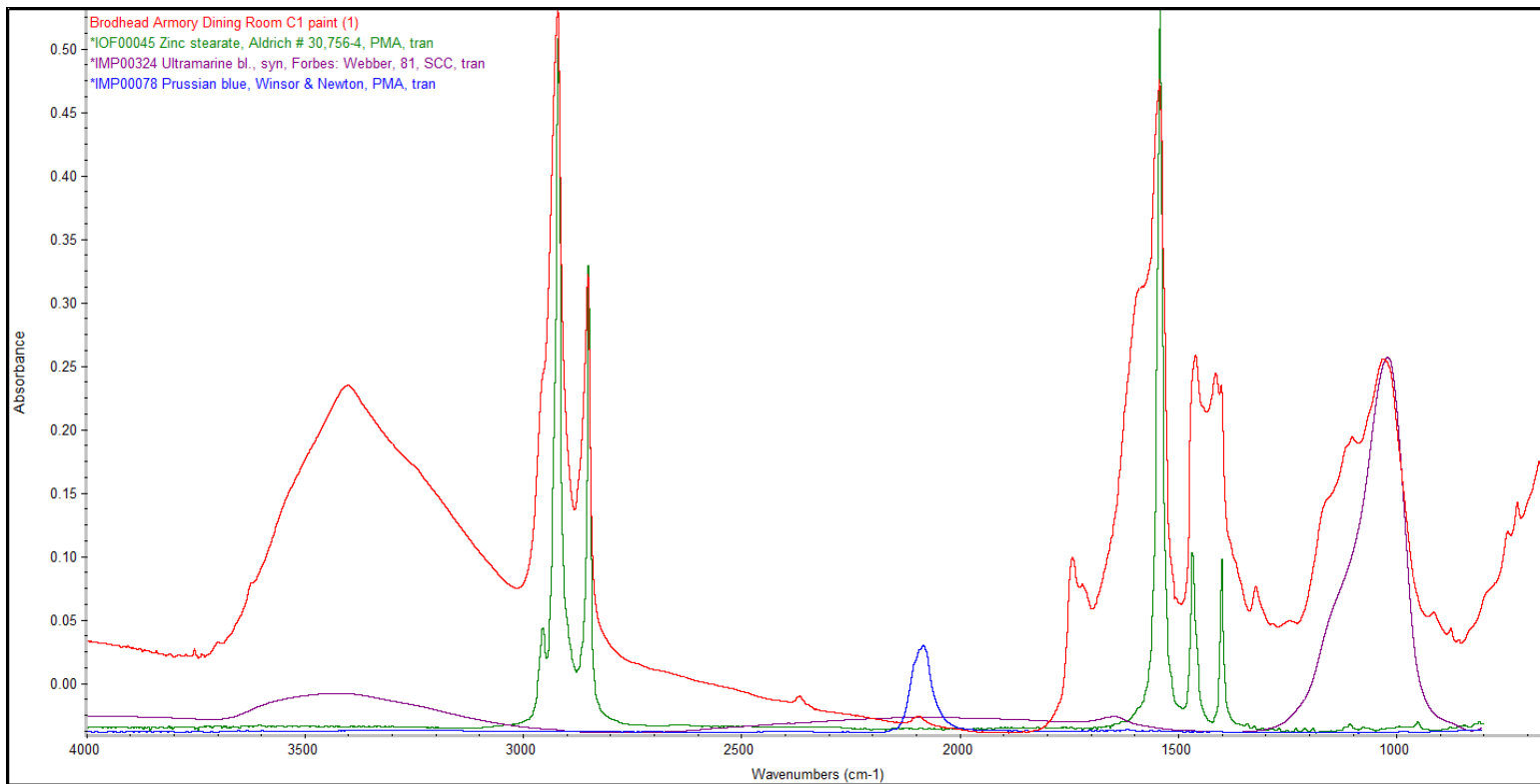


Figure 4 FTIR spectrum of Dining Room Canvas Sample C2 paste on back of canvas (red spectrum) overlaid with reference spectrum for lead white in linseed oil (green spectrum).

