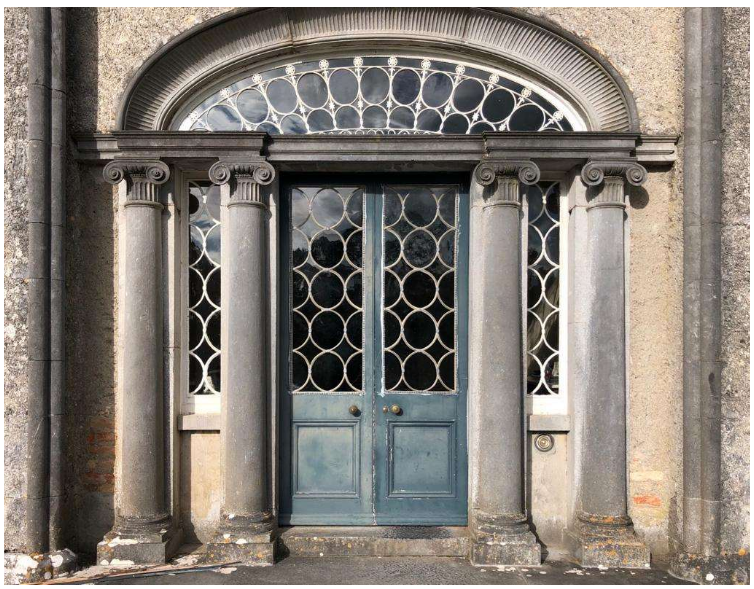
# Examination and Conservation Treatment Report

## X House Entrance Leadlight Casements

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Appendices

# 1. Introduction

The aim of this report is to briefly outline the historic context and condition of the two leadlight casements from the front entrance doors of X, Co. Offaly, to record the condition and treatment proposed for conservation, and to evaluate the success of the treatment carried out.

## 2. Object Identification

| | |
|---|---|
| Object name / type : | 2no. casement leadlights from X |
| Owner : | X |
| Date / Period of production : | unknown, c.1810 |
| Maker, designer, artist : | unknown, (design of house attributed to architect Richard Morrison) |
| Inscriptions, markings : | scratched graffiti on pane of Casement 2 (illegible, possibly : *F. F. Setatrue P)* |
| Measurements (H x W x D) : | 1353 x 476 x 20mm |
| Materials : | Cast lead, wrought iron, solder, historic and contemporary glass |
| Origin : | Co. Offaly, Ireland |
| Conservator : | Róisín Beirne |
| Date of treatment : | 10th May 2019 – 27th June 2020 |

Fig.1 - Casement 1 (April 2019)

Fig.2 - Casement 2 (April 2019)

## 3. Object Examination

## 3.1 Description

The objects are two leadlight casements from the panelled double doors at the front entrance of X, Co. Offaly. The full glazing of the entrance way consists of a matching fanlight, and sidelights. The design of the house is attributed to the architect Richard Morrison and it is likely this distinctive glazing scheme dates to the original construction c.1810, (NIAH, 2004). The function of these casements, the transom fanlight and sidelights was to illuminate the otherwise dark foyer while adding a distinctive decorative feature to the building's façade. It is probable that the leadlights were painted originally in an off-white colour to cause them to stand out against the darkened glass, (Pearson 2006, Baty 2011). The windows were removed approximately eight years ago following damage and have remained in storage since.

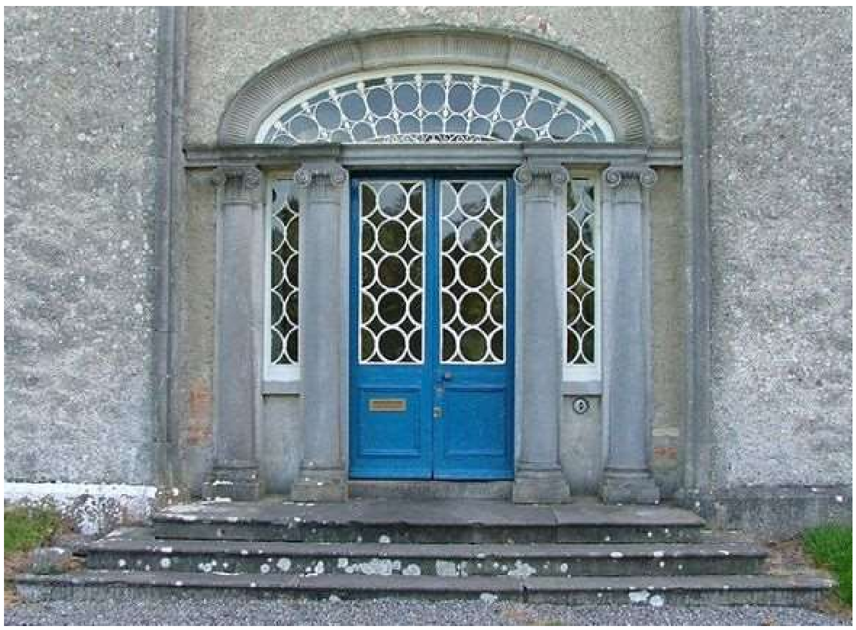

Fig.3 - 'Front entrance', NIAH, 2004, Co. Offaly.

Fig.4 - 'Front façade', NIAH, 2004, Co. Offaly

## 3.2 Materials and fabrication

The casements are constructed from a flat bar metal frame and glazing bars, with decorative cast lead detailing on the exterior and glazed with a variety of different clear glass types. The flat bar creates a semi-rigid structure into which the glass panes can be puttied. The lead front is mainly decorative but does provide a rebate in which to secure the panes. The combination of these elements reinforce each other and when correctly and securely positioned within a timber surround creates a structurally sound casement.

### *Leadwork*

The decorative lead facing on the casements was most likely fabricated using an open sand cast mould. A pattern would have been made of wood or plaster and pressed into an open box of fine, damp sand to make an impression. Molten lead would then have been poured into this void to create the cast. When cooled, the decorative lead sections could be removed and any excess sand brushed off its surface, (SPAB Conservation of Decorative Leadwork). These sections would then have been soldered into position from behind onto the flatbar metal frame.

Four distinct cast patterns were used in these casements.

No.1 A straight line of chunky semi-spherical dots create a border around the exterior frame.

Fig.5 - Decorative lead detail No.1 from above, Casement 1

Fig.6 - Decorative lead detail No.1 from side, Casement 1

No.2 A finer curved line of smaller semi-spherical dots adjacent to a raised rib which cover the circular glazing bars. This section was most likely cast as a full oblong circle and manipulated or cut to fit where needed.


Fig.7 - Decorative lead No.2 full circle, Casement 2


Fig.8 - Decorative lead detail, Casement 2

No. 3 A sixteen petaled flower positioned on the joint between the central circle and the side half circles. These were soldered into position over the No.2 decorative strip beneath.


