Date: November 9th, 2023

To: Building Official
City of Key Colony Beach Building Department
600 W. Ocean Drive
Key Colony Beach, FL 33051

Project: Casa Clara Condominium Assoc., Inc.
201 E. Ocean Drive
Key Colony Beach, FL 33051

Re: Milestone Damage Survey Report

Introduction:

As per the Board of Directors' request, a milestone survey of the balconies, catwalks, building exterior wall areas, and roof at Casa Clara Condominium was performed in September. The purpose of the survey was to determine the conditions of the structure in these areas, and to help determine, if required, a repair strategy, as well as a budgetary cost estimate. Examinations were accomplished primarily visually and by acoustic soundings.

General Overview:

All the structures displayed similar levels of damage consistent with buildings of its age and proximity to the ocean. Previous repairs have been made to the buildings; new areas adjacent to these repairs are starting to spall. Based on our observations made as part of our ongoing special inspections, it is my professional opinion, to the best of my knowledge, that there are no immediate risks posed by the damages (those not yet repaired) that are visible at the balconies and catwalks, and also that all the property's structures are habitable. In my estimation, to the best of my knowledge, no shoring or other precautionary measures are required at this time other than those that will be dictated by local repair phasing once the repair work is underway.

Specific Findings:

The following summary details our observations:

Balcony Areas:

- The balconies are covered with tile finishes or an applied, walkable waterproofing membrane.
- All balconies have the original aluminum picket railing system in place.
- Minor deck spalling and minor wall stucco delaminations were also observed; no special shoring is required for any of those areas at this time.
- The wall stucco delaminations appear to be minor in nature.

Catwalks:

- The catwalks are covered with a waterproofing surface.
- Minor partial depth deck surface and overhead ceiling damages were observed.
- Some stucco delamination is present.

Columns:

- Some minor column damages requiring repairs have been observed; only standard shoring will be required.

Stairs:

- The stairs are exposed to the elements, with the undersides and sides stucco-ed and painted and the treads and riser surfaces waterproofed. There are two sets for each building.
- Minor, isolated spalling was observed at a few stair locations.

Roofs:

- The roofs on all three buildings have been replaced within the last five years and appear to be in good shape.

Chloride Related Damage:

The primary mechanism for corrosion damage for the Casa Clara buildings is that of chloride-based corrosion. Corrosion of reinforcing steel in concrete structures is a recurring and expensive form of damage prevalent along Florida's coastlines. The problem arises due to a combination of chlorides, moisture, and warm temperatures.

Reinforcing steel begins to corrode, in unprotected concrete structures along our coastline, within 8 to 12 years after construction. Once initiated, the rate of corrosion depends on the amount of moisture present; in general, Florida's high humidity means sufficient moisture is always prevalent. The warm ambient temperatures are also "corrosion friendly." Left untreated, corrosion will continue to accelerate to a point where the steel is destroyed, and the building's structural integrity is severely diminished. Other factors which affect how quickly the chlorides reach the steel are the amount of concrete covering the steel and the density of that concrete. The water-cement ratio of the concrete mix is a big driver in affecting permeability and thus absorption rates. More water means the concrete has less strength and is more porous.

Corrosion tends to accelerate with time. As the steel corrodes, the rust formed on the surface of the steel creates pressures within the surrounding concrete, because rust occupies 4 to 7 times the equivalent volume of steel. These resulting pressures eventually cause the concrete to crack. If the cracks are near the surface and occur in a plane parallel to such, chunks of concrete are loosened (spalls). The cracks allow more moisture to intrude, accelerating the corrosion rate. These cracks will usually occur 3 to 5 years after the threshold level has been reached – meaning we first observe cracking of structures at about 15 to 20 years of age, given common conditions.

Repair Methods:

The generally accepted method of repair is to remove the concrete surrounding the corroded steel, abrasively clean the steel, coat it with a corrosion-resistant material, replace the concrete, and apply a waterproofing membrane to the surface. Abrasively cleaning the steel (sand blasting) is extremely important to remove chlorides, which may be present in deeply corroded steel. Corroded steel with more than a 15% cross-section loss requires that new steel be spliced into the structure.

Repair concretes are specifically chosen to have low shrinkage and to match the existing concrete. Water content is held to a 0.40 water/cement (w/c) ratio to provide dense, less permeable concrete. In addition, corrosion inhibitors are added to the new concrete to resist chlorides.
We recommend a waterproofing membrane, either urethane or cementitious, be applied over the entire deck to keep water out.

All of these repair steps are recommended standard guidelines for concrete repair, in accordance with International Concrete Repair Institute (ICRI) and American Concrete Institute (ACI) standards.

Recommendations:

- Identified structural concrete damages should be repaired in accordance with ACI and ICRI standards in order to limit the effects of those corrosion related damages.
- The balcony waterproofing should be recoated when it reaches the age of 5 years, to maintain the warranty with the Manufacturer.
- Minor cracks should be epoxied to seal them, in order to prevent any chloride infiltration to the reinforcing steel.
- Delaminated stucco sections should be repaired.
- The Association should plan to paint, once the current exterior coating has reached the age of 8 years, to properly protect the building and prolong the life of the structure.
- The roof should be maintained on a routine, regular basis, meeting or exceeding any warranty requirements, in order to keep the roof warranty intact.

Conclusions:

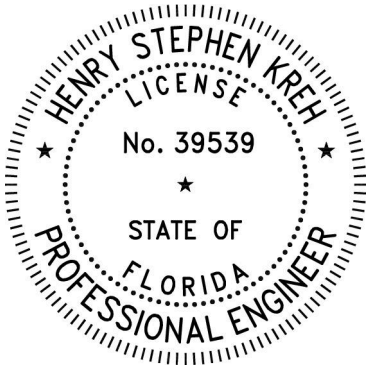
While we have identified minor concrete damages, the overall structural integrity of buildings has not been affected. Based on our observations, made as part of our inspections and cursory survey, it is my professional opinion, to the best of my knowledge, that there are no immediate risks to persons or property. The buildings appear to be safe and habitable.

Respectfully,

Henry S Kreh Digitally signed by Henry S Kreh
Date: 2023.11.13 14:37:37 -05'00'

Andres Caicedo
President
BN 5287

Henry S. Kreh, PE
Vice President
FL P.E. #39539



Casa Clara Milestone Report
Photograph Log

Photo #1 - Aerial of Property - Key Colony Beach

Photo #2 - Aerial of Property - East Ocean Drive

Photo #3 - Typical East and West Balconies at Buildings #1 and #3

Photo #4 - Typical South Balconies at Buildings #1 and #3

Photo #5 - Retaining Wall Below 1st Floor – Buildings #1 and #3

Photo #6 - Overview of Buildings #3 (left) and #2 (right)