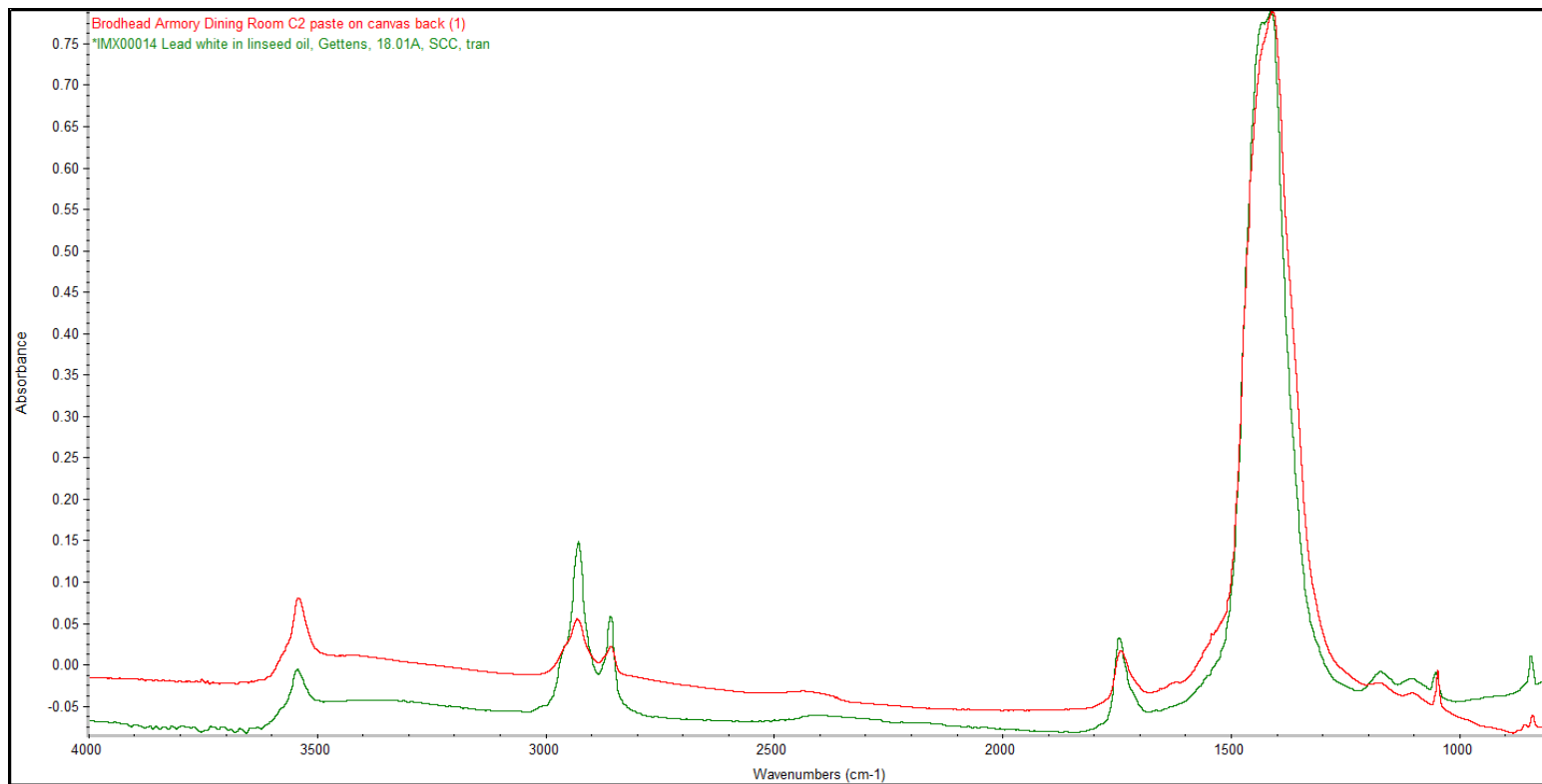


Figure 5 FTIR spectrum of Dining Room Canvas Sample C2 paint (red spectrum) overlaid with reference spectrum for linseed oil (green spectrum).