Fig.9 - Decorative lead No.3 : 16 petal flower, Casement 1

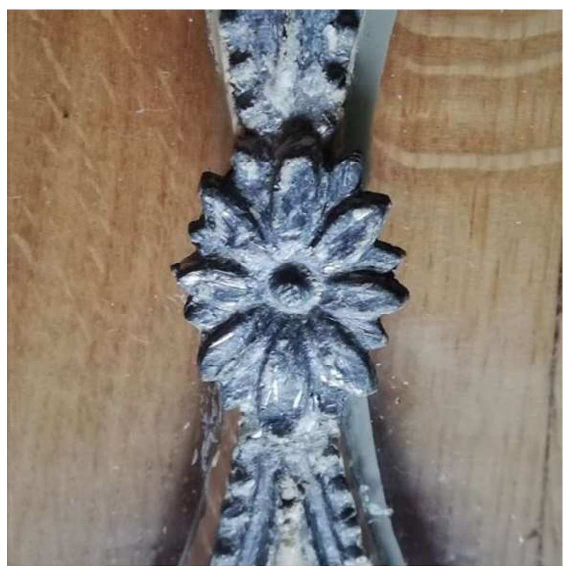
Fig.10 - Decorative lead No.3 : 16 petal flower, Casement 2

No. 4 A smaller eight petal decorative flower positioned on the joins at the top and bottom of the circular No.2 strips and positioned in halves and quarters where the circular glazing bars meet the exterior No.1 strip.

Fig.11 - Decorative lead No.4 : 8 petal flower, Casement 1

Fig.12 - Decorative lead No.4 : 8 petal flower, Casement 1

*Metal flat bar frame and glazing bars*

The metal flat bar is approximately 1.5 x 15mm in dimensions. It is most likely rolled wrought iron coated with a thin coating of a more corrosion resistant metal, most likely tin.

Fig.13 -. Silver coloured metal coating, Casement 1

Fig.14 - Patches of orange corrosion, Casement 1

At first where visible under loose putty the flat bar appears to have a light silver colour similar to zinc, a metal that was sometimes used rolled for fanlight frames. The metal, however, attracts magnets suggesting it is ferrous. Orange corrosion evident in patches is also suggestive of ferrous metal. The silver sheen noted on the metal is a very thin even coating on both sides of the flat bar. As the coating was most likely uniform when originally made it is possible it was plated by dipping in molten tin, a practice that was commercial used in the UK since the 1600's to protect iron from corrosion. The practice of coating iron in zinc by dipped it in the molten metal, an early form of galvanising, was first recorded in France in 1742 but wasn't patented in the same country or the UK until 1836 and 1837. Hot-dip zinc however produces a very distinctive spangled coating which is not evident on these casements. Electro-plated zinc lacks the spangled appearance, but while experimentally demonstrated from the 1820's was not used viably until the development of the electric dynamo in the 1880's. The flatbar was most like plated in molten tin.

The glazing bars and frame are fixed to each other and the decorative lead front by solder joints. The combination of the soldering to the lead front and to each other is what gives the structure some robustness. Without glass however to give rigid lateral support the entire structure is surprisingly flexible and fragile.

Blocks of solder are used as spacers where sections do not meet evenly around the exterior of the frame. These solder blocks are also placed in areas susceptible to movement and extra stress; at the corners and where the circular frames meet the exterior at the base and top so may have provided some extra reinforcement also, (fig. 15 & 16).

There are ten evenly spaced holes along each long side and two on each short side of the casements to allow for fixing into the timber door. This gives some clues as to how the casements were originally assembled in the door. The flatbar frame and lead fronting would most likely have been assembled off site. The full metal frame would have then been placed into the timber door on site without any glass, nailed into position using these holes and the glass would have been subsequently puttied into place.

Fig.15 - Solder block on the base of Casement 1

Fig.16 - Solder block in the corner of Casement 1

*Glass and Glazing*

There a are multiple different types of glass in these casements, most likely a result of repetitive breaking and repair of individual panes over the years. Crown, cylinder and float glass could be identified by surface undulations, colour tints and varied thicknesses, (fig.17 and 18). Of the glass that was removed, either as a result of repositioning or breakage the thickness of the glasses varied from 1.25-3mm. The colour tinting of the glass varied from almost white to light green, to light blue/green.

Fig.17 – Different hues of clear glass, C1

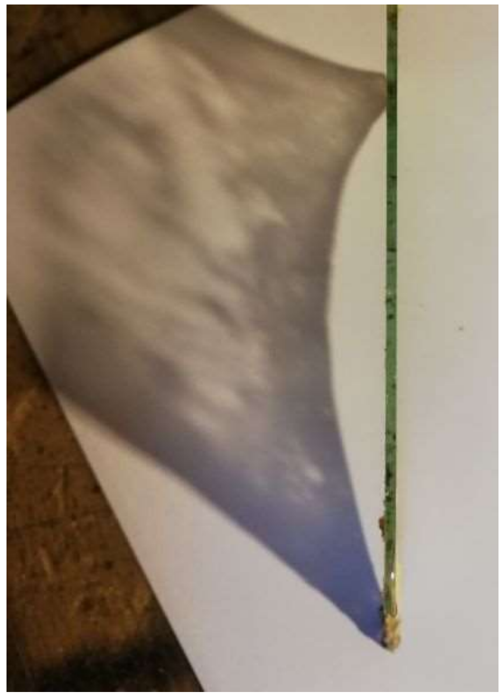

Fig.18 – Curved striations visible in reflection, C2

On a pane in Casement 2 there is some historic graffiti scratched into the glass surface, possibly *F. F. Setatrue P*. In historic windows, particularly of churches and public buildings graffiti signatures can often be found dating from the 15th century when literacy became more prevalent up to the present day. It was a common practice for glaziers to scratch their names and dates into panes of windows they were working on, though usually these would be high up and in hard to see places. It is probably however, that as this signature is in a very prominent casement in the entrance doors, that the signature might be of a past resident, or a guest that visited.