Photo #7 - Typical East and West Balconies at Buildings #1 and #3

Photo #8 - Crack in Beam

Photo #9 - Overhead Spall

Photo #10 - Overhead Spall

Photo #11 - Spalled Stair Edge

Photo #12 - Overhead Spall

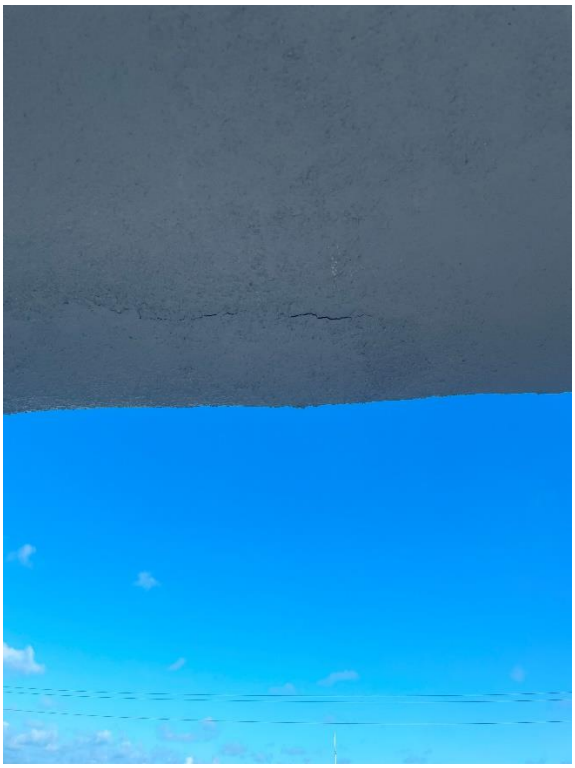


Photo #13 - Edge Spall

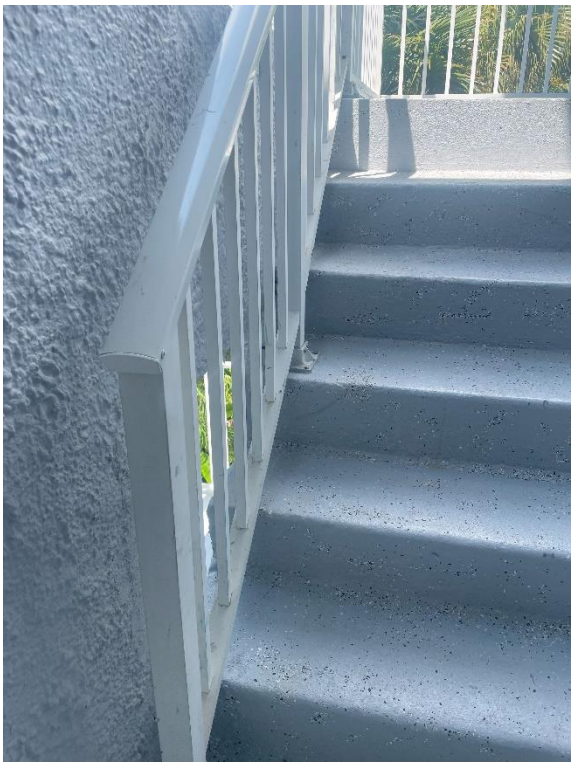


Photo #14 - Tread Spall at Stairs

Photo #15 - Roof Corner w/ Parapet Wall Cap

Photo #16 - Overview of Roof

Casa Clara Condominium

201 E Ocean Dr.

Key Colony Beach, FL 33051

ACG Engineering Services Inc
4064 NW 85TH DR., COOPER CITY, FL., 33024
PH: 954.505.4274 – FAX: 754.8165664
WWW.ACG-ENG.COM – COA #29940

Casa Clara Condominiums
201 E Ocean Dr.
Key Colony Beach, FL 33051

Structural Survey

REV	DESCRIPTION	DATE

PROJECT No.:
DRAWN: J.J.
CHECK: A.C.
APPROVED: A.C.
DATE: 12-04-17

S-1

HENRY STEPHEN KREH
LICENSE
No. 39539
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

HENRY S. KREH
FL. P.E. #39539

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:39:01 -05'00'

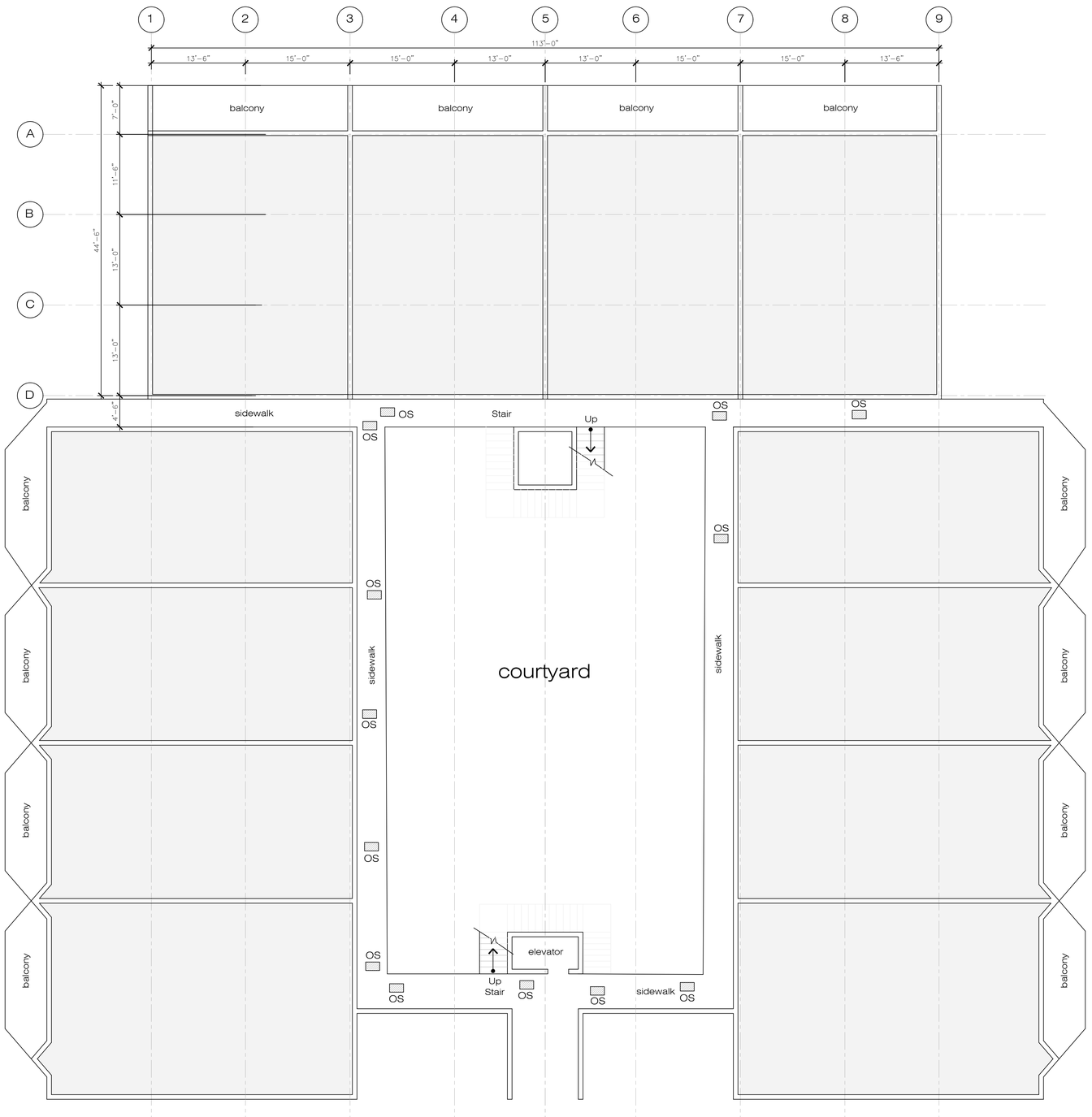
Ground Floor Plan
Building 1

1/8"=1'-0"