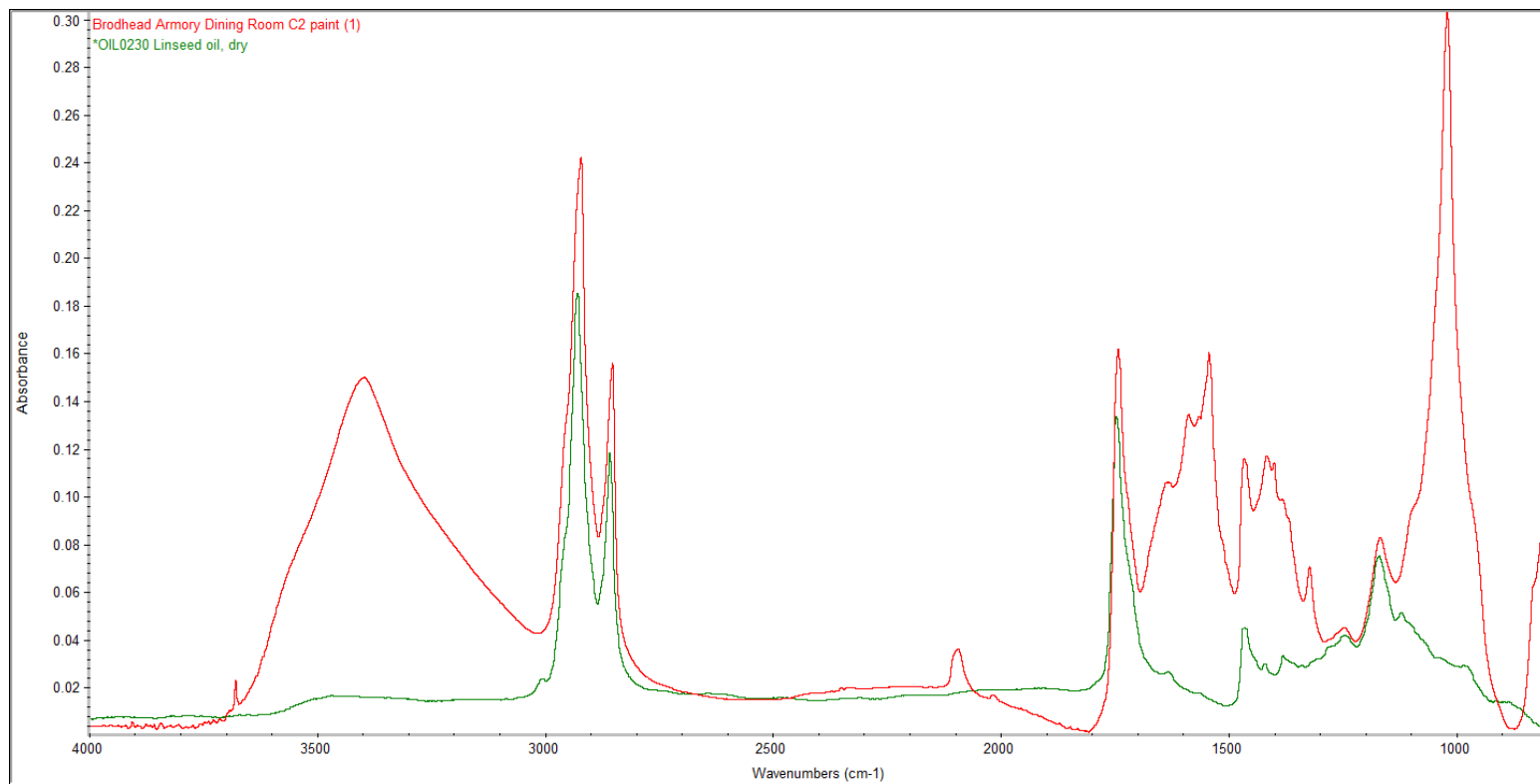


Figure 6 FTIR spectrum of Dining Room Canvas Sample C2 paint (red spectrum) overlaid with reference spectra for zinc stearate (green spectrum), talc (purple spectrum) and Prussian blue (blue spectrum).