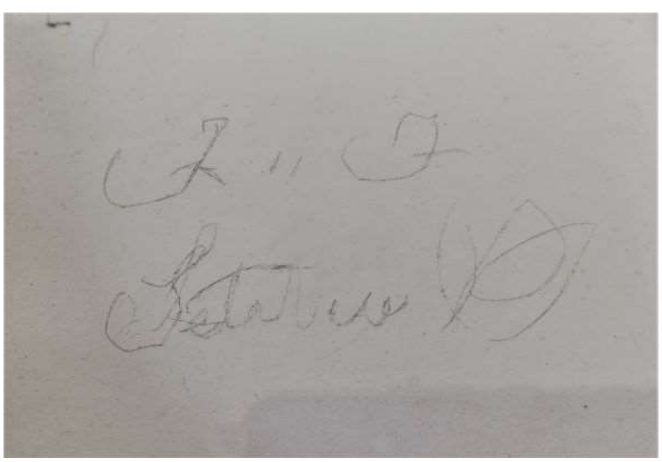

Fig.19 – Graffiti scratched into glass pane, Casement 2

Fig.20 – Graffiti scratched into pane, Casement 2

The quality of method used to replace the individual panes over the years varies considerably. In general, it appears that when a pane was to be replaced, as much of the broken pane as possible was removed. More tidy replacements cut the class back neatly to the edge of the leadwork and cut the putty back on the interior also. Often in particularly narrow areas where it was difficult to break small shards, the glaziers would have been unable to remove the glass back this far by breaking it and fragments remained above the new pane and were puttied over, (fig. 21).


Fig.21 – Fragments of previous repairs remain in corners, C2


Fig.22 – Differing depths of bedding putty, C2

Less sophisticated repairs failed to neatly cut back the glass to the edge, leaving jagged shards overlapping the leadwork, as well as applying a much thicker depth of bedding putty, (fig. 22). The result of these more careless replacements were more drastic depth differences between some panes and others, and wider putty fronting to cover the careless work, (fig.22, 23 & 24).
Failure to cut back excess putty of previous repairs also resulted in measuring new panes to fit over increasingly smaller and smaller areas with panes sometimes measuring up to 10mm thinner all around than the original lead frame, (fig.26 & 65). In other instances failure to remove the excess putty and glass fragments of the damaged pane resulted in poorly shaped panes disguised by wider putty fronting, (fig.25).


Fig.23 – Varying depths of putty, thin, Casement 2


Fig.24 – Varying depths of putty, thick, Casement 2


Fig.25 – Careless glass cutting, C1


Fig. 26 – Excess putty use resulted in smaller and smaller panes, C2

*Paint*

The uniform topcoats of paint on the casements appears to be a white modern plastic paint with a glossy plastic texture. Underlayers are more historic off-white, cream layers also uniform across the surface. It is likely that the lead was originally painted in the off-white colour. Most commentaries on Georgian fanlights suggest they were 'generally painted in an off-white colour to match the doorcase below' (Pearson 2006, Baty 2011).

# 4. Condition

When initially assessed the two casements were structurally unstable due to cracked and missing panes of glass, and loose and cracked joints in the metal frame.

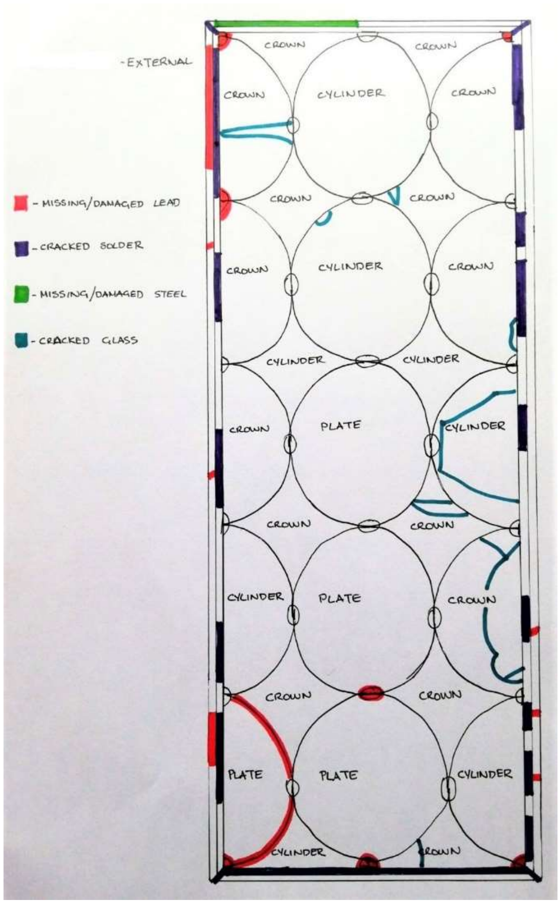


Fig.27 - Condition survey of Casement 1 (May 2019)

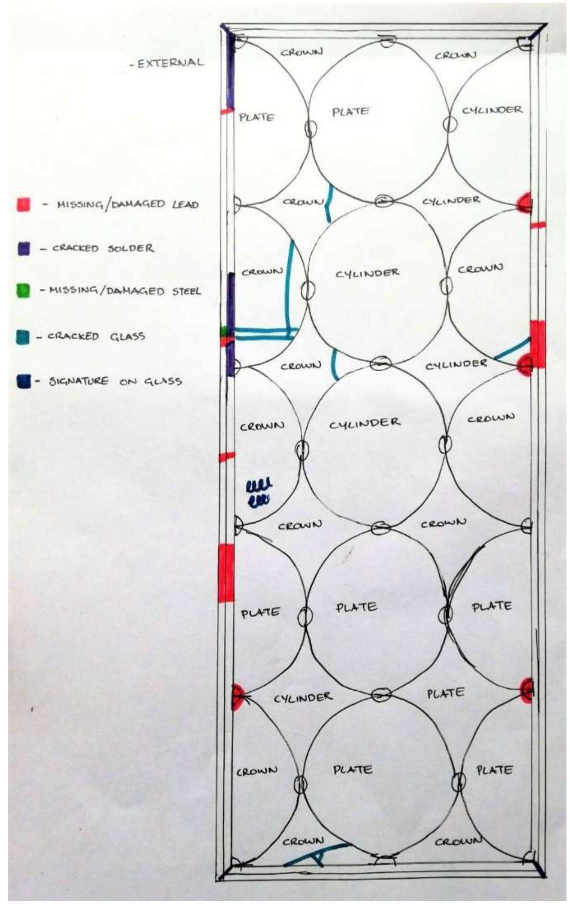


Fig.28 – Condition survey of Casement 2 (May 2019)

* The initial condition survey in fig. 27 & 28 label suggested glass types, as Crown, Cylinder and Plate. 'Plate' was incorrectly written to represent potential 'Float' as well as 'Drawn' glass.

## *Leadwork*

There were cracks and distortions of the surface leadwork as well as cracked solder joining it to the flatbar frame on both casements, but particularly in Casement 1. Sections of the surface leadwork were missing from both, and in some places had been replaced by carelessly moulded putty at a point in its history, (fig. 29). Following removal of the paint from the lead frontage it was evident that some of the flower decorations had been lost and replaced with rudimentary lead casts also, (fig. 30). In some places the finer leadwork detail No.2 was shaved back, most likely while attempting to pare back putty during previous re-glazing works.