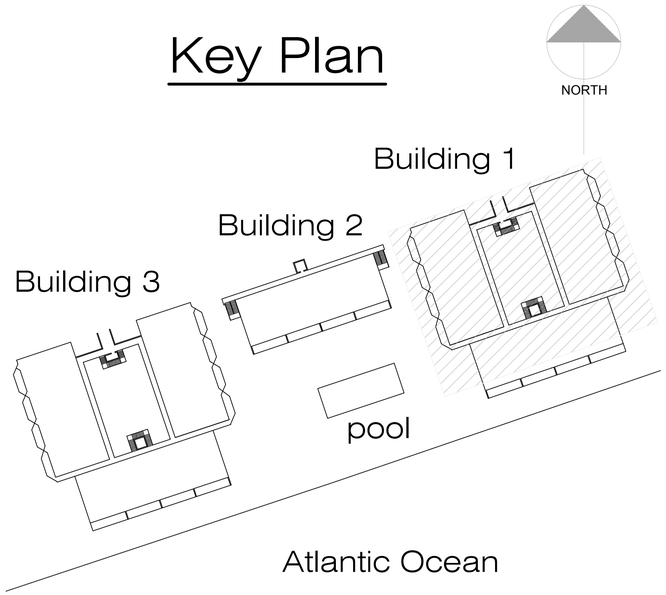
NORTH

LEGEND

- OS-overhead concrete spall
- CS-concrete spall
- HT-hollow tiles
- ST-stucco damages
- E-Edge concrete repairs
- CL-Column concrete repairs



Key Plan



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S-2

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

HENRY S. KREH
FL. P.E. #39539

Henry S Kreh
Digitally signed by Henry S Kreh
Date: 2023.11.13 14:39:47 -05'00'

2nd Floor Plan
Building 1

1/8"=1'-0"

NORTH

LEGEND

- OS-overhead concrete spall
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- HT-hollow tiles
- ST-stucco damages
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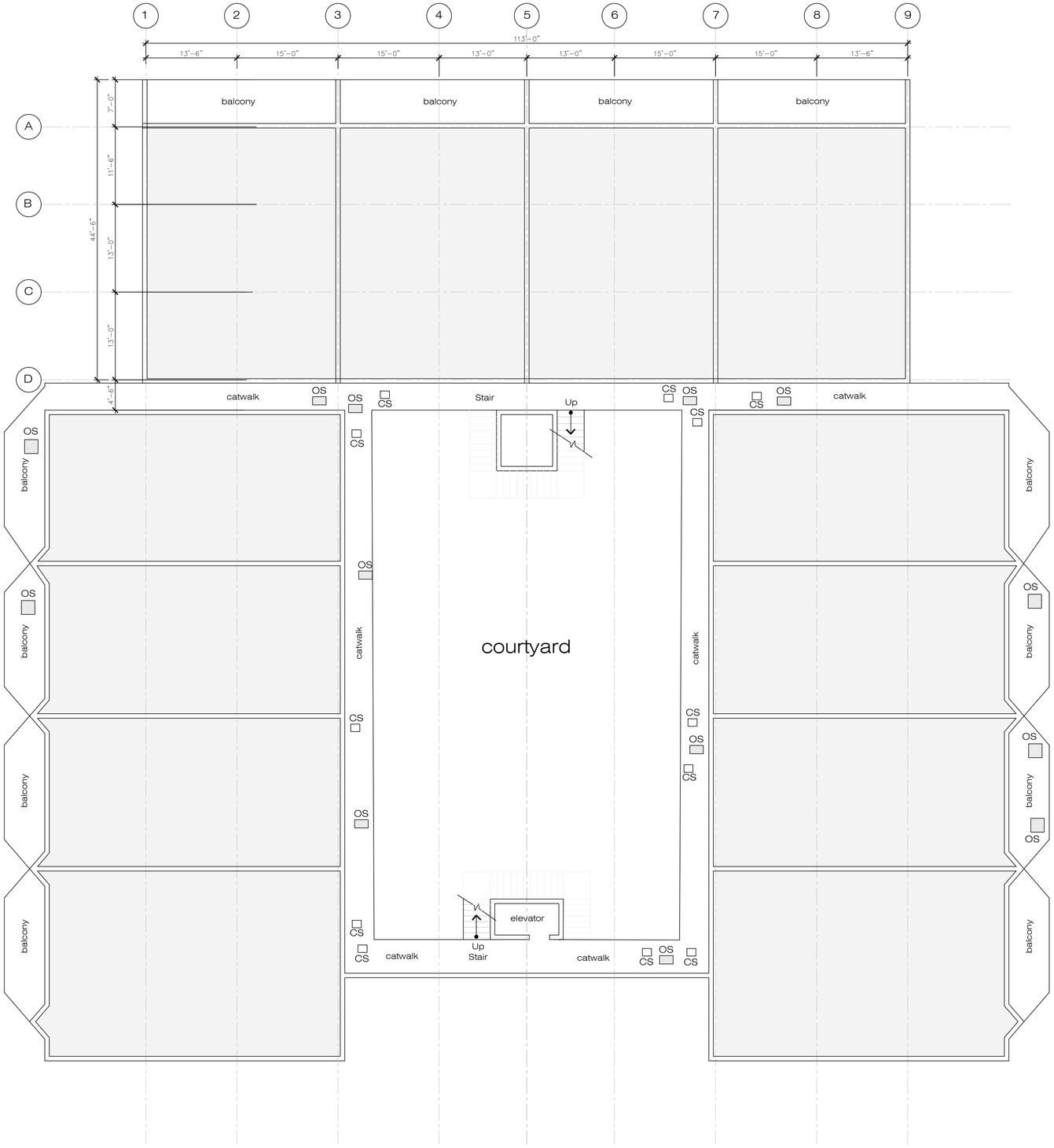
- CL-Column concrete repairs



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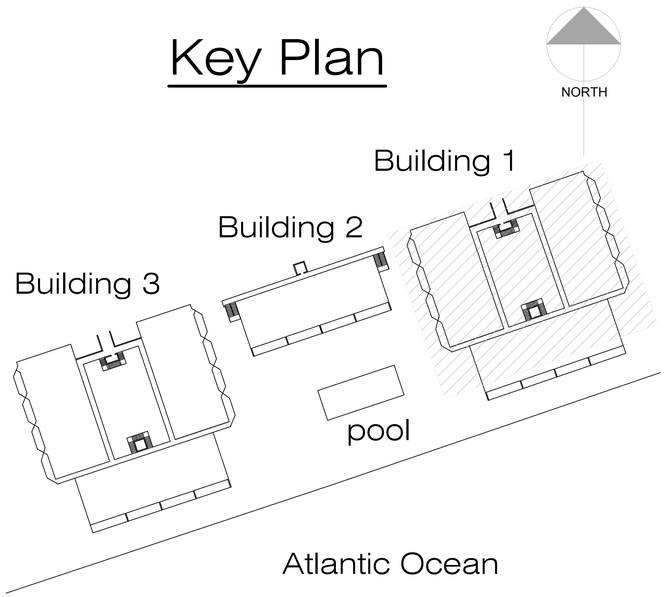