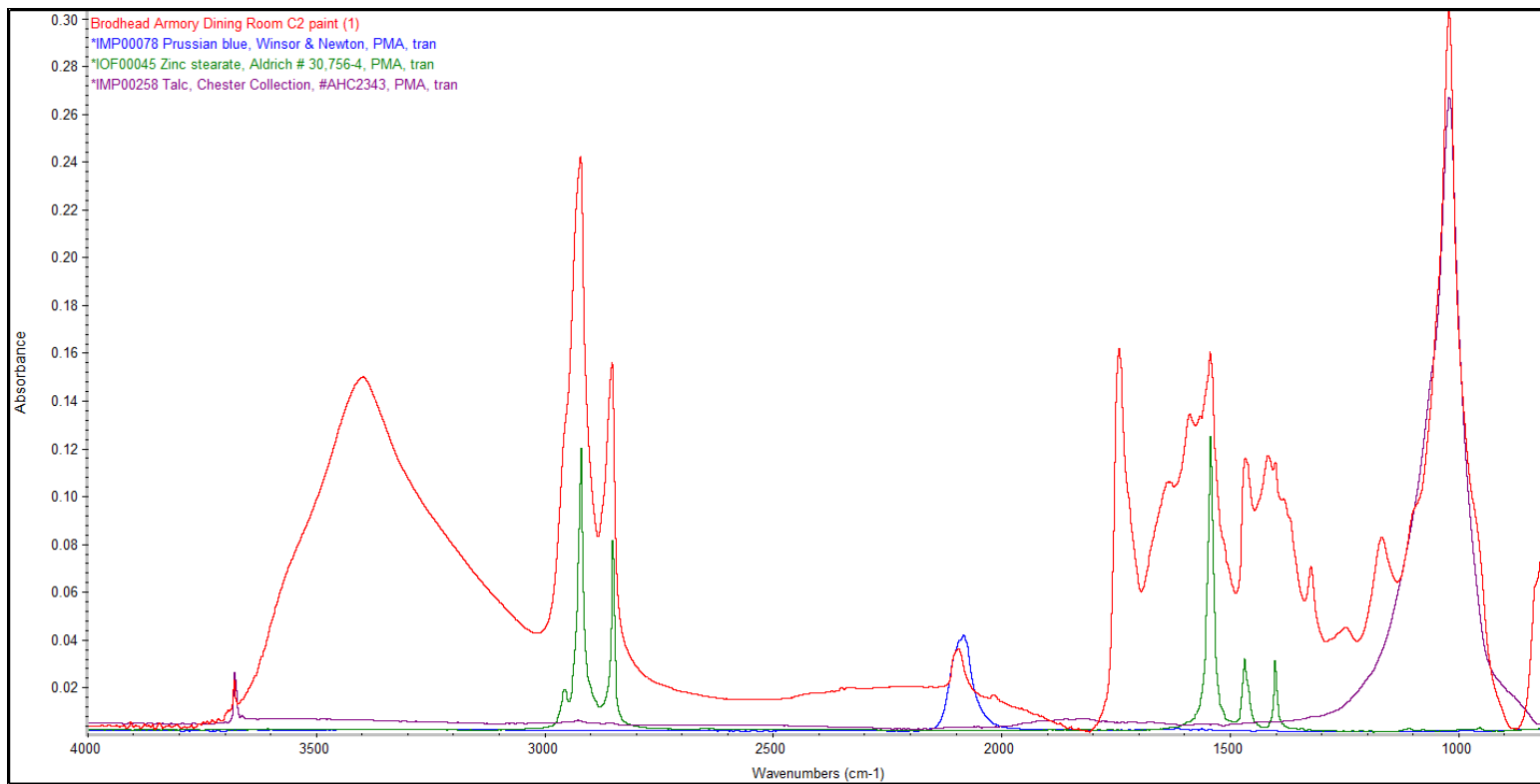


Figure 7 FTIR spectrum of Ward Room Sample W1 substrate (red spectrum) overlaid with reference spectra for calcite (green spectrum) and gypsum (blue spectrum).