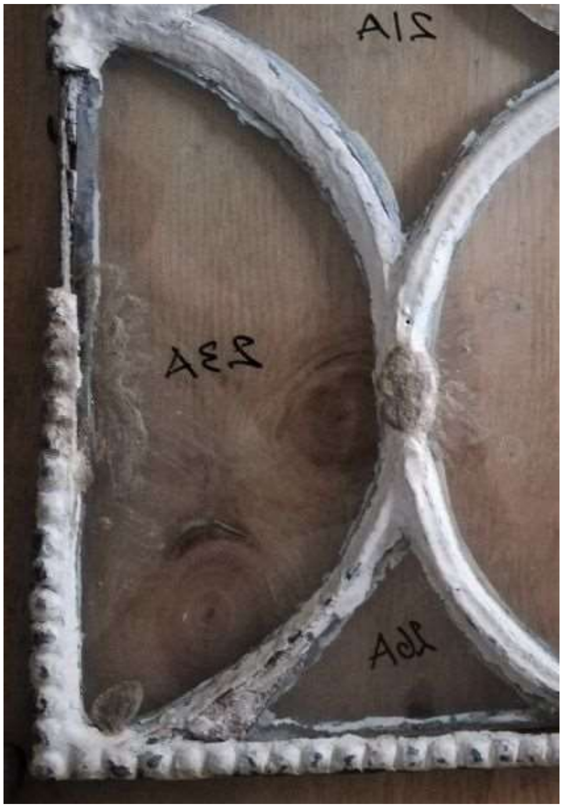

Fig.29 – Missing lead carelessly puttied over, Casement 1 Fig.30 – Full extent of decorative lead loss evident, C1

Some localised lead corrosion was discovered beneath the paint surface in areas, (fig. 31). The lead was lighter in colour and friable on the surface. Lead is known to be generally resistant to severe corrosion, its initial corrosion product usually forms an insoluble layer that protects the underlying metal from further attack. However repeated condensation of a thin film of water over time in the presence of weak organic acids such as those released from wood, moss or lichen can result in the formation of non-protective corrosive products and result in friable corrosion. This corrosion was noted mainly in corners where rain or condensation might have pooled and seeped through cracks in the paint and putty maintaining a thin film of water on the lead surface beneath the paint which would not easily evaporate again, (Selwyn, L. 2004, p 121).

Fig.31 - Friable corroded lead discovered beneath paint, C2 Fig.32 -Lead corrosion adhered to detached putty, C2

*Flat bar metal frame and glazing bars*

The flatbar metal frame was not painted on the exterior where it would have been secured into the timber door. Surface corrosion of the ferrous metal frame was evident in these areas particularly towards the bottom of the frame, (fig. 33). This was most likely caused by failure of the sealant between the frame and timber, allowing wicking of rainwater into the space between from which it would not be able to quickly evaporate. In Casement 1 corrosion of the flatbar at the bottom of the frame was so severe that a portion had disintegrated, leaving only shards attached to the decorative lead frontage, (fig. 34)

Fig.33 - Corrosion of base metal, Casement 1

Fig.34 - Severe corrosion of bar has led to disintegration, C1

Many joints of the flatbar frame had cracked and become loose allowing for extra movement in the frame, (fig.35). In many cases the paint and putty was the main form of stability in areas of the frame. Continual movement at these loose joints no doubt accelerated deterioration and cracking of other joints and contributed to the cracking of the glass. There was one crack in the flat bar itself which ran through a nail hole.

Fig.35 - Cracked and loose joints on Casement 2

Fig.36 – Cracked joint, Casement 1.

*Glass and glazing*

Many panes of glass had shattered or had suffered drastic fractures across the width or length of the pane while a few had small localised cracks only along the pane edges. Many of these cracks were evident adjacent to areas with loosened joints indicating that the damage occurred as a result of the structural movement of the frame, (fig. 27 & 28). Putty had hardened, was cracked, loose, or missing in varying places around the frame, further contributing to structural instability, (fig. 38).


Fig.37 – Shatter pane, Casement 2


Fig.38 – Missing putty, Casement 2

The application of putty to the face of the casement from previous repairs was in many cases excessive and untidy, further contributing to the obscuration of the leadwork detailing, (fig. 39 & 40).


Fig.39 – Excessive and careless application of putty, C2


Fig. 40 – Untidy application of putty, C2

*Paint*

Paint was in poor condition, cracked and chipped in many places allowing moisture to seep into the metal underneath. Excessive layers of paint had nearly entirely obscured the detailing of the decorative leadwork, (fig.41 & 42).

Fig.41 – Paint obscuring decorative flower, Casement 2

Fig.42 – Paint obscuring decorative leadwork, Casement 1

# 5. Treatment Plan

## 5.1 Aim

The aim of the following treatments is to stabilise, preserve and restore where necessary the materials of the leadlights to provide weather tight, structurally sound casements for reinstallation in the entrance doors of the house. This will be carried out in a manner that will cause minimal alteration to the objects original material and prevent further deterioration. Treatment should also reveal the obscured details of the leadlights decorative features. The selection of materials and methods for the conservation of this object has been informed by the evaluation of the objects condition, and subsequent research and testing carried out.

## 5.2 Treatment Proposal

Removal of paint build up using heat gun. Glass to be insulated from heat using cardboard sheeting.

Broken glass panes to be removed and replaced with cylinder glass. Glass panes adjacent to metal repairs to be removed before metal repairs to take place to avoid damage.

Repair of damaged metal flat bar using like for like materials, original jointing method and conservative repairs.

Replication of missing sections of lead frame using heat resistant silicone and cast lead, to be soldered into place.

Reglazing, salvaging as much of original glass as possible.

# 6. Treatment

## 6.1 Casement 1

### *Paint and putty removal*

Samples of paint layers were removed from key places on Casement 1 to keep a historic record.

The excessive build-up of paint and putty was removed from the decorative lead front of the casement using a UV heat gun Speedheater Cobra®, metal dentist tools and in some cases a brass bristle brush. On the reverse the UV heat gun was used with a putty knife and dentist tools to remove excess paint and loose as well as excess putty. 3-ply cardboard was cut to fit over each glass pane to protect it during UV heat treatment but some glass breakage still occurred.

Fig.43 – Removal of paint using UV heat gun detail, Casement1

Fig.44 – Removal of paint using UV heat gun, C1

Where putty and paint build up extended outside of the lead detailing it was trimmed back. In many cases this excess of putty was a result of past repairs where the broken glass fragments and putty were not removed properly. This resulted in replacement panes being fitted on top of the broken remains, (See 3.2 Materials and fabrication). The size of the majority of these replacement panes therefore were too small to fit into the original lead frame and so when excess paint and putty was trimmed back they no longer were fixed in place and were removed intact, (fig. 65).

Glass panes that were adjacent to areas in need of metal or lead repair were also removed to avoid damage during the metal repairs.