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S-3

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

HENRY S. KREH
FL. P.E. #39539

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:40:17 -05'00'

3rd Floor Plan
Building 1

1/8"=1'-0"

NORTH

LEGEND

- OS-overhead concrete spall
- CS-concrete spall
- HT-hollow tiles
- ST-stucco damages
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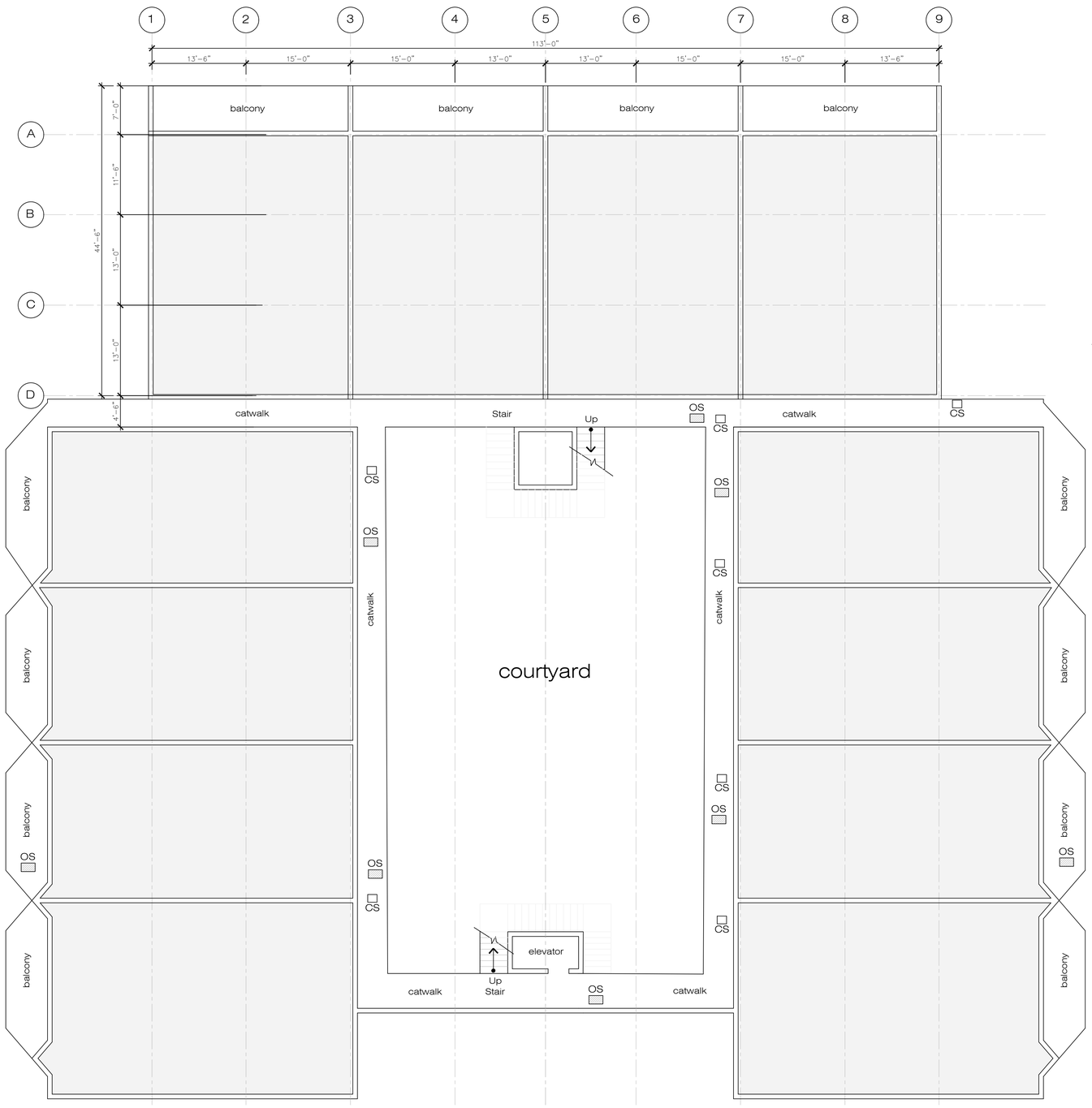
- CL-Column concrete repairs



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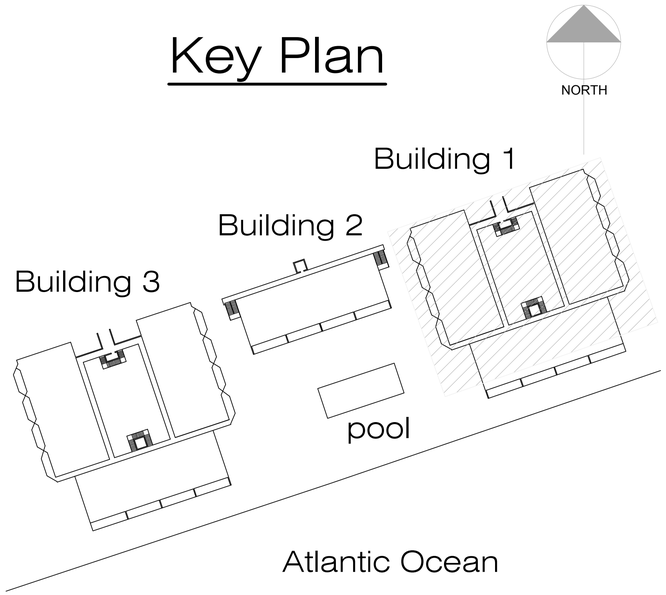

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S-4

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

HENRY S. KREH
FL. P.E. #39539

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:40:51 -05'00'

