June 10, 2020

Dan Watnem
Manager
Excelsior Beach to Bay Condominium
6263 Midnight Pass Rd
Sarasota, FL34242

RE: Excelsior Beach to Bay Condominium
DEG File No. 203952
Observation Report

Dear Dan,

As per our agreement, ***De Stefano Engineering Group, PL (DEG)*** has completed a limited condition survey of building, the building perimeter, and related elements at the above referenced project. Our review also included observations of the fenestrations.

Our observations included limited visual observations of the accessible building and related elements. Neither our observations nor this report is intended to cover hidden defects, mechanical, electrical, architectural features, code compliance issues, or other areas of the building not specifically mentioned. DEG did not remove any portions of the structure nor performed any testing.

Our findings were as follows:

OBSERVATIONS

DEG observed the following:

- Failing Joint Sealants
- Blistering and Water behind Paint Coatings
- Failure of Post Bases
- Railing Sealant, Paint, and Gaskets
- Corrosion of Fenestration Systems
- Sealant joints are too small and failing
- Expansion Joints
- Crack in Stucco and Knee Walls
- Failure of Balcony Weeps
- Failure of flashings
- Failure of Coping Sealants
- Pealing Coatings
- Deck Coating

ANALYSIS

Delaminated Stucco

DEG observed some locations where the stucco is delaminating. Stucco is an exterior plaster, which has historically been used to weatherproof and in some cases decorate building exteriors. Although stucco is nonstructural, it offers a protective coating and prolongs the life of the building.

Stucco failure is caused by the breakdown of its water-shedding capacity and the ultimate deterioration of the supporting structure. Poor original materials and techniques, incompatible building materials with different expansion rates, structural settlement, seismic movement, and biological growth can all cause cracking or adhesion failure between the stucco and its backing or between individual stucco layers. Lack of proper maintenance increases the likelihood of problems that can lead to the breakdown of the stucco skin.

A mechanical key must be created to ensure a strong bond between the stucco and its support. For masonry, either raking out the mortar joints or texturing the masonry surface is usually necessary. Generally, stucco is applied in one to three coats; three-coat work is most common. Layers usually differ slightly in composition, and each coat is scored to provide a key for the next layer.

Sealants

Practically every building's exterior skin requires sealants for weather tightness. Junctures of dissimilar materials or joints installed to allow for structural or thermal movement require sealants to maintain envelope effectiveness. Above-grade applications include sealing joints between changes in building façade materials, window and door perimeters, and expansion and control joints. Sealants are also used to detail numerous joints, including flashings, and copings that act as termination or transition details.

Since sealants are a minor portion of the overall construction scope, they receive a comparable amount of effort in their design and installation. Yet because they are a first-line defense against water infiltration, sealant failures can cause an unequal proportion of problems and resulting damage.

The most common reason for sealant failure is too few or incorrectly sized joints. In order to preserve the esthetics of a building facade, joints may be undersized or, to limit the number of joints, made huge, following the ill-conceived rationale that "if you use bigger joints, you need less of them."

Many architects and engineers, if they size joints at all, only consider movement due to thermal expansion and contraction. However, several other factors influence correct sizing and placement. Any change of plane or materials requires a joint.

Wind loading affects joint placement not only for structural glazing applications but also for parapet walls. Moisture-related movement of materials also plays a part. Differential thermal movement between different but adjacent materials must also be accommodated with joints.

If the joints are detailed too far apart, or are made too small, the building simply creates its own. Most often the new joints appear as cracking in the exterior walls, but incorrectly sized or located joints also manifest themselves by causing bending or bowing out of the walls, crushing at the joints, or shearing of the curtain-wall fasteners or masonry ties.

Proper sealant selection also entails avoiding incompatibility between the sealant and the substrate. Improperly chosen sealants can cause straining or etching of the substrate and loss of sealant adhesion. Other symptoms of incompatibility problems include disintegration, discoloration, or hardening of the sealant.