In these cases where glass panes were removed, all putty and glass fragments were removed also using a putty knife. The exposed metal surface was then lightly brush with the brass bristle brush to leave a clean surface for re-puttying. In some cases where there was light corrosion of the metal bar, a steel bristle brush was used locally to remove corrosion and one coat of the hydrocarbon microcrystalline wax, Liberon® Wax Polish Black Bison Neutral, was applied to protect from recurrent atmospheric corrosion until re-puttying.

*Metal repairs*

The corroded section of metal flat bar was removed from the top of the casement and the lead still attached to it was detached by warming the solder until soluble. The adjacent metal, both flat bar and lead back was sanded using a Dremel® 3000 to give a clean surface for soldering. Isopropyl Alcohol was used to degrease the metal before application of Baker's No.3 Soldering Flux® and fixing of a new 2mm rolled steel section using solder, (SPAB Conservation of Decorative Leadwork, p16).

Fig.45 – Corroded flat bar and lead detached, C1

Fig.46 – Replacement 2mm rolled steel cut to size, C1

Fig.47 – Corroded iron cut back and new metal cut to fit, C1

Fig.48 – Smooth join between new metal and original, C1

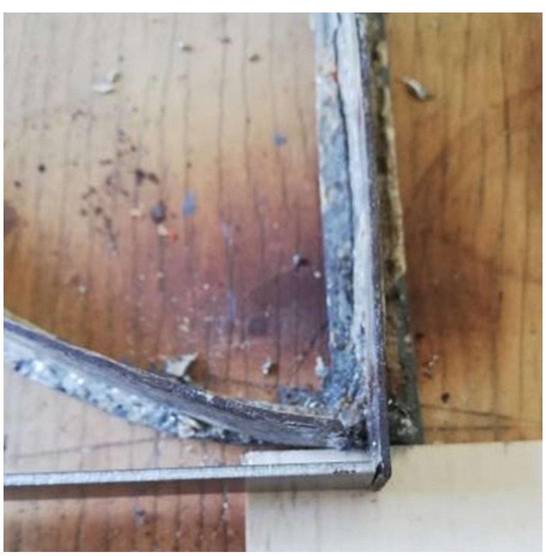

Fig.49 – New metal join at corner, C1

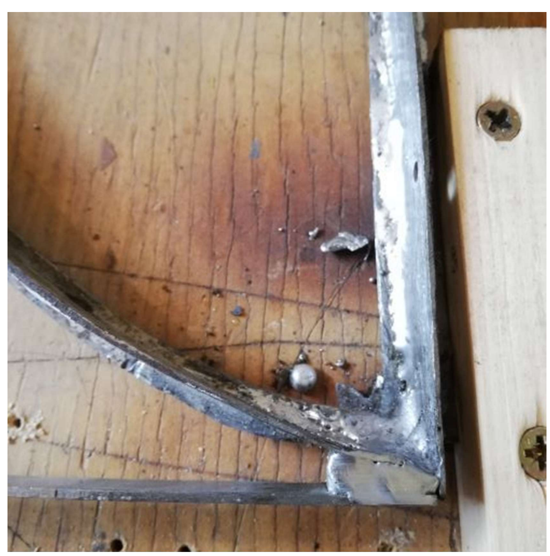

Fig.50 – New solder block and joint to fix replacement metal, C1

Fig.51 – New solder joins, C1

Fig.52 – Replacement metal soldered into poistion, C1

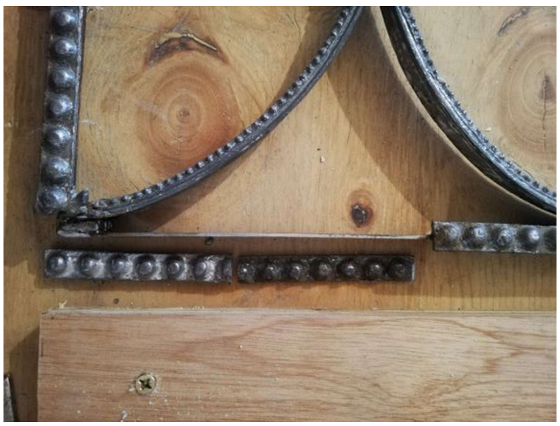

Fig.53 – Leadwork was trimmed and refit over area of loss

Fig.54 – Leadwork soldered into position, C1

Areas of surface corrosion on the flat bar that were exposed after paint removal were brushed back using a metal brittle brush and in some case the Dremel® 3000 before applying two coats of Liberon® Wax Polish Black Bison Neutral to protect from recurrent atmospheric corrosion until appropriate re-painting took place.

Missing solder spacing blocks were refilled at the corners of the casement and one bottom section at the circle joint.

Fig.55 – Cracked solder join and block, Casement 1

Fig.56 – Preparation for new solder block, Casement 1

Fig.57 – New solder join, Casement 1

Fig.58 – New solder block, Casement 1

Moulds were taken of the four decorative leadworks types using DWR Plastics High Temperature Resistant Moulding Rubber®. Plasticine and card were used to create the edges of the moulds and Ambersil PUR 400 Release agent for integral skin and elastomeric polyurethanes® was applied to the surface of the metal to ensure full removal afterwards.

Fig.59 – Plasticine used to create edge for mould taking, C1

Fig.60 – Heat resistant silicon mould taken of leadwork, C1

Fig.61 – Heat resistant silicone mould of leadwork, C1

Fig.62 – New cast of decorative lead, Casement 1

The required sections needed to fill the areas of loss were cast in lead from these moulds, trimmed to fit using hand tools and fixed in place by soldering as described above, (fig. 61 & 62).


Fig.63 – Missing leadwork sections, Casement 1


Fig.64 – Replacement decorative lead, Casement 1

Cracked solder joins between the lead and metal flat bar were re-fixed by selective removal of the cracked solder, sanding and cleaning back of the metals and re-soldering as above.

Broken and loose lead sections were soldered together by the same method.

*Re-glazing*

Glass that had been removed in many cases no longer fit back into its original position in the lead frame as a result of the previous repairs mentioned above. New cylinder glass was cut to fit the larger sections and all usable original panes were cut to fit the smaller sections where they could, (fig. 65).

Glass panes both new cylinder and original panes were then bedded and puttied into position using Phoenix® Rapid Set Putty. While originally the bedding putty would have been flush with the lead detailing, there were a number of unremoved panes still in place in the casement that had been through previous replacements where it had been puttied along the lead front as well as the back. In order to create a sense of uniformity between the new replacement panes and the older replacement panes, the lead front was puttied at the front also with as steep an angle as possible, (fig. 66).

