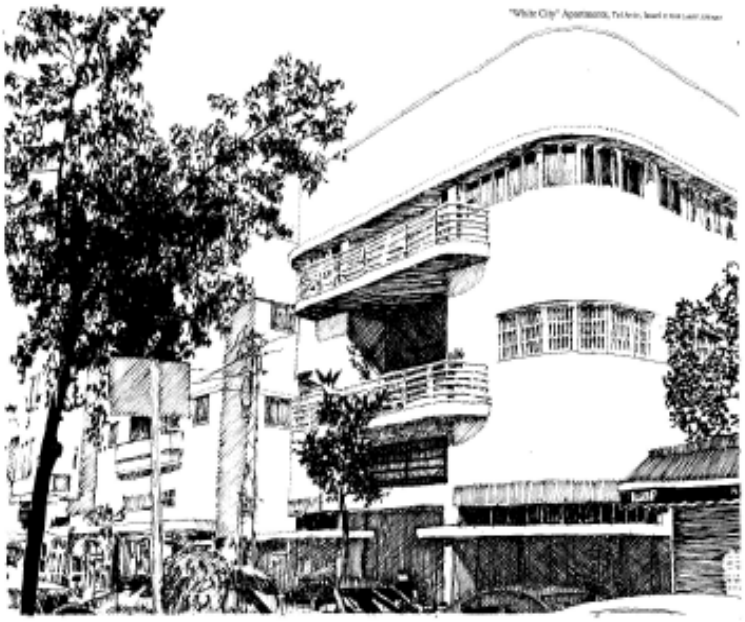
ARCHITECTURE

EHLINGER & ASSOCIATES **SECOND QUARTER 2019**



"White City" Apartments

This issue's print of a sketch by Ladd P. Ehlinger, AIA is of a typical apartment building in the "White City" section of Tel Aviv. The "White City" is named so because most of the buildings in this section of the city are white and of concrete. Tel Aviv is home to probably the largest collection of Bauhaus or International Style buildings in the world - over 4,000 of them. There is some influence also of LeCorbusier, the Swiss radical architect of the period. The Bauhaus was a school of arts, crafts and architecture seeking a synthesis of all, founded by Walter Gropius in 1919. Hitler shut down the Bauhaus in 1933. Gropius came to America to Harvard to teach and practice into the 1950s.

This flowering of modern architecture occurred in Tel Aviv thanks to the mass immigration of German Jewish architects to the British Mandate of Palestine who were escaping Hitler in the early 1930s, many of whom were trained or taught at the Bauhaus in Dessau, Germany.

The "White City" section buildings are characterized by their adaptation of Bauhaus design to the local environment: rounded corners in many instances to soften the shapes in the intense light, being lifted off the ground on round columns ("pilotis") to provide for air and play space, constructed of reinforced concrete painted white or light colors to reflect the bright light, the balconies to catch the Mediterranean breezes and provide shade, the flat roofs for added space in the evenings, and the windows smaller than those of northern Europe due to the more intense light, glare and heat in Israel. The most notable example of this style in New Orleans is the old "Blue Plate Foods" factory on Jefferson Davis Parkway that was recently converted to condominiums, and several houses in the old Metairie, Lakeview and Gentilly areas. There are no examples that I know of in Huntsville.

Tel Aviv (Hebrew meaning: "Hill of Spring") was originally developed as a suburb of the port city of Jaffa beginning in 1909. Later, the Scottish urban planner, Sir Patrick Geddes, redesigned it as a garden city after he had designed New Delhi in India. The first Mayor of Tel Aviv, Meir Dizengoff, commissioned him in 1925 to begin work. Geddes did not decide on an architectural style, only the block plan and infrastructure. The style came from the emigrating architects.

The "White City" of Tel Aviv became a UNESCO (United Nations Educational, Scientific and Cultural Organization) World Heritage Site in 2003, proclaiming it "an outstanding example of new town planning and architecture in the early 20th century." The citation recognized the adaptation of modern International Style (Bauhaus) architectural styles to the local cultural, climatic, and traditions of Tel Aviv.

More: HVAC & Historic Properties

Last issue we discussed the two largest issues that may be caused by installing HVAC in historic properties: vapor drive and rising damp in masonry walls, and their concomitant results of condensation resulting in mold and fungus rot of the adjoining wood structural components, and efflorescence (salt blooms) that sometimes spall (fracture into smaller pieces) the masonry units and mortar.

There are two ways to stop the vapor drive through a raised wood floor system: by use of a reinforced polyethylene film vapor barrier in conjunction with insulation batts between the floor joists; or by spraying closed cell foam which functions as insulation and a vapor barrier.. The risk with the vapor barrier film is that there will not be total closure and infiltration will occur. With the foam system, the risk is that some trade such as telephone, alarm wiring, etc. subsequently penetrates the foam, thereby allowing infiltration of warm moist air also.