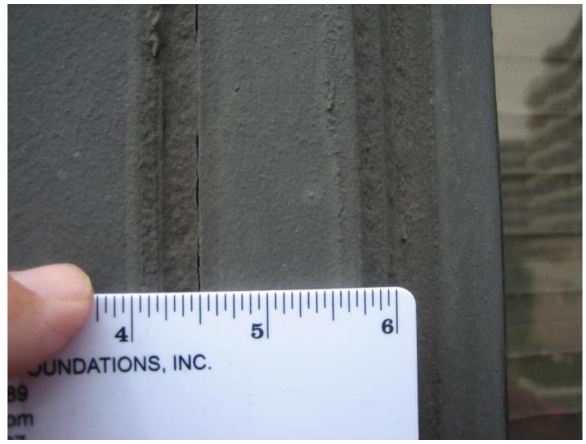
Most of the sealants on the project are failing primarily due to age. All sealants have a limited lifespan. They inevitably reach a point when they are no longer effective at withstanding the stresses of the environment and therefore need to be replaced. Understanding why a sealant joint has failed prior to sealant replacement and remedying the cause of failure will ensure that a new, appropriately specified sealant will achieve its maximum expected service life.

The four types of sealant joint failures are – adhesive failure, cohesive failure, substrate failure, and failure due to loss of sealant properties – and other indicators of deterioration are the results of a variety of causes, from age to chemical reactions.

Adhesive Failure

During adhesive failure, the sealant separates cleanly from its substrate. This type of failure will result if the sealant is applied to a dirty or wet surface, or if the substrate is contaminated by a material – such as paint or a waterproofing coating – that will discourage a strong bond.

Other causes of adhesive failure include improper primer application during surface preparation and improper design of the joint. A properly designed joint will reduce stress on the bond line. This includes control of the width-to-depth ratio, the installation of correctly sized backing materials, and the tooling of the sealant to ensure contact with the substrate and to achieve the proper concave surface of the joint.



Adhesive Failure

Cohesive Failure

During cohesive failure, the sealant is split within itself. Improper joint design—including an inadequate number of joints and incorrectly sized or located joints—is a leading cause of this type of failure, as is the installation of an inappropriate sealant. Each type of sealant has specific performance characteristics not suitable for every installation.

Cohesive Failure

Substrate Failure

Substrate failure occurs when the sealant remains tight to the substrate, but the substrate separates from itself. This type of failure takes place when the adhesive and cohesive strength of the sealant is greater than the cohesive strength of the substrate.

Substrate Failure

Loss of Sealant Properties

Reversion refers to a type of property loss that occurs when sealant returns to its uncured or original tacky state.

Other types of property loss are indicative of a sealant's advanced age. Weather may harden or dry out sealant, resulting in a loss of elasticity, and exposure to ultraviolet light will degrade sealant.

Replacement of Sealant Joints

Sooner or later, all sealant will fail, even if it has been properly specified and applied. When failure occurs, it is important to replace the failed sealant material as soon as possible to prevent water from entering the building envelope and to ensure that the joints properly accommodate movement from thermal expansion and contraction, wind loading, and moisture.

Expansion Joints

Expansion Joints allow for movement in a structure or material that is caused by thermal expansion and contraction and other inducements such as wind loading and water absorption.

There are expansion joints about midspan of the building. At these locations, the slab or beam rests on steel angles. The joints have been filled with sealant which appears to have been installed to prevent these areas from leaking. These joints are about 1-1/2" wide. The sealants are not designed to span this distance. These locations require a true manufactured expansion joint. This will allow the building to move as intended without overstressing the joints.

Further, these angles need to be coated with the building, so they do not rust. Should these angles corrode, replacing them would be a costly venture. At the time of our observation we only observed surface rust.

Blistering Paint Coatings

Expansion Joints

Expansion Joints

Paint and Coatings

Paints and Coatings are made of primarily three components: Pigments, Binders, and Solvents.

1. Pigments are granular solids incorporated into the paint to contribute color, toughness, texture, and give the paint some special properties.
2. The binder, commonly referred to as the vehicle, is the actual film-forming component of paint. It is the only component that must be present; other components listed below are included optionally, depending on the desired properties of the cured film.
3. The main purposes of the solvent are to adjust the curing properties and viscosity of the paint. It is volatile and does not become part of the paint film. It also controls flow and application properties and affects the stability of the paint while in liquid state. Its main function is as the carrier for the non-volatile components. These volatile substances impart their properties temporarily – once the solvent has evaporated or disintegrated, the remaining paint is fixed to the surface.

Besides the three main categories of ingredients, paint can have a wide variety of miscellaneous additives, which are usually added in very small amounts, yet give a very significant effect on the product. Some examples include additives to modify surface tension, improve flow properties, improve the finished appearance, improve pigment stability, control foaming, control skinning, etc. Other types of additives include catalysts, thickeners, stabilizers, emulsifiers, texturizers, adhesion promoters, UV stabilizers, flatteners (de-glossing agents), biocides to fight bacterial growth, and the like. Additives normally do not significantly alter the percentages of individual components in a formulation.