Fig.65 – Original glass that no longer fits within frame to be reused elsewhere, Casement 2

Fig.66 – Lead front was puttied as steeply as possible

## 6.2 Casement 2

*Paint and Putty removal*

Having discovered that full trimming back of the paint and putty resulted in removal of original replacement panes in Casement 1, the removal of excess putty and paint on Casement 2 was more conservative in order to retain as many of the panes in place as possible. A UV heat gun was used to soften paint and putty on the face of the casement before selective removal using metal dentist tools and in some cases a brass bristle brush, (fig.67 & 68). 5-ply cardboard was used to protect the glass during UV heat treatment which was far more effective that the 3-ply cardboard but some glass breakage still occurred.

Fig.67 – Paint removed using UV heat gun and dental tools, Casement 2

Fig.68 – Paint removal, Casement 2

As with Casement 1, glass adjacent to areas for metal or lead repair was removed to avoid damage during metal repairs. Where panes of glass were fully removed, a more conservative approach for removal of the previous putty and glass fragments was undertaken in order to retain the variety of depth levels of the glass fronts, (fig. 69). Loose putty was removed and remaining putty and glass fragments were trimmed back so that the new pane of glass could fit securely within the lead frame, (fig.70). Where the metal rebate was exposed is was lightly brushed with a soft bristle brush to prepare for re-puttying.

Fig.69 – Evidence of previous glass types in putty, C2

Fig.70 – Retaining variety of depth in bedding putty, C2

Where light corrosion was evident on the metal rebate following removal of loose putty it was locally brushed back with a steel bristle brush to uncorroded metal before application of one coat of Liberon® Wax Polish Black Bison Neutral to protect from recurrent atmospheric corrosion until re-puttying.

*Metal repair*

Areas of surface corrosion on the exterior of the flat bar were brushed back using a metal brittle brush and in some cases the Dremel® 3000 before applying two coats of Liberon® Wax Polish Black Bison Neutral to protect from recurrent atmospheric corrosion until appropriate re-painting took place.

Loose flat-bar joints were re-fixed in place by the same soldering method as was used in Casement 1. Missing solder spacing blocks were refilled at the top corners of window and one bottom section at circle joint. A crack in the flat bar at a drill hole was re-fixed by soldering also as the metal was still in good condition, but due to low surface area was a more fragile joint that other repairs.

Areas of decorative lead loss were replaced by cast sections from the same moulds taken from Casement 1. The replacement sections were trimmed to fit using hand tools and fixed in place by soldering as in Casement 1, (fig. 76).

Cracked solder joins between the lead and metal flat bar were re-fixed by selective removal of the cracked solder, sanding and cleaning back of the metals and re-soldering as above. Broken and loose lead sections were soldered together by the same method.

Fig.71 – Loose joint, Casement 2

Fig.72 – Missing leadwork about loose joint, C2

Fig.73 – Cracked and loose joint, C2

Fig.74 – New solder join, C2

Fig.75 – New solder join side, C2

Fig.76 – Cast lead replacements in place, C2

*Re-glazing*

By taking a more conservative approach to removal of putty and glass fragments many more of the original panes either remained in place or were able to be re-fixed in their original place. There were still some panes that no longer fit into their original position in the frame however. Where possible original glass was re-used in new locations and new cylinder glass was cut to fit any larger sections, (Appendix I).

Glass panes both new cylinder and original panes were then bedded and puttied into position using Phoenix® Rapid Set Putty. As with Casement 1 to create a sense of uniformity between the older replacement panes that were puttied on the front and the new replacement panes, the lead front was puttied at the front with as steep an angle as possible for each pane.

Fig.77 – Putty glazing on the front, Casement 2

Fig.78 – Putty glazing on the interior, Casement 2

## 7. Aftercare Programme

### *Protective coating*

As the casements are to be repainted Phoenix® Rapid Set Putty was selected as the most appropriate putty for its workability, fast setting time and appropriateness for use internally and externally on metal. It must be painted in order to ensure a full waterproof seal. The product information advises applying the first coat of paint within 4-5 days, and the final coat within 28 days.

The SPAB advice for conservation of decorative leadwork notes that the principal reason for painting leadwork is to beautify rather than protect. Should it be decided to not re-paint the decorative leadwork, the putty will still need to be painted but the leadwork can be protected from further friable lead corrosion by applying a protective coating of two or three coats of a microcrystalline wax such as Liberon® Wax Polish Black Bison Neutral or Renaissance® Wax. If painting, a lead-based paint would be preferable but more modern paints can be applied also.

As there was quite a lot of active surface corrosion along the exterior edges of the metal flat bar frame I would recommend painting it on the interior and around the edges before it is to be fitted back into the timber door. A suitable mastic should be used to properly seal the casement into the timber frame.

### *Maintenance and Cleaning*

Much of the deterioration of the casements was a result of the metal corrosion of the ferrous frame due to moisture seepage. Regular maintenance and inspections of the paint, putty and sealants should be carried out to prevent such deterioration again and consideration should be given to repainting every 2-5 years. Cracked or damaged seals should be dealt with as soon as possible and refilled, or re-sealed.

When cleaning the use of water should be kept to a minimum. The frame and glass should be dusted and wiped with a damp cloth regularly on the inside and outside, approximately once a month, to avoid a build of dirt which can result in a need for more intensive and invasive cleaning at a later stage. A nylon brush such as a regular paintbrush can be used to quickly and easily to remove dust from top to bottom. If there are deposits that cannot be easily removed this way, the use of a mild detergent or soap can then be used. Standard glass cleaners should generally be avoided for cleaning historic glass as they include surfactants that make them difficult to remove, (English Heritage Glass and Glazing p 205).

### *Repainting*

When it becomes necessary to repaint the leadwork, a soft brass bristle brush or fine grit sandpaper, 250+ grit can be used with extreme care to take back the paint surface covering the leadwork. This can help to slow the excess build up on the face again. The lead surface is very soft however and brushing or sanding should be discontinued if the lead is exposed in any places. Care should be taken also to avoid damaging the putty seals.

# 8. Evaluation

Fig.79 - Casement 1 (June 2020)

Fig.80 – Casement 2 (June 2020)

Overall the treatment of these leadlight casements has been successful as it meets the aim to stabilise their condition for reinstallation into the entrance doors of the house, while also restoring aesthetic appreciation of the decorative leadwork.

The loss of some of the varied historic glass during works was an unfortunate consequence of the works, but in many cases was unavoidable in order to carry out the necessary works to stabilise and unify the appearance of the structure. A fine balance was managed in conservation of Casement 2 by taking a more conservative approach to trimming back of putty, and allowance for some irregularity and variety in the bedding depth of putty between the panes which resulted in retaining more of the historic glass in its place.

The removal of the excess paint layers from the decorative leadwork was by far the most labour intensive and time consuming aspect of the treatment, but did manage to reveal the underlying leadwork with only minimal abrasion of the soft metal in the process. The use of a chemical conservation quality poultice paint stripper may be an alternative to trial for further works on the other leadlights of the entrance way, though care should be taken in the selection of the stripper to avoid chemical damage to the lead itself.

