RESOLUTION NO. 18-088

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA, REQUESTING THAT THE HISTORIC ARCHITECTURAL REVIEW COMMISSION (HARC) REVIEW THE DETERMINATION OF THE CHIEF BUILDING OFFICIAL REGARDING THE DEMOLITION OF CERTAIN STRUCTURES AT THE HISTORIC DIESEL ENERGY PLANT AT 100 ANGELA STREET/GERALDINE STREET, AND MAKE RECOMMENDATIONS TO THE CITY COMMISSION; PROVIDING FOR AN EFFECTIVE DATE

WHEREAS, the Chief Building Official conducted a hearing, which resulted in a determination of unsafe conditions that necessitate demolition of certain components of the Diesel Generating Plant at 100 Angela Street, pursuant to Section 14-73, 14-75, 14-106, 14-107, 102-218(c) and 102-221 of the Code of Ordinances and Florida Statutes Section 553.80; and

WHEREAS, this Resolution calls for a request for the City Manager to direct City staff to submit the issue of demolition of certain components of the Diesel Generating plant to HARC; and

WHEREAS, the City Commission acknowledges that the authority to make such a determination is solely vested with the Chief Building Official under the City Code of Ordinances referenced here, and the Florida Building Code.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF KEY WEST, FLORIDA AS FOLLOWS:

Section 1: That the City Manager is directed to submit the issue of demolition of certain components of the Diesel Generating Plant to HARC for an advisory, non-binding, opinion, pursuant to Sec. 102-221, to be provided to the City Commission as the owner of the Diesel Generating Plant.

Section 2: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the Presiding Officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 6th day of March, 2018.

Authenticated by the Presiding Officer and Clerk of the Commission on 7th day of March, 2018.

Filed with the Clerk on March 7, 2018.

Mayor Craig Cates	Yes
Vice Mayor Clayton Lopez	Yes
Commissioner Sam Kaufman	Yes
Commissioner Richard Payne	Absent
Commissioner Margaret Romero	Yes
Commissioner Billy Wardlow	Yes
Commissioner Jimmy Weekley	Yes

CRAIG CATES, MAYOR

ATTEST:

Cheryl Smith /spt

CHERYL SMITH, CITY CLERK

Sec. 14-73. - Dangerous buildings.

It is found as a fact that there exist in the city buildings which are dangerous due to dilapidation; due to defects increasing the hazards of fire, accident or other calamities; due to lack of ventilation, light or sanitary facilities; and due to other conditions rendering such buildings unsafe, insanitary or detrimental to the health, safety or morals, or otherwise inimical to the welfare, of the city residents.

(Code 1986, § 31.020)

Sec. 14-75. - Existence of dwellings unfit for habitation.

It is found as a fact that there exist in the city dwellings which are unfit for human habitation due to dilapidation; due to defects increasing the hazards of fire, accident or other calamities; due to lack of ventilation, light or sanitary facilities; and due to other conditions rendering such dwellings unsafe or insanitary or dangerous or detrimental to the health, safety or morals, or otherwise inimical to the welfare, of the city residents.

(Code 1986, § 31.019)

Sec. 14-106. - Issuance of complaint; hearing.

Whenever a petition is filed with the chief building official by a public authority or whenever it appears to the chief building official, on his own motion, that any dwelling is unfit for human habitation or any building is dangerous, the chief building official shall, if his preliminary investigation discloses a basis for such charges, issue and cause to be served upon the owner-occupant of and parties in interest in such dwelling or building a complaint stating the charges in that respect and containing a notice that a hearing will be held before the chief building official at a place therein fixed within the city, not less than ten days nor more than 30 days after the serving of such complaint. The owner-occupant and parties in interest shall have the right to file an answer to the complaint and to appear in person or otherwise and give testimony at the place and time fixed in the complaint. Any person desiring to do so may attend such hearing and give evidence relevant to the matter being heard. The rules of evidence prevailing in courts of law or equity shall not be controlling in hearings before the building official.

(Code 1986, § 31.027(a); Ord. No. 15-06, § 1, 4-7-2015)

Sec. 14-107. - Order to repair, alter or improve building.

If, after such notice and hearing as provided in section 14-106, the chief building official determines that the dwelling under consideration is unfit for human habitation or the building under consideration is dangerous, he shall state in writing his findings of fact in support of such determination. The chief building official shall issue and cause to be served upon the owner-occupant thereof an order requiring the owner-occupant, within the time specified therein, to repair, alter or improve such building so as to render it fit for human habitation or to vacate and close the dwelling as a human habitation, or it shall require the owner-occupant within the specified time therein to repair, alter or improve such building so as to render it safe or to vacate and close the building for any and every use.

(Code 1986, § 31.027(b); Ord. No. 15-06, § 1, 4-7-2015)

Sec. 102-218. - Criteria for demolitions.

(a) The historic architectural review commission shall issue a certificate of appropriateness for an application for demolition:

(1) If the subject of the application is a contributing or historic building or structure, then it should not be demolished unless its condition is irrevocably compromised by extreme deterioration or it does not meet any of the criteria of section 102-125(1) through (9).

(2) For a contributing historic or noncontributing building or structure, a complete construction plan for the site is approved by the historic architectural review commission.

(b) The historic architectural review commission shall not issue permits that would result in:

(1) Removing buildings or structures that are important in defining the overall historic character of a district or neighborhood so that the character is diminished;

(2) Removing historic buildings or structures and thus destroying the historic relationship between buildings or structures and open space; and

(3) Removing an historic building or structure in a complex; or removing a building facade; or removing a significant later addition that is important in defining the historic character of a site or the surrounding district or neighborhood.

(4) Removing buildings or structures that would otherwise qualify as contributing, as set forth in section 102-62(3).

(c) Nothing in this section is intended to alter the authority of the Building Official to condemn for demolition dangerous buildings, as provided in chapter 14 of the Code of Ordinances.

(Ord. No. 