Most of the paints and coatings on the project are failing primarily to age. All paints and coatings have a limited lifespan. They inevitably reach a point when they are no longer effective at withstanding the stresses of the environment and therefore need to be replaced.

There are many types of coating failures; however due to Florida's climate the primary cause of coating failures and the ones experienced on your project are Chalking, Biological Deterioration, Blisters, and Improper Application.

Chalking

Chalking is the progressive powdering of the paint film on the painted surface. This condition often occurs as the paint weathers and the binder is slowly degraded by the sun's ultraviolet radiation and moisture, releasing the binder's hold on the pigment. Over time, nearly all paints will show some chalking when they are subject to outdoor exposure.

Biological Deterioration

Macro and microorganisms can destroy both the decorative and protective properties of paint coatings. Algal and fungal growth can cause discoloration of water and solvent borne paint coatings and ultimately destroy the integrity of the coating. Florida's humid climate and ultraviolet radiation enhance the biological growth and deterioration of the paint coatings.

Blistering

Blistering is the formation of round 'bubbles' of paint film. The cause is always moisture related. This is usually cause by excessive moisture coming through the substrate or sometimes it is cause by improper surface preparation.

The elastomeric coatings currently installed on the structures appear to retain their elastomeric properties and waterproofing qualities. However, the aesthetic issues need attention. Therefore, we do not recommend installing another elastomeric coating, but a high-quality acrylic coating.

The advantages of using the acrylic coatings are better color retention, less dirt retention, less biological growth, and reduced cost. The breaches in the elastomeric coatings will have to be addressed and properly repaired.

The control joints at the floor levels need to be removed and replaced, as these appear to be a source of water intrusion. The elastomeric coatings at these locations will have to be addressed.

The paint coatings on the window system have their own unique characteristics. Greens and reds are two of the hardest colors for color retention and they are more susceptible to fade. Brown is made up of these two colors and therefore fades more than other colors. Consequently, a high quality dimensionally stable paint coating needs to be selected. This coating also needs to be compatible with the sealant systems employed.

Improper Surface Preparation

Improper surface preparation is usually the main culprit for most coating failures. A coating is only as good as the surface it is adhering. Over the years, buildings accumulate layers of paint coatings applied at different times in the life of the structure.

These coatings have their own individual adhesive properties. Most coatings have enough adhesive properties to last the life of the structure. The surfaces must be properly prepared prior to the final coating applications. Many coating failures are attributed to the lack of preparation. In the past, to keep the costs of the work down, painting contractors and paint manufacturers remove or modify this step.

The key to a good paint coating application is the introduction – the cleaning and preparing the substrate to receive the paint coatings. This usually requires the application of a primer. A primer is a preparatory coating put on materials before painting. Priming ensures better adhesion of paint to the surface, increases paint durability, and provides additional protection for the material being painted.

Aluminum Windows, Screen Enclosures, and Rails

Aluminum alloys are widely used in structures where a high strength to weight ratio is important, such as in the window and door industry. Aluminum has a natural corrosion protection from its oxide layer, but if exposed to aggressive environments it may corrode. Still, if correctly fabricated, constructions of aluminum may be reliable and have long service life.

Many of the windows and screen enclosures observed at the project are pitting, decaying, and are past or approaching their useful life and need to be replaced. However, if the windows are to be extended; surface preparation is key. The amount of preparation needed mainly depends on the type and condition of the original substrate.

To properly prepare the surfaces will require extensive sanding and priming. The finish coat needs to be a high-quality paint. Further, to properly prepare the windows would require the sealant, as defined above, needs to be replaced.

Some of the walkway railings on one building have been replaced. These seem to be in good condition. Some of the existing handrails are beginning to deteriorate and are approaching an unsafe condition. Further, these rails are no longer code compliant.

Further, many of the glass enclosures have been fabricated using single non-thermal glass. The issue that is causing the damage on the interior of the balcony knee walls is condensation. Condensation is the change of the physical state of matter from the gas phase into the liquid phase and is the reverse of vaporization. When water condensates on the interior of the glass it drips down onto the frame and because the wall is sloped the water collects at the lowest point of the wall.

Condensation in building construction is an unwanted phenomenon as it may cause dampness, mold, health issues, wood rot, corrosion, weakening of the mortar as we have seen in the masonry knee walls, and energy penalties due to increased heat transfer. To alleviate these issues, the indoor air humidity needs to be lowered, or air ventilation in the building needs to be improved.