The use of the original soldering joints and techniques to repair the metal frame provided great stability to the frame when combined with the lateral support provided by the puttied glass within a timber frame. The repair to the cracked frame through the nail hole in Casement 2 was the most fragile of the joints due to the reduced surface area available for the join and care should be taken when handling to provide support there. In hindsight, a less conservative repair, where the adjacent metal with the nail hole was removed and replaced would possibly have been more suitable to provide greater structural stability.

While all historic paint was removed in this treatment, it was a necessary consequence in order to carry out repairs and improve the readability of the casements, and a historic record has been kept should it be needed for further analysis.

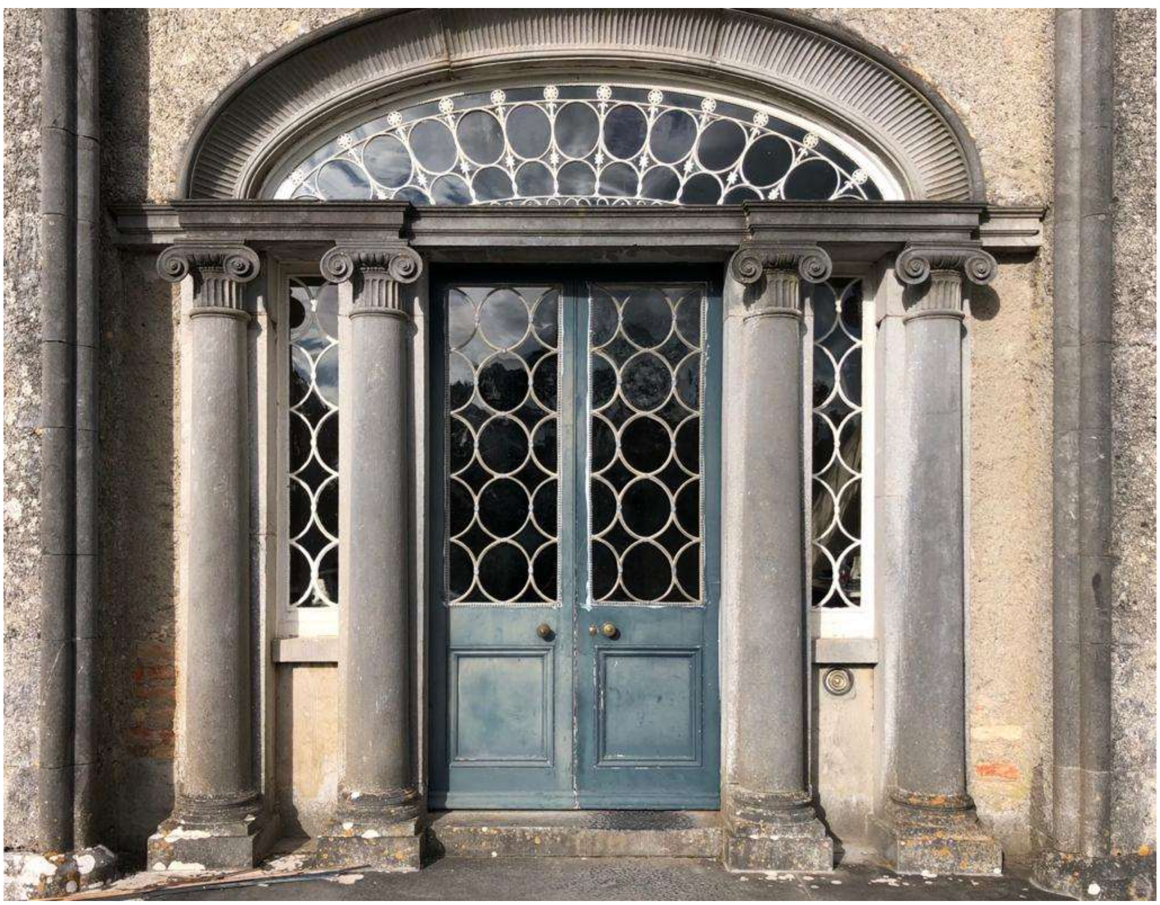

Fig.81 – Casements reinstalled in the entrance doors, 2020

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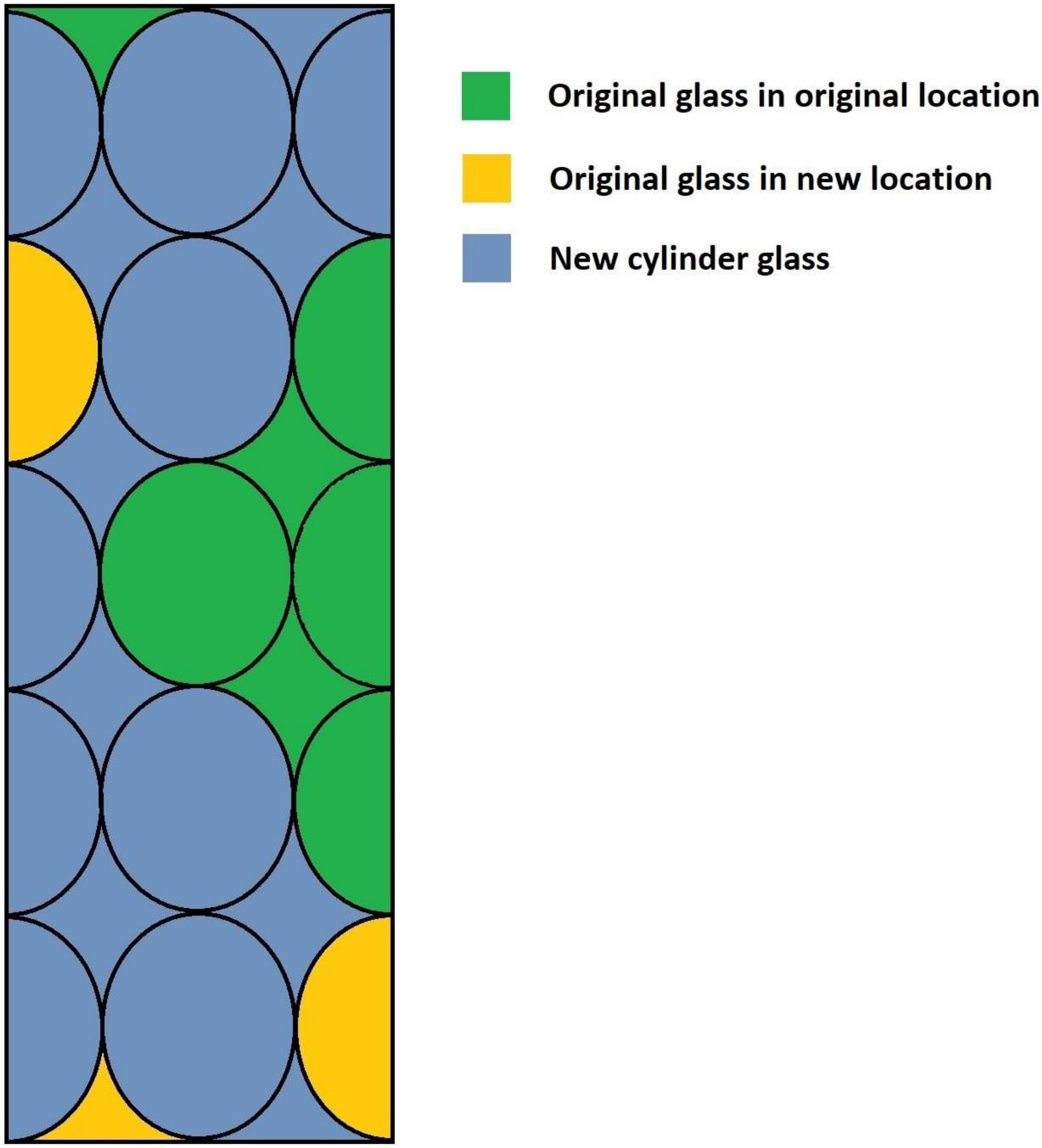