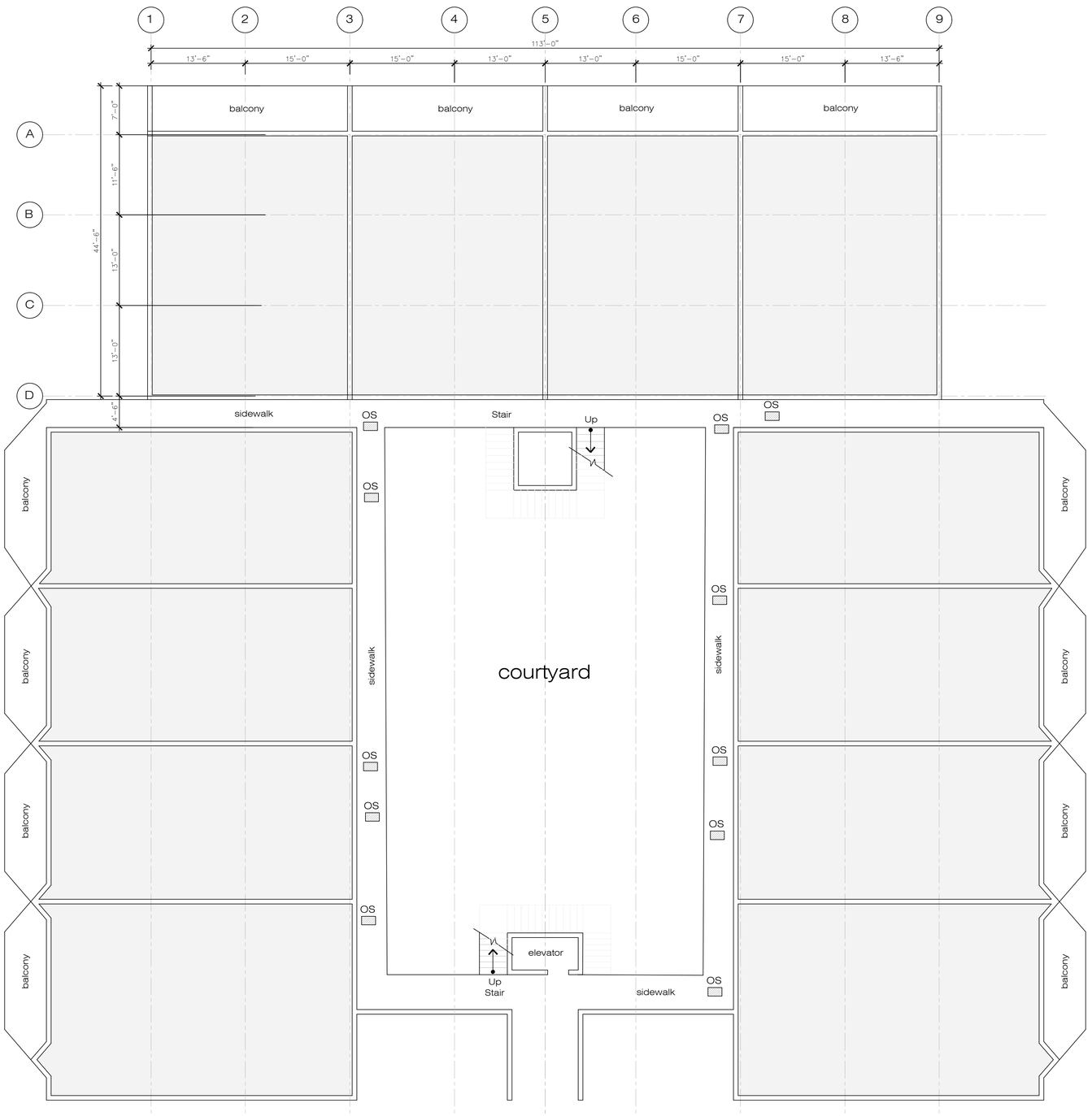
Ground Floor Plan
Building 3

1/8"=1'-0"

NORTH

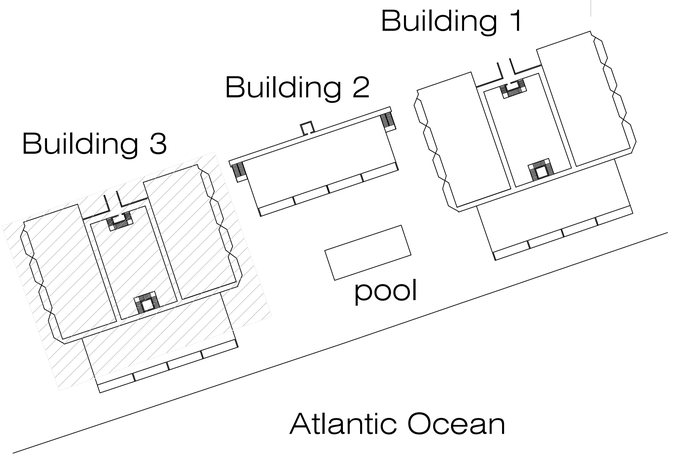
LEGEND

- OS-overhead concrete spall
- CS-concrete spall
- HT-hollow tiles
- ST-stucco damages
- E-Edge concrete repairs
- CL-Column concrete repairs



Key Plan

NORTH



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S-5

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

Henry S Kreh Digitally signed by Henry S Kreh Date: 2023.11.13 14:41:38 -05'00'

HENRY S. KREH
FL. P.E. #39539

NORTH

2nd Floor Plan
Building 3

1/8"=1'-0"

