# PRESERVING THE PAST

## A Precedent In Improving Historic Windows

Interior view of historic window restoration in Master bedroom.

Nowhere is the passage of time more evident in a historic home than its original leaded glass windows. Stippled from a century of wind and rain, light dances and refracts through the uneven surface of slumped glass. The tooled texture of the lead remembers the craftsman who built and maintained them. The small panes held in place with soft metal is a symbol of the era in which these homes were built.

Energy efficient windows are incredibly important in today's homes. To satisfy energy requirements, original windows are often replaced with double pane windows and simulated leading. When considering how important the character of original glass and leading is, replacing them with an imitation in the name of conservation is contradictory. So how do we rectify the need for a tight

building envelope with the authentic beauty of the original single pane windows?

Recently, while renovating a landmark historic home, we developed a method for preserving historic leaded panes in a system that performs as well as current high-performance windows. The Seattle Landmarks Preservation Board approved this method, making it a precedent in upgrading other landmark homes.

Working with a local glass company, we designed an insulated glass unit that holds the historic leaded pane between two new panes. The glass company carefully disassembled the original windows, numbering and tracking each important piece. After repairs and cleaning, the original lead and glass was reassembled and inserted as the center pane of a new insulated triple pane glass unit.

**A sample of the leaded glass inserted as the center pane of a triple pane assembly**

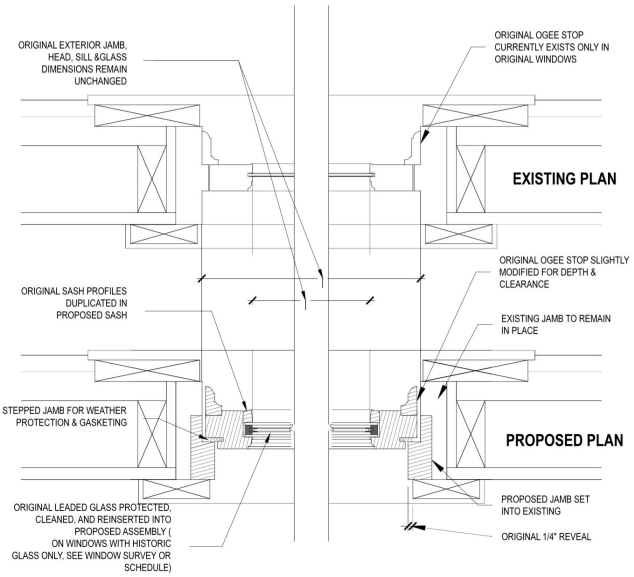
The exterior panes on either side of the leaded original pane are 1/8" thick low iron glass. It is the Iron content in glass that is responsible for the green tint and reduced clarity in typical glass. Low iron glass has no visible green tint, and is incredibly clear. We chose low iron for the exterior panes so these additional panes disappear, highlighting only the original glass in the window.

A spacer separates each pane by 1/8" to eliminate thermal bridging, rattling and rubbing. This spacer made of desiccated foam and a foil facing deflects water vapor and gas. The entire unit was then fitted with an additional layer of foil facing to prevent moisture and dirt from entering between panes.

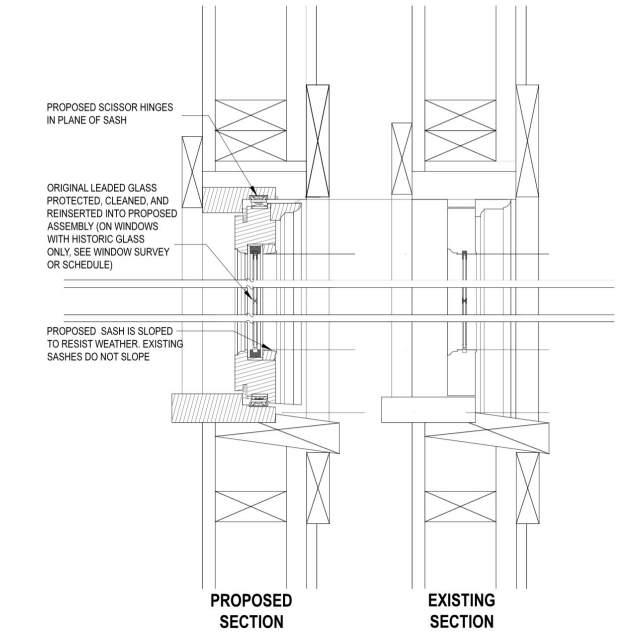
**"It is an interesting and creative solution. Preserving the material by sandwiching it between glazing is a good idea."**

***-ALLISON WALKER BREMS, CHAIR OF LANDMARKS PRESERVATION BOARD***

For the Landmarks Preservation Board, the most compelling argument to encase the original leaded pane in the center of this unit is protection. Despite regular repair and maintenance, the leading had deteriorated badly in the 108 years of exposure to elements. If not encased in glass and protected, much of the historic leading would need replacement soon.




**The sash accommodates the triple pane glass, while maintaining the original profiles.**




**New resistance hinges are completely hidden from sight.**

This new insulated glass unit is 3/4” thick, compared to the original 1/4” thick leaded pane. To accommodate the additional thickness without changing the appearance of the window considerably, we increased the sash thickness from the center point. In this way we were able to maintain the original profiles on the interior and exterior face of the sash.

In increasing the sash thickness, we made room for high performance gaskets, creating a tight seal and further increasing energy efficiency.

Many of the original sashes opened inward, and as such included an exterior stop. We opted to reverse the swing outward for a weatherproof seal. To maintain the original profile of the window, including the exterior stop, we chose to integrate the former stop profile into the sash itself. This not only maintains the appearance of the original windows, but also provides additional structure for the sash, reducing the likelihood of warping over time.

Northstar Woodworks built the window sashes of mahogany, a naturally rot resistant and stable wood. The sashes were then faced with a thick fir veneer to preserve the original species. Many of the window sashes lasted more than 100 years, and this composite of mahogany and fir will certainly outlast the originals.

By repairing and protecting the historic leading, sandwiching it between low iron outer panes, and using rot-resistant construction with spacers, sealant, and modern gaskets, we were able to create windows that increase longevity and match insulation values of todays high performance windows, all while maintaining the historic integrity of a beautiful Landmark home.

Thank you to Matthew King Construction, Northstar Woodworks, Seattle Stained Glass, the Landmarks Preservation Board, and especially Eric and Susan Benson for ensuring that this project succeeded. We are proud of this collaboration, and hope it leads to many more.