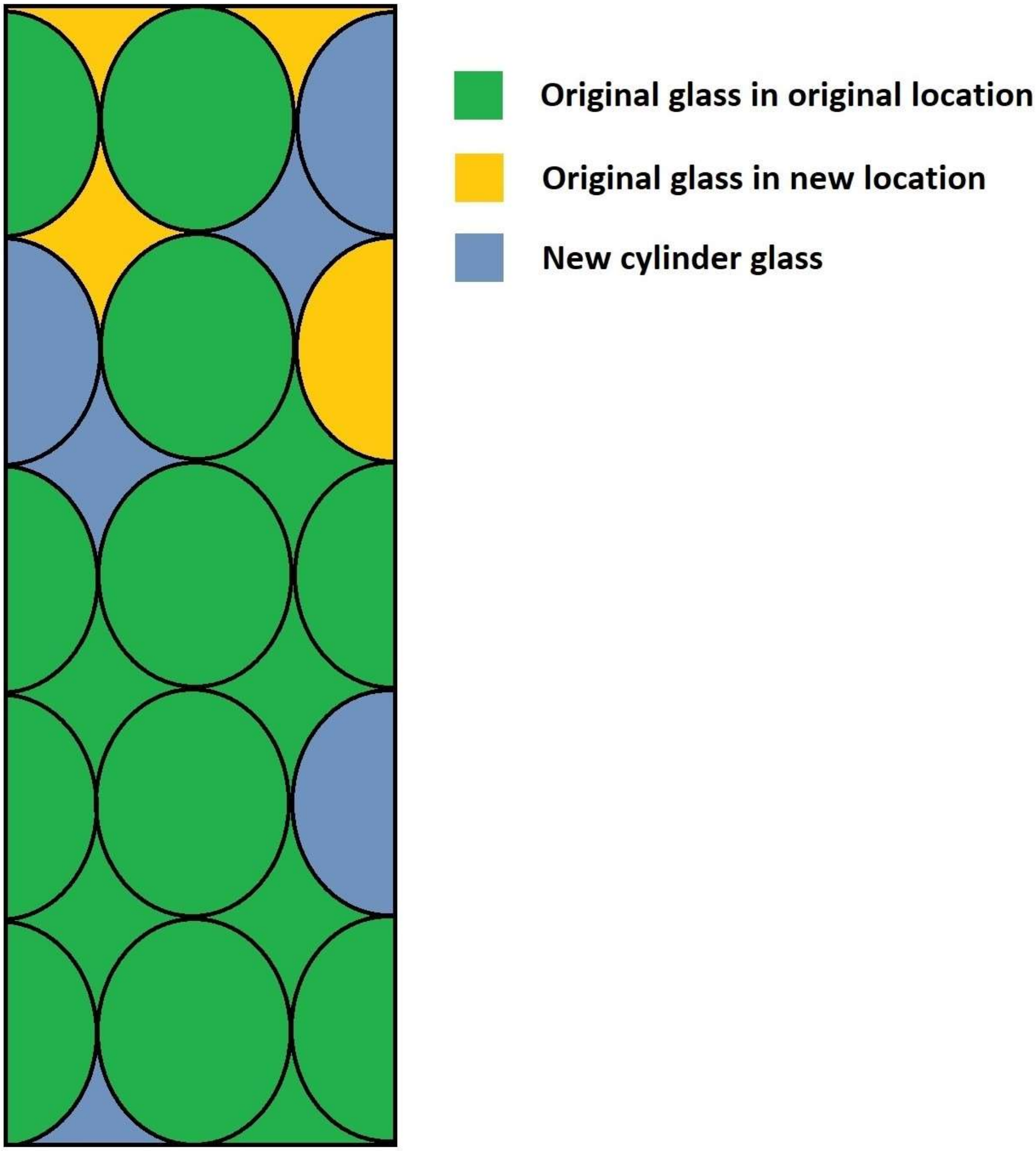
Appendix I Map of Glass Post-Treatment

CASEMENT 1



CASEMENT 2

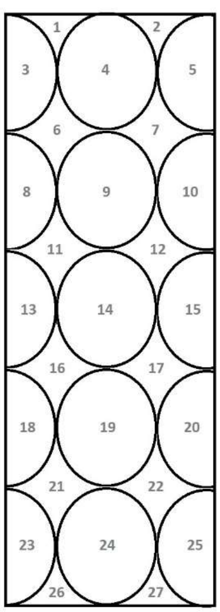

Original glass in original location
Original glass in new location
New cylinder glass

## Casement 1

| Pane | Face | Edge | Width (mm) |
|---|---|---|---|
| 9A | white | light green | 1.25 |
| 21A | light green | light green | 2 |
| 22A | white | very light green | |
| 24A | light green | light dark green | 3 |
| 25A | light green | light green | 3 |
| 26A | white | light green | 1.25 |

## Casement 2

| Pane | Face | Edge | Width (mm) |
|---|---|---|---|
| 1B | white | light green | 1.25 |
| 2B | light green | dark green | 1.25 |
| 5B | light green | light dark green | 2 |
| 6B | dark light green | dark green | 1.25 |
| 7B | white | light green | 1.5 |
| 10B | light blue/green | dark blue/green | 3 |
| 11B | white | light green | 2 |
| 20B | light blue/green | light dark green | 3 |
| 26B | dark light green | dark green | 2 |




Face view of casement