LEGEND

OS-overhead concrete spall

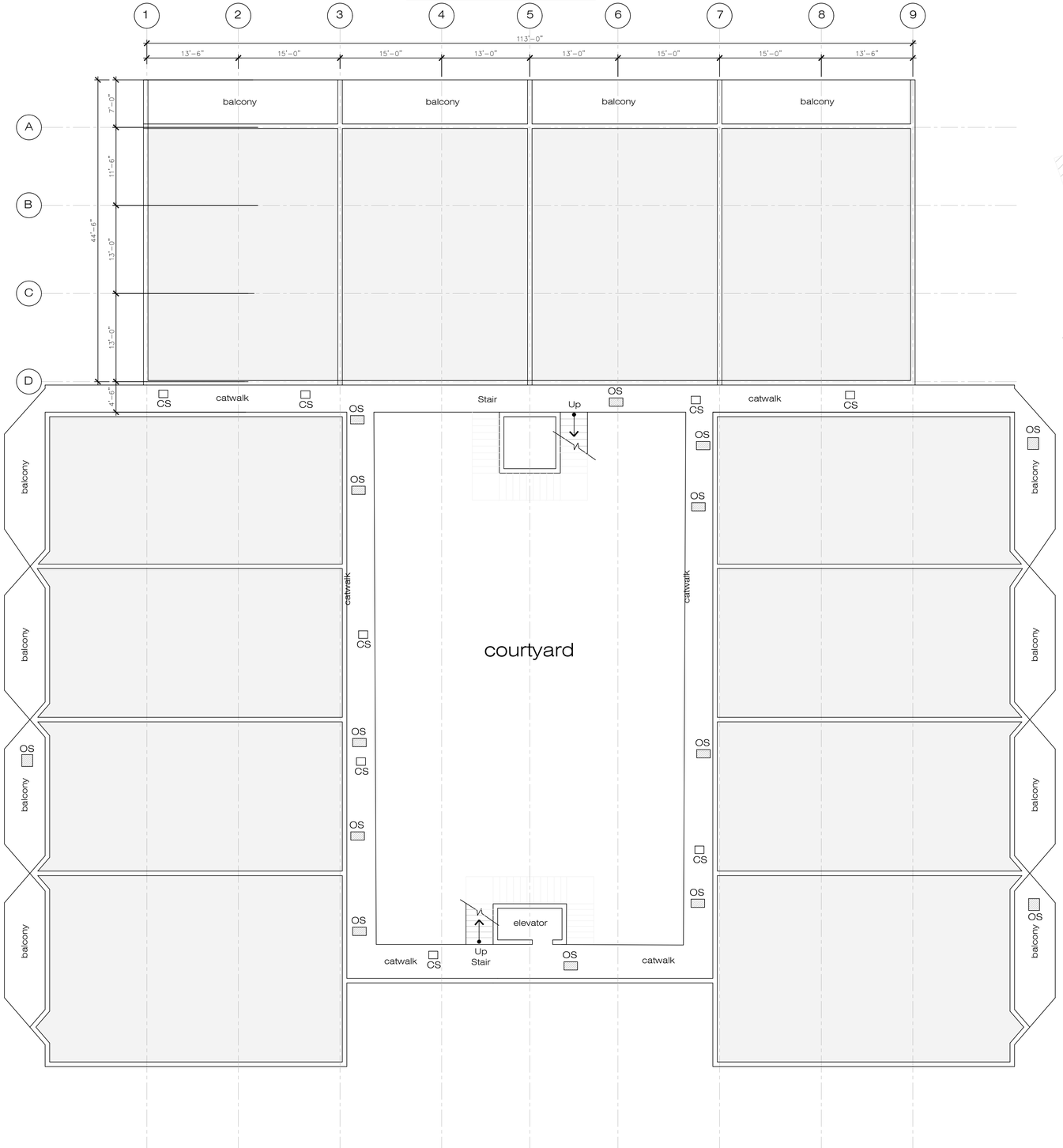
CS-concrete spall

HT-hollow tiles

ST-stucco damages

E-Edge concrete repairs

CL-Column concrete repairs



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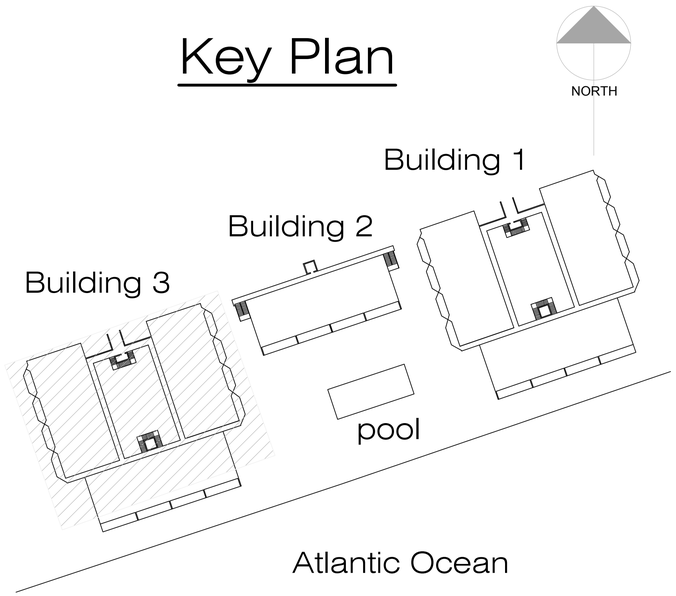

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Key Colony Beach, FL 33051

Structural Survey

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APPROVED: A.C.
DATE: 12-04-17

S-6

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:42:12 -05'00'

HENRY S. KREH
FL. P.E. #39539

3rd Floor Plan
Building 3

1/8"=1'-0"

NORTH

LEGEND

OS-overhead concrete spall

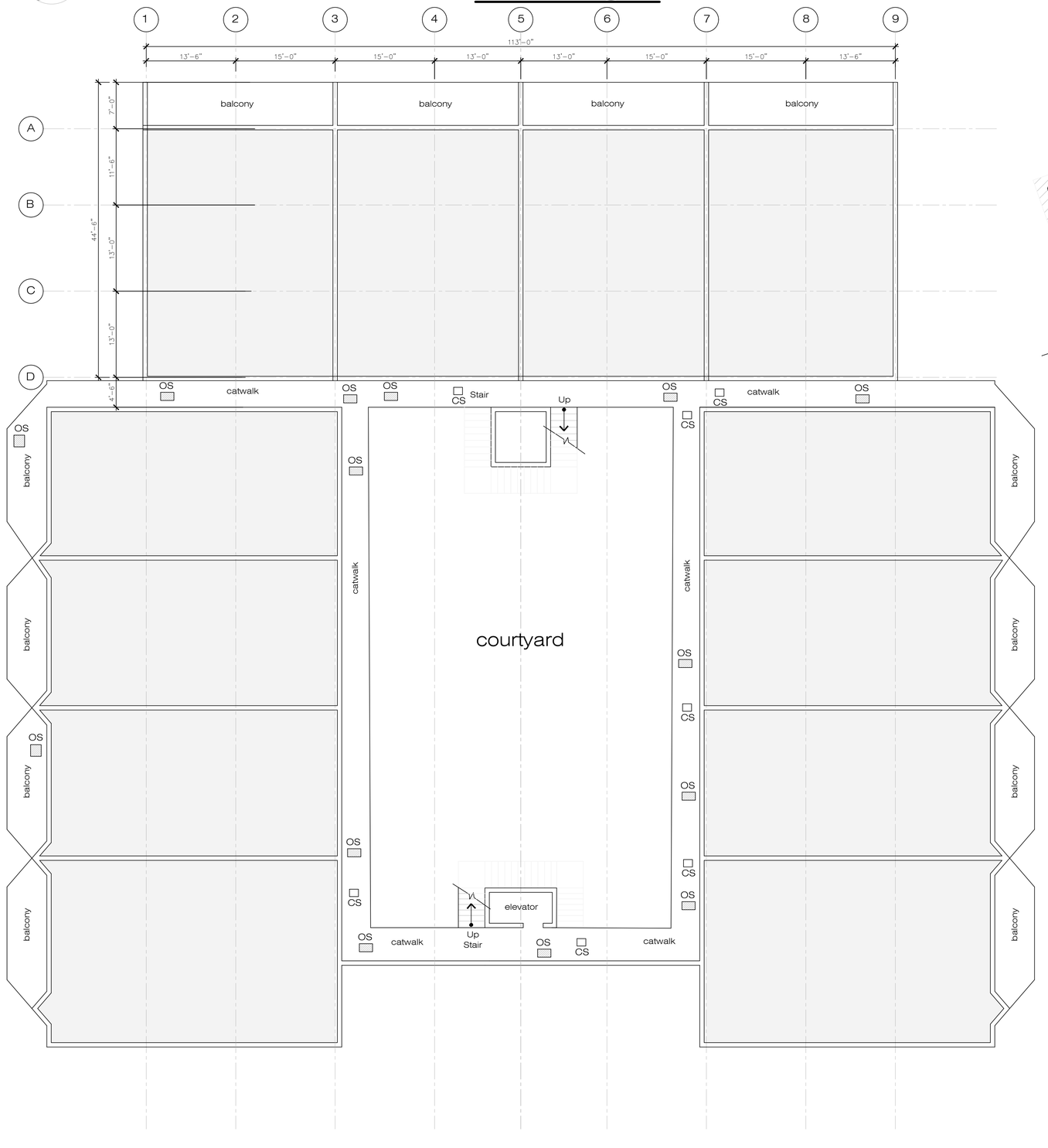
CS-concrete spall

HT-hollow tiles

ST-stucco damages

E-Edge concrete repairs

CL-Column concrete repairs



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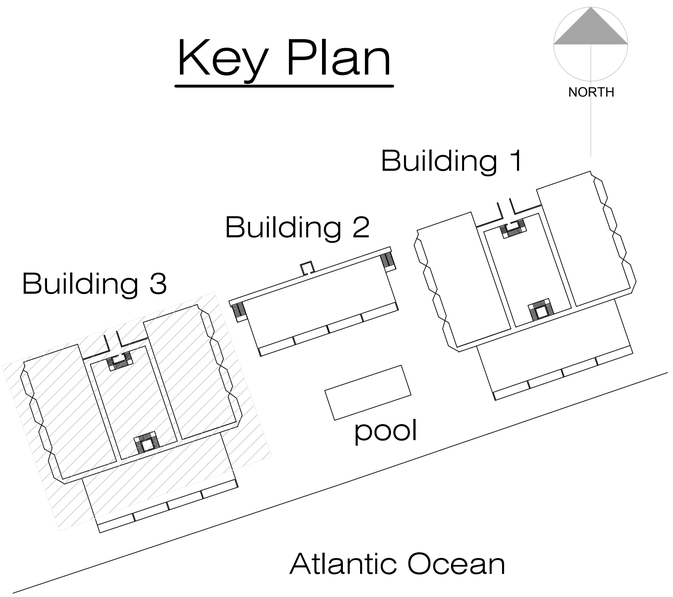