Vapor drive through masonry walls is best prevented by a paint or coating that has a permeability of 40 to 60 perms as this will stop the water penetration and allow vapor out when warmed by the sun.

There are two methods of preventing rising damp: injection of silicone based chemicals under pressure below the floor line that cures into a waterproof barrier, or sawcutting completely through the wall in successive 4' long maximum segments with a hydraulically driven chainsaw, inserting a copper flashing coated with asphalt both sides, then tuck pointing to within 12" of the end, cutting the next slot and lapping the coated copper flashings.

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Living Wall Air Filtration

Air conditioning a building can be expensive, and 10-30% of that cost is to meet fresh-air requirements. In a standard HVAC system, this means venting a portion of the return air to outside, and then bringing in outside air to replace it, which has to be conditioned from outside air temperatures. This fresh air is necessary, but can be expensive, particularly with 20+ degrees temperature differences between inside and outside.

There is a new technology that can replace most of this air exchange, meet the code requirements of ASHRAE 62.1 IAQP, improve indoor air quality beyond fresh air replacement, and also remove typical indoor air pollutants. It's a vertical hydroponic plant system, designed specifically for air filtration: a living wall.

Two sheets of growth medium (where the plants are rooted) are hung over a catch basin. Water, treated with nutrients for the plants, is pumped from the basin to the top where it flows down between the sheets. Plants are inserted into the growth medium, and air is forced through the sheets, either with a fan, or attaching it to the HVAC return-air. Growth lights are added as necessary. These living walls can be attached to a wall, or be free standing, as pictured.

The flow of air through the plants and the microbes in the water filters pollutants out of the air, and replaces fresh air. Roughly 2/3 of exterior fresh air requirements are allowed to be met with this system.

Up to 40% of chemicals and odors in the air will be removed. The air will be cooled by about 9 degrees, with resulting humidity at 80%. This humidity released from a living wall must be accounted for, particularly in high-humidity environments, and especially when the living wall is a retrofit.

Modern HVAC systems are designed to keep interior humidity levels between 40%-50%, and levels higher than this at 65-75 degrees can result in condensation and mold and mildew growth. When the return air is connected directly and the HVAC is designed for a living wall, this extra humidity won't be a problem, as it is similar to treating exterior air. When retrofitting a living wall, this humidity should be accounted for with an analysis of the existing HVAC, and adding dehumidifiers if required.

Roughly 1 square foot of wall space per 100 square feet is needed for optimal returns, and for each 10 S.F. of wall, energy savings are estimated from $200-$500/year, based on location.

There are installation and maintenance costs. About 10% of the plants will (naturally) die each year, and will need to be replaced. Water will need to be monitored for nutrient levels, and pumps serviced, etc., but there are maintenance companies which do this. With all of the costs accounted for and compared, the expected ROI is about 5-10 years.

Living walls can be retrofitted to any building with space for them, but will work best if included in the original design with the HVAC system.

Living Wall at the RJ Surtees Student Athletic Centre, Ontario, Canada

Green Facades

Using vegetation on the exterior of a building is nothing new, and the benefits from shade are well known. What separates a Green Facade from other methods of landscaping is the use of a trellis as both an architectural feature and a protection of the building envelope.

Allowing vines with aerial roots to grow on a building can cause long term damage to a building envelope, especially on stucco and brick surfaces. If the vines are separated from the building by a trellis system, then with a standard maintenance schedule, the building's envelope isn't at risk.

Such a trellis can be a simple flat surface offset from the exterior wall, or it can be a three dimensional lattice. What is important is the distance between the mesh grid, so that the canopy spread of the vines will make the structure appear solid. The vines will likely require some guidance to spread properly, but once established, the vines can be maintained as part of a standard landscaping from below.

The benefits to the building itself, without the added risk of damage by letting the ivy grow directly on the wall can be great. A separated shading field can reduce the outside wall temperature up to 25 degrees on hot days, and will work far more effectively and is easier to maintain than trees, and stormwater runoff can be reduced by directing flow through the ivy beds.

The environmental benefits can be a blessing and a curse. Pollinating vines will attract insects, fruiting vines can potentially create staining issues, and birds and small mammals will greatly enjoy feeding and nesting in the cover.

The spaces created, however, can be very inviting and pleasant, even from the interior where a trellis may be in front of a window. This technique might even be used where blocking a bad view is desired, but natural lighting is needed.

It is far less expensive and maintenance intensive than a living wall (which is not usually appropriate for exterior use), and can be retrofitted to many types of building envelopes, but usually works best when incorporated in an original design. It can also be created as free standing wall systems in open exterior spaces.

R. Perrin Ehlinger, AIA

Census Bureau, MD. Green Facade trellis system shortly after installation. (2006)

Census Bureau, MD. Green Facade trellis system after maturation. (2010)