This can be done in several ways, for example opening windows, turning on extractor fans, using dehumidifiers, or providing thermal installed glazing. Air conditioning or ventilation systems can be installed to help remove moisture from the air and move air throughout the building.

Walkways Railings

Concrete Repair

Concrete Repair

Deteriorated Reinforced Concrete

Based on our observations, it is our professional opinion that some of the structural elements observed have begun the natural process of deterioration of reinforced concrete. Evidence of deterioration generally becomes visible on the walkways and stairs systems at the onset of spalling.

This deterioration occurs due to nature's universal characteristic that all things tend toward a more stable state. Reinforcing steel as installed in concrete structures is a refined product whereby iron alloys are made to exhibit favorable strength characteristics. Unfortunately, these metal alloys are not chemically inert, i.e. outer electron valences are not full. Under favorable conditions, the metal reacts with available oxygen to create iron oxides, which are more stable than the original metal.

When reinforced concrete is first placed, the surrounding concrete protects the reinforcing steel. Chemical characteristics of the concrete affect the oxidation reaction, creating a protective layer of non-expansive iron oxide around the reinforcing steel. This protective layer is known as a “passivating layer.”

Following the formation of the passivating layer, further oxidation does not occur if the characteristics of the concrete remain unchanged. However, as concrete is exposed to the elements the chemical characteristics of the concrete change, resulting in an environment conducive to corrosive oxidization of the metal. The oxides formed by this reaction are considerably more voluminous than the base metal (up to eight times greater) and are commonly known as rust. Unlike the passivating layer, corrosive oxidation continues until all the base metal has been converted to iron oxides. In reinforced concrete, the results of this corrosion are a loss of strength and eventually, collapse.

The corrosion of reinforcing steel in the concrete of coastal buildings is further affected by the presence of airborne salts. The salts are highly chemically reactive, accelerating the above-mentioned change in the chemical characteristics of the concrete. When in contact with the reinforcing steel, the salts react directly with the passivating layer and the metal, also accelerating the corrosion process. The corrosion of reinforcing steel is not only a chemical process, but an electrical one as well. The above-described reactions take place through the exchange of electrons. Consequently, electrical currents are generated within the reinforced concrete.

As corrosive oxidation takes place, the volume increases in the reinforcing steel exerts large tensile forces on the surrounding concrete, easily overcoming the concrete’s relatively low tensile strength. To relieve these tensile forces, cracks, and failure planes form in the concrete. As the corrosion continues, the concrete continues to crack and eventually breaks off. Cracks that have propagated to the extent where concrete has broken off are known as spalls.

To reduce this problem of corrosion, the American Concrete Institute (ACI) has established minimum requirements for concrete cover. ACI currently prescribes a cover of 1-1/2" for smaller bar sizes in structural components that are not protected from the elements. In normal environments, this cover should provide protection adequate to extend the life of a structure to its anticipated useful life, generally fifty years. Prior to the 1970's, the requirement was 3/4" but was increased to its current level following studies of concrete porosity and resistance to chloride penetration by the U.S. Army Corps of Engineers, ACI, the International Concrete Repair Institute, and others.

These minimum concrete cover requirements recognize the chemical changes in the concrete as described above take time to occur, and in general protect the reinforcing for the anticipated life of the structure. However, corrosion frequently occurs before the design life of the structure is reached. Premature corrosion occurs due to concrete cover that is less than prescribed (generally due to construction errors in steel or concrete placement), poor quality concrete, cracks (which allow reactive chlorides a direct path to reinforcing steel), or exposure to corrosive environments. At the Excelsior Condominium, evident corrosion appears to be primarily the result exposure to a salt-rich coastal environment, exacerbated by cracking and inadequate coverage over the reinforcing steel.

The structural components at the Condominium are corroding because of the process described above. Generally, this deterioration becomes significant after 20 to 30 years.

Presently, many previously restored concrete structures suffer from severe corrosion of the reinforcement only a few years after being repaired, as is the case of this structure. In many cases, deterioration due to the continuing superposition of new material over or adjacent to existing chloride-contaminated concrete results in continuing corrosion.