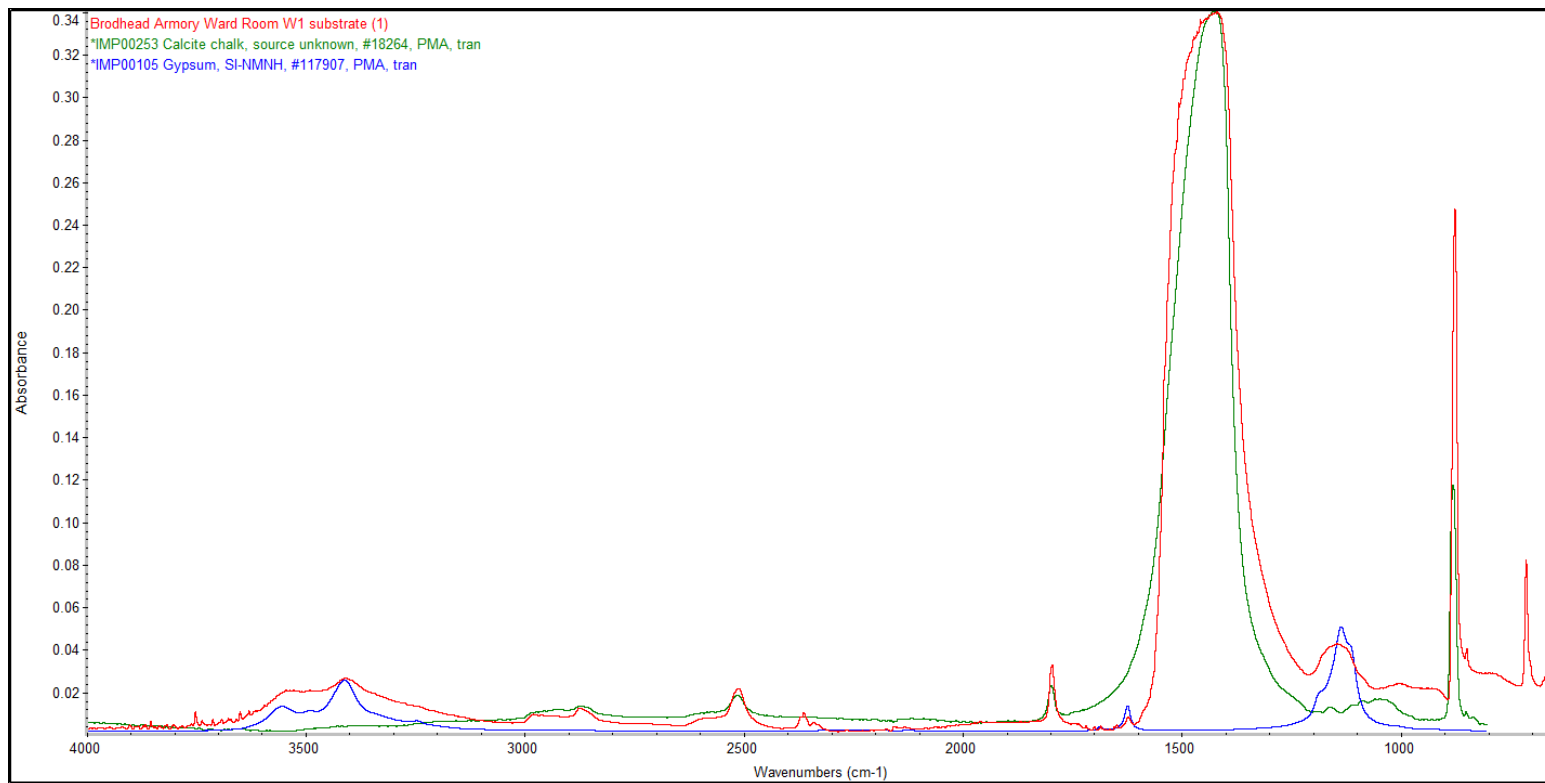


Figure 8 FTIR spectrum of Ward Room Sample W1 paint (red spectrum) overlaid with reference spectra for gypsum (blue spectrum) and calcite (green spectrum).