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Structural Survey

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CHECK: A.C.
APPROVED: 12-04-17
DATE:

S-7

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

HENRY S. KREH
FL. P.E. #39539

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:42:48 -05'00'

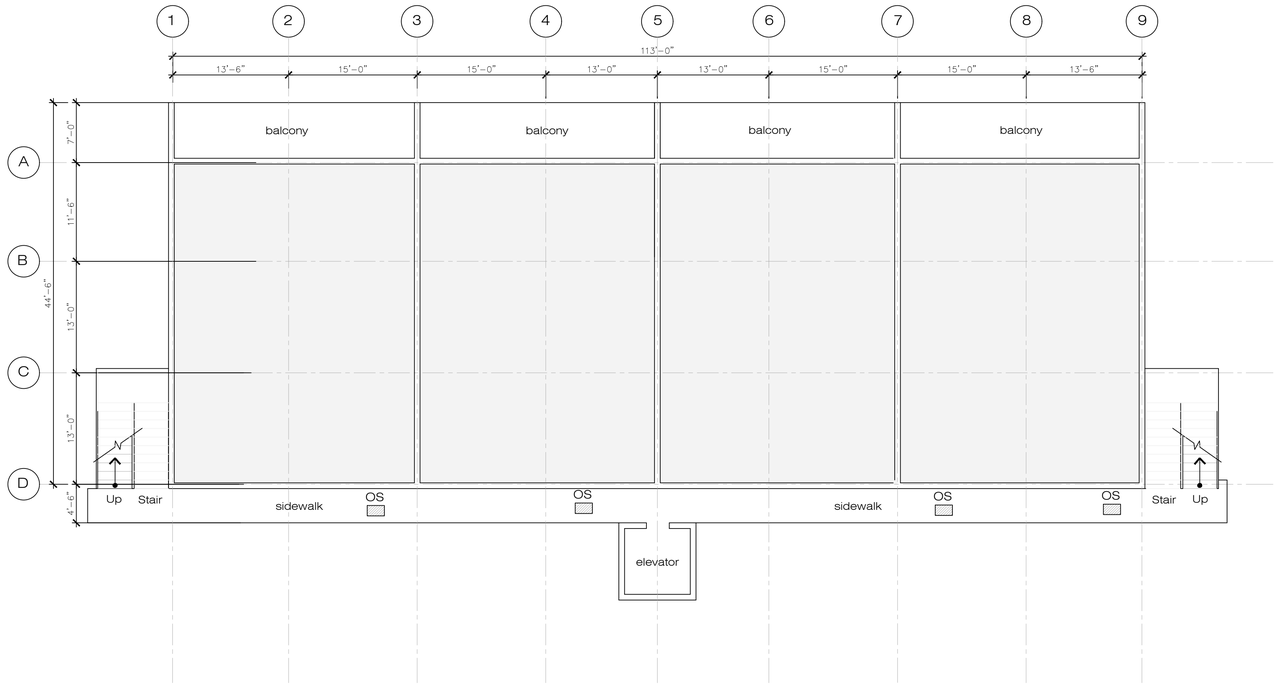
NORTH

LEGEND

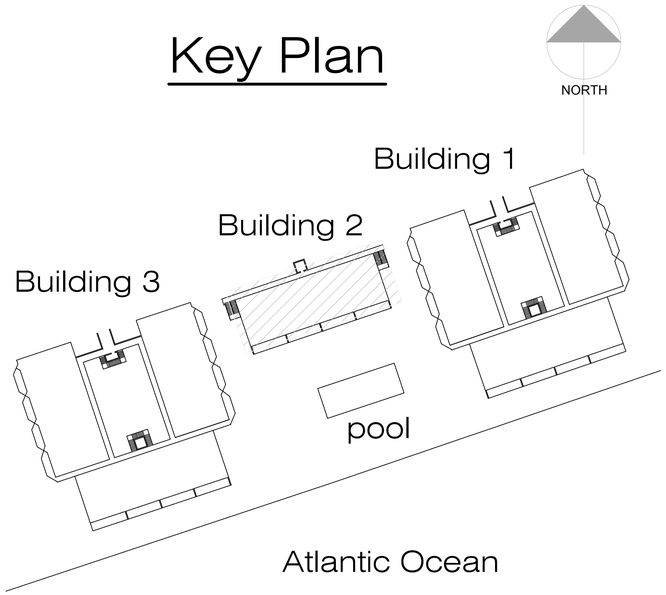
- OS-overhead concrete spall
- CS-concrete spall
- HT-hollow tiles
- ST-stucco damages
- E-Edge concrete repairs
- CL-Column concrete repairs

Ground Floor Plan
Building 2

1/8"=1'-0"



Key Plan



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Structural Survey

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S-8

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

Henry S Kreh

Digitally signed by Henry S Kreh
Date: 2023.11.13 14:43:37 -05'00'