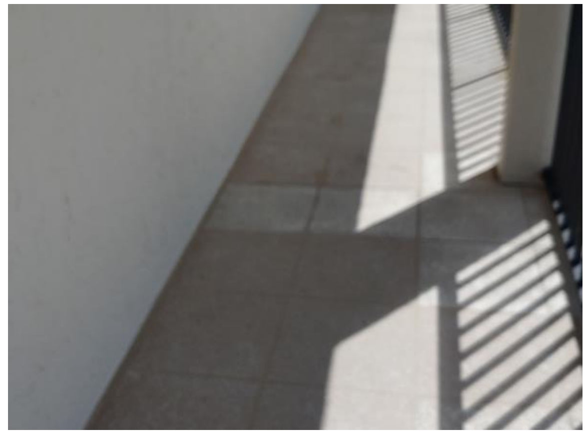
Removing chloride-contaminated concrete and replacing it with fresh concrete is more likely to produce a durable repair rather than simply repairing what appears to be wrong. However, there is still no guarantee the procedure will be 100% successful. This is because it is extremely difficult to identify precisely how much concrete needs to be removed to ensure that future corrosion sites are eliminated. It is also very difficult to remove all chloride contamination from the reinforcement, particularly where pitting corrosion has occurred.

Most of all, a repair of this nature may, in many situations, accentuate corrosion in the reinforcing steel adjacent to the repair area. This phenomenon is often called ring anode corrosion or halo effect. Ring anode corrosion results from electro-chemical incompatibilities between the repair and the substrate concrete. Differences between the base concrete and the repair can create differences in electrical potentials that drive new corrosion cells across the interface between the patch and the substrate concrete.

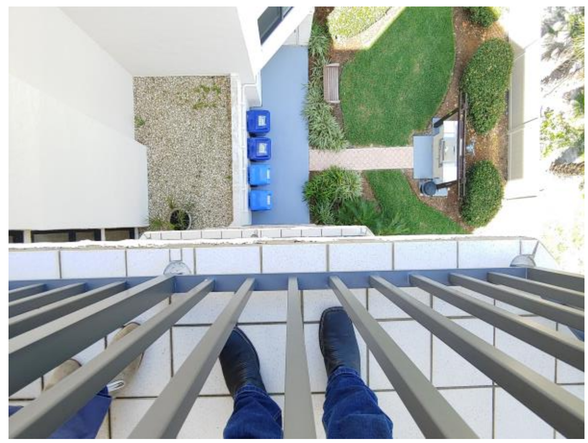
Factors that can lead to corrosion problems include differences in chloride ion content, pH, permeability, or even different types of reinforcing steel that are coupled together. These factors may accelerate corrosion in the repair itself, but more often results in deterioration of the concrete adjacent to the repair. The rate of deterioration due to ring anode corrosion is dependent upon the same factors that control the overall rate of corrosion. These include the amount and difference in chloride content, moisture availability, temperature, and permeability of the concrete.

The reason the corrosion is an issue, in reinforced concrete the reinforcing steel is placed at the tension zones. To demonstrate this concept, assume a rubber eraser. If you bend the eraser down at each end, you will notice that the bottom of the eraser compresses or shortens while the top of the eraser lengthens or stretches. Thus, the bottom of the eraser is in compression and the top is in tension. Concrete is strong in compression yet week in tension, while, steel is both strong in compression and tension. In reinforced concrete structures, the steel is in the tension areas of the concrete. This allows the concrete to span greater distances. Corrosion of the reinforcing steel reduces the capacity of the steel and its bond to the concrete and thus its ability to support the loads on the structure.

This situation is similar as being experienced on the balcony CMU walls. These can be repaired using an engineered concrete repair mortar.



Walkways Coatings



Stucco Repair

Concrete Repair

Concrete Protection

To arrest corrosion and reduce the potential for future damage several techniques are available.

Decorative Membrane

The most common technique is to install a traffic-bearing membrane or other barrier system to the surface of the slab. In conjunction with the membrane, cracks and joints would be addressed using sealant joints compatible with the membrane system.

This technique is intended to reduce the moisture and oxygen available for the corrosion process, and to prevent further infiltration of contaminants such as salts. Although successful at reducing corrosion, this technique does not eliminate corrosive activity. Moisture in the form of humidity will be present within the concrete and previously deposited contaminants are not removed.

Membranes are available in several varieties but typically fall into two primary categories: polymer and cementitious-based membranes, which typically have decorative topcoats. The urethane-based membranes are the most common and most cost effective. They are flexible and offer crack spanning ability. The topcoats are sand or a colored quartz finish. The sand finished membranes are typically of one color while quartz topcoats add colors that are embedded in a clear coat. The colors are achieved using several colors of quartz to make them more attractive.