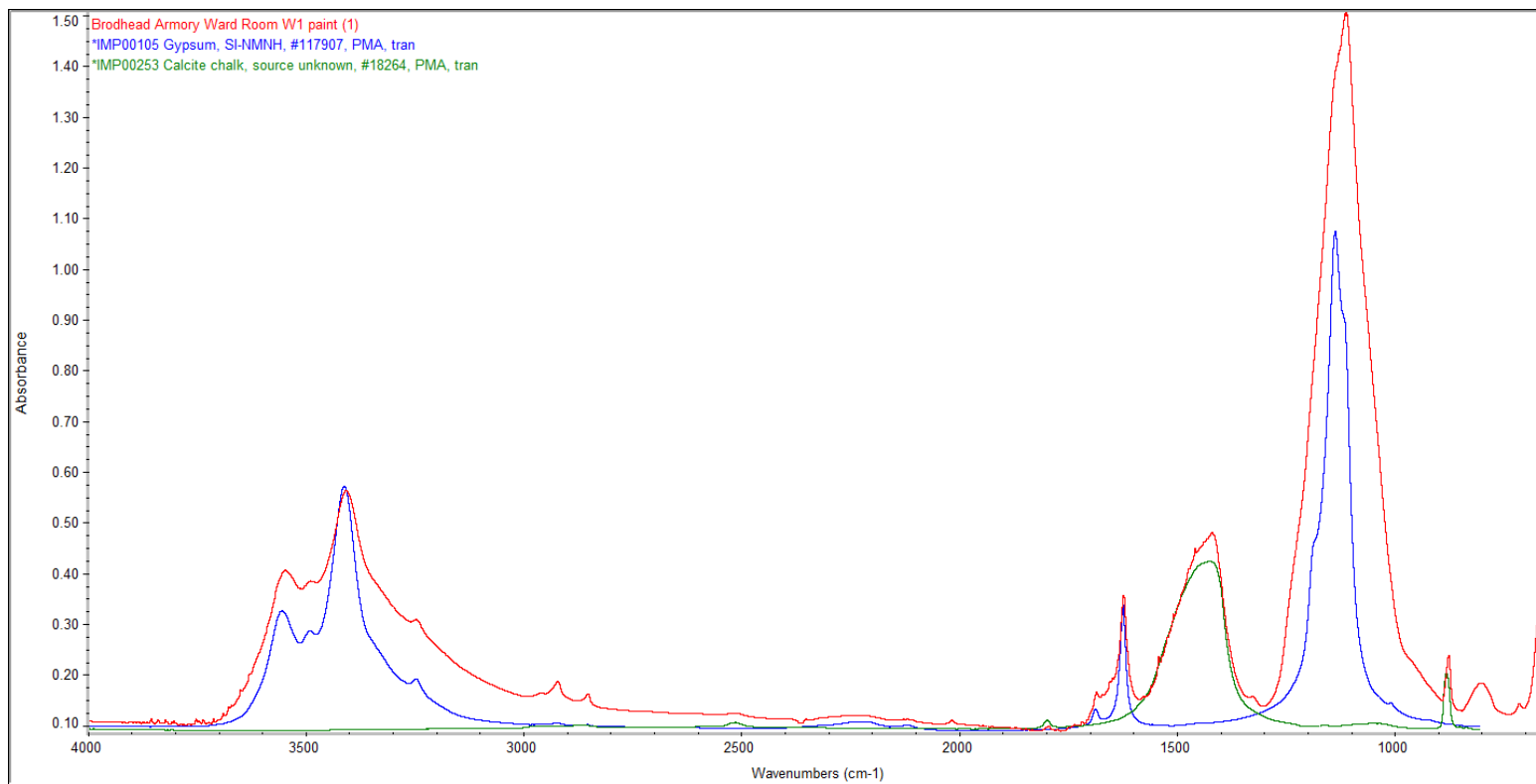


Figure 10 Raman spectrum of Ward Room Sample W1 paint (red spectrum) overlaid with reference spectra for calcium carbonate (blue spectrum) and gypsum (green spectrum).