HENRY S. KREH
FL. P.E. #39539

NORTH

LEGEND

- OS-overhead concrete spall
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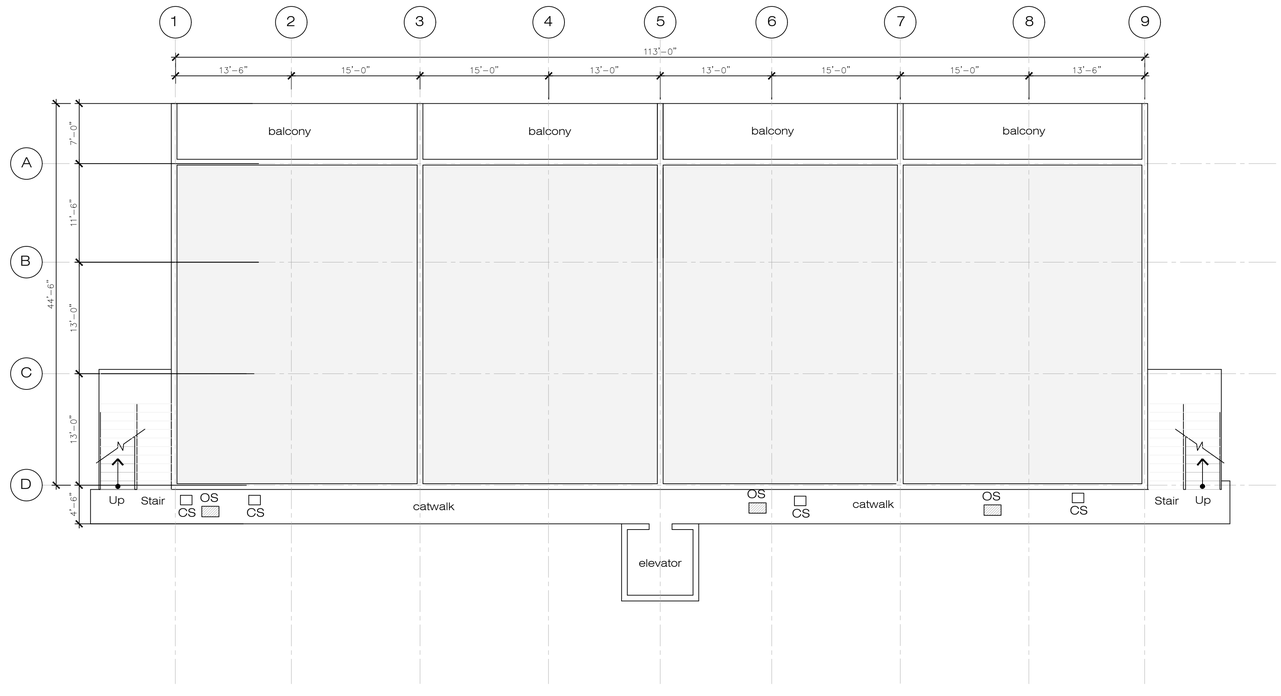
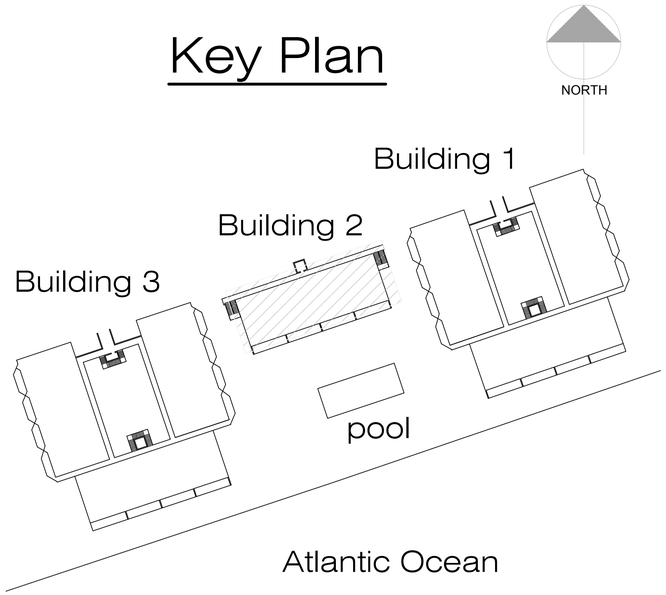
2nd Floor Plan
Building 2

1/8"=1'-0"



Key Plan



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Structural Survey

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S-9

HENRY STEPHEN KREH LICENSE No. 39539 STATE OF FLORIDA PROFESSIONAL ENGINEER

Henry S Kreh Digitally signed by Henry S Kreh Date: 2023.11.13 14:44:17 -05'00'

HENRY S. KREH
FL. P.E. #39539

NORTH

LEGEND

- OS-overhead concrete spall
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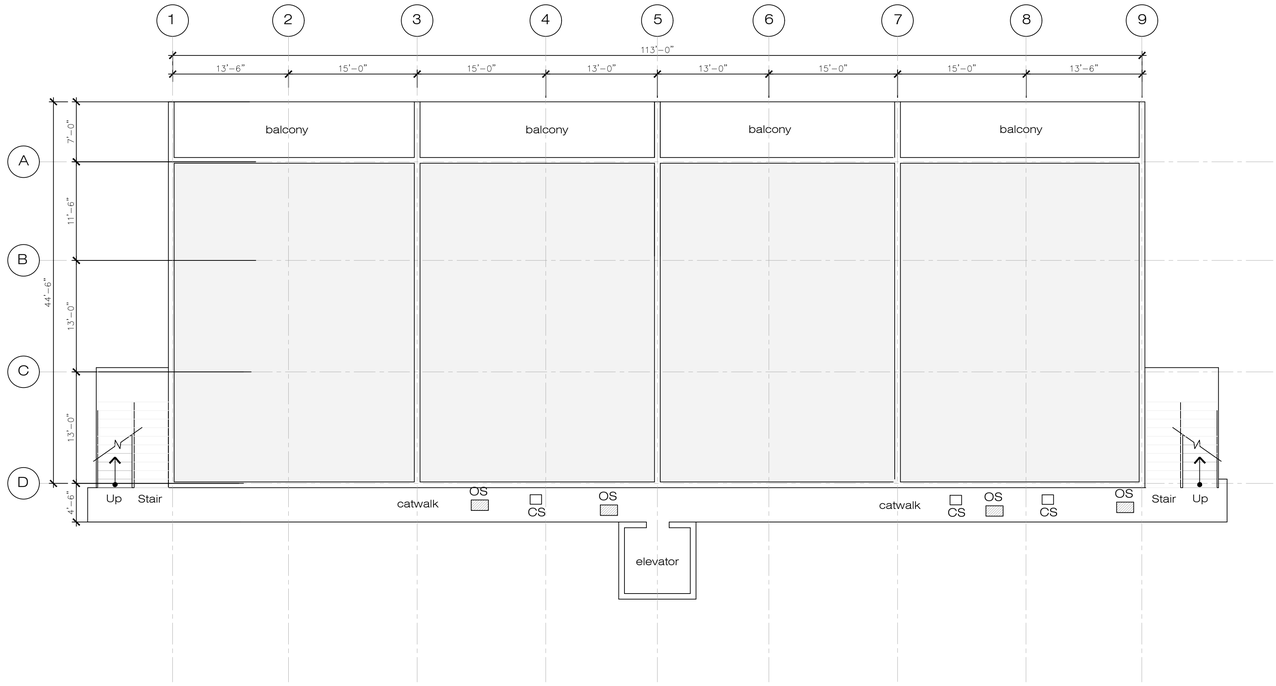
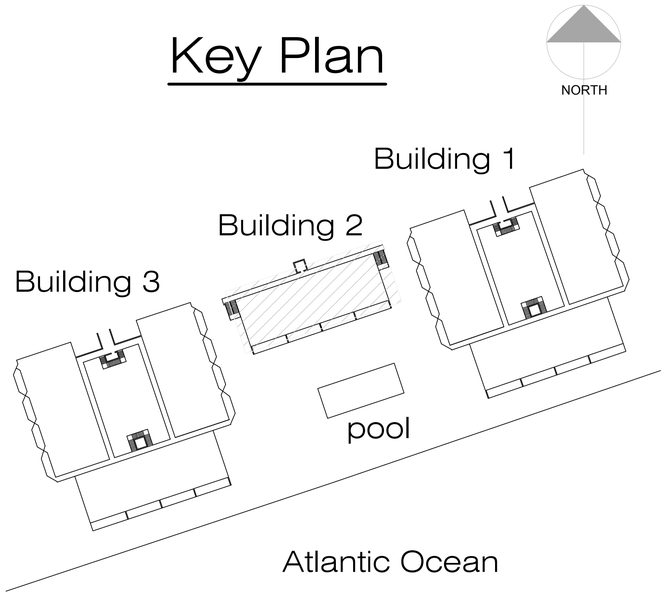
3rd Floor Plan
Building 2

1/8"=1'-0"



Key Plan



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S-10

HENRY STEPHEN KREH
LICENSE
No. 39539
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Henry S Kreh Digitally signed by Henry S Kreh
Date: 2023.11.13 14:44:53 -05'00'

HENRY S. KREH
FL. P.E. #39539