In our experience, these types of membranes are difficult to maintain, readily pick up dirt, and are easily stained. While these are relatively simple to repair, the repairs are visible and noticeable. In high traffic environments, such as hotels and condominiums, they are a maintenance issue.

Conversely, the cementitious membranes offer some degree of flexibility but do not have the crack spanning ability as the urethanes. However, if the surface is not susceptible to cracking or the movements accommodated, they are good and effective membrane systems. These membranes typically have a cementitious topcoat which are very attractive and are like the membrane system currently installed. These can be a uniform finish or can have patterns installed made to look like tile, stone, wood, or the combination thereof.

The topcoats are generally available in two varieties: color impregnated with a clear finish coat or have a film forming finish coat. The color-impregnated coatings are used with the decorative textures. The base coat is applied in one color and the pattern is applied in a different color. Then a clear topcoat is applied over the entire surface to seal the surface and resist dirt pick up and staining. All systems have some degree of dirt pickup and staining even with the clear coat. The film forming topcoat can be used in a similar fashion as the impregnated systems, the difference being the film forming topcoat provides the color after the textures are provided.

The current systems installed on the building are cementitious. The Gulf side building has a decorative colored membrane which appears to be holding up well. Several locations need to be repaired. The advantage of these systems are they can be recoated as the membrane appears to be intact. At the areas where concrete repairs are located, the membrane system can be repaired and blended into the existing systems. Then the entire system can be recoated and maintain the original appearance.

In the bayside buildings, there is a decorative cementitious coating as manufactured by a company called ProTile. This is more or less a polymer modified stucco. There is no membrane beneath the coating. This coat has a susceptibility of cracking a delaminating as can be seen at several locations. These can also be repaired, however these systems are not waterproof as they are without a membrane. These systems can be removed, a membrane installed, and the ProTile again or a membrane system like the Gulf side walkways.

CONCLUSIONS AND RECOMMENDATIONS

Based on our observations and analysis, it is the professional opinion of DEG that the deterioration of structural and building envelope components at Excelsior Condominium has progressed significantly to warrant a structural restoration and protection project. Although the damage observed at the buildings is not extensive, this project should be undertaken as soon as practicable to mitigate project costs and future costs and to prevent deterioration to the extent where the stability of the structure would be compromised.

DEG recommends a structural restoration and protection project according to the following general course of action.

- Remove the existing decorative coating and membrane on the bayside building walkways and install a membrane system with decorative finishes and topcoats.
- Repair the existing membrane system and topcoats on the Gulf side walkways.
- Remove and replace some of the walkway railings.
- Remove and install a prefabricated expansion joint.
- Remove and replace the sealants.
- Repair damaged concrete and masonry by removing concrete near corroded reinforcing steel, cleaning and preparing reinforcing steel and installing repair mortars. Since the success of repairs of concrete damaged by corrosion of reinforcing steel is highly dependent on the method of repairs, the International Concrete Repair Institute (ICRI) has compiled guidelines for repair methods based on research and the experience of engineers, contractors and material manufacturers worldwide. These guidelines represent the current understanding of correct methods for durable repairs. DEG recommends repairing damaged concrete according to ICRI guidelines. The success of repairs is also dependent on the materials used in the repairs. We recommend using repair materials that have been engineered specifically for the repair of corrosion-damaged concrete.
- Repair the cracks with a gravity fed low modulus epoxy, install a control joint, and install a flexible joint sealant.
- Install chemical corrosion inhibitor at all exposed structural concrete elements to reduce the corrosion rate of the host concrete.

- Install galvanic anodes at repair areas to reduce the potential of the halo effect at areas where the migrating corrosion inhibitors cannot reach, such as under walls.
- Remove and replace delaminating and failing cementitious finishes.
- Remove and repair the areas of paint that are blistering. Paint the building with a high build breathable paint coating.
- Remove and replace some of the existing screen enclosures.

To implement our recommendations, the next anticipated course of action is to proceed with compiling the scope of work and the Project Manual as described in our agreement. We are available to proceed immediately with this work.

Due to the limited scope of this investigation, we cannot attest to the structure's compliance with building codes or accepted construction techniques, except as noted herein. This report is prepared for the sole benefit of the client. Any unauthorized use without our permission shall result in no liability or legal exposure to DEG.

If you have any questions or require additional information regarding this report, please do not hesitate to call.

Sincerely,

DE STEFANO ENGINEERING GROUP, PL

Mark A. de Stefano, PE

Mark A. de Stefano, PE
President / Principal

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Certificate of Authorization 27383

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