Appendix B: Fresco Removal Diagram

Completed by

Simon Leverett

Historic Masonry Expert

Leverett Masonry Consulting

Leverett Masonry Consulting

www.masonguru.solutions

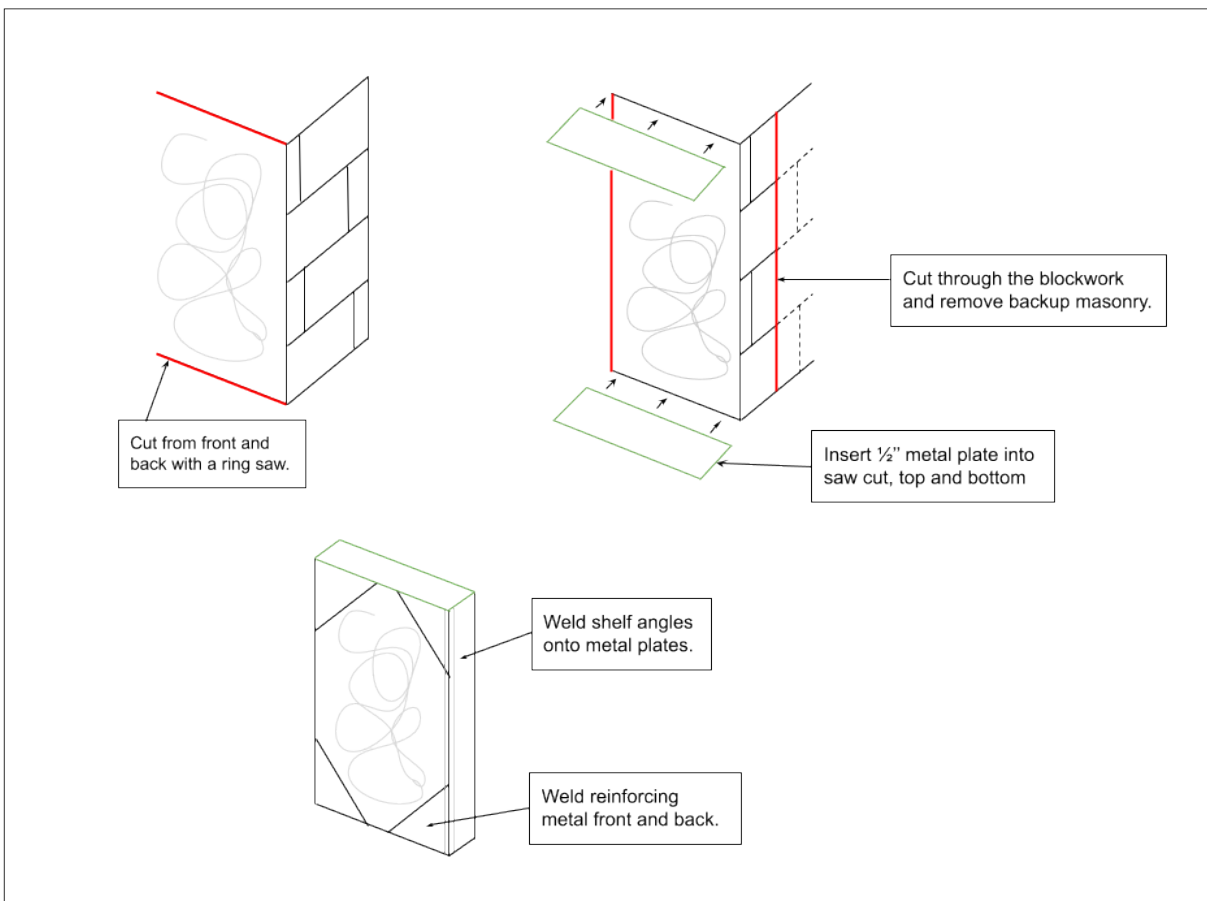
◆ Specifications ◆ Inspections ◆ Training

March 1st, 2022

Dear Mr. Kartsonas,

After my visit to the Brodhead Naval Armory, I considered the options available to remove the large WPA mural in the Wardroom. As the murals are mounted directly onto breeze/cinder block, this is not a simple task. By cutting the murals into smaller sections and installing a metal cage around the sections, using steel plates and shelf angles, it would be possible to remove the sections without causing damage. Obviously, there would be work for the conservator to stabilize the finishes and again when it comes time to reassemble the murals. Because the block has been exposed to water and freezing temperatures (causing damage to the mortar), the chances of removing large sections of blockwork in one go without causing damage is highly unlikely.

The drawings below show a method of removal but not without many challenges. The largest being access to remove and relocate the panels since the murals on an upper floor of the building with no access of using a small skid steer or forklift. Some sort of hydraulic lift of scaffold lift could possibly work to extract the pieces and move them to the door located on the east elevation. Once the pieces are at the east elevation, a scaffold system or crane would be required to lower the pieces to the ground (see photograph below).



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◆ Specifications ◆ Inspections ◆ Training



Example of a scaffold system with lift capabilities.

Appendix C: Report on the Removal of Frescos
at St. Leonardo Chapel

Completed by

Adele Trazzi

Conservator

Verona, Italy

Detachment of two wall paintings depicting St. Giuseppe and the Annunciation of Mary, by painter Carlo Bonacina (1961), placed in St. Leonardo Chapel in the Seminary of Stigmatini Congregation in Verona.



Carlo Bonacina is an artist (Mestrino 09/20/1905, Pergine Valsugana 01/30/2001), working in Verona and Trentino, that belongs to Magic Realism Current and his production counts many frescos because of his contemporary cultural atmosphere, characterized by rediscovery of antique traditional techniques.

The artworks under intervention are fresco paintings on a thin plaster rendering made of lime and sand. The pigments were applied on lime layer, while the plaster was still moist in order to obtain a white background on which to paint and to keep more moisture, required for the fresco technique.

The pictorial surfaces were at first dry cleaned with brush, vacuum cleaner and Wishab sponge; then washed with demineralized water and microporous sponge to limit the amount of moisture.

Materials list:

- carpenters bone glue (Cervione glue);
- molasses;
- vinegar;

- oxgall.

Textile fabrics:

- open weave/wide woven cotton gauze and tightly woven cotton canvas. Fabrics were washed to remove any sizing then ironed.

Rigid plywood support was cut the same size as two detached paintings.

In order to ensure an homogeneous cohesion of the paint layer, Paraloid B72 5% acetone was applied twice with a brush. After the solvent evaporated, facing glue was applied.

The adhesive was prepared using the bain-marie method and mixed all the ingredients it was applied very hot with a brush directly on the fresco to prevent the gauze texture from being imposed on the painting.

Wide woven cotton gauze was adhered to it, further it was secured with a second coat of warm glue. After the gauze got dry, the most consistent canvas was applied using bone glue in the same way to what was done for the gauze layer.

Before proceeding with the mechanical removal of the paintings, the specially prepared multi-layer panel was fixed with staples to the facing canvas. To facilitate the detachment of the plaster from the wall, the surface was beaten with a hard rubber mallet after which with the help of steel blades, proceeding from bottom to top, the wall painting was removed.



Back working process.

The supporting plaster has been thinned and regularized with metal spatulas, scalpel and abrasive papers. Some gaps have been filled with lime and sand, likewise the original support. The treated surface was fixed with Acril 33 to 20% in water. The backing of the painting was carried out with the application of a double layer of cotton fabric glued with calcium caseinate.

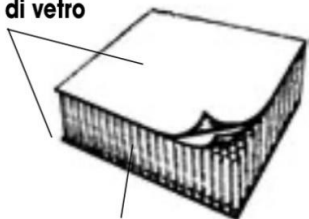
After the time necessary to solidify the caseinate (about 20 days), the facing with boiling water has been removed.



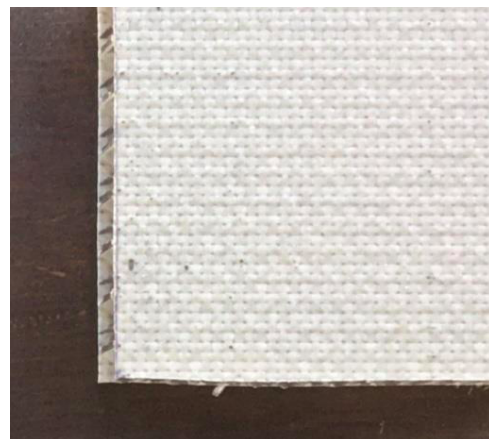
Preparation of the new support.

The new support of the detached paintings was made by gluing with Mowital B60HH in alcohol solution, a sheet of expanded polystyrene suitably perforated to facilitate the evaporation of the solvent on a panel consisting of an aluminum honeycomb structure between two sheets of resin glass (Areolam®). The painting released from the facing has been glued to the new support with Mowital B60HH, left under the pressure of a homogeneous layer of sand to ensure the correct adhesion of the sandwich, allowing the evaporation of the solvent.

Strati in tessuto di vetro



struttura in alluminio a nido d'ape





Aesthetic presentation.

The grouting of the gaps was made with lime, sand and marble powder in imitation of the original texture.

The pictorial integrations were carried out with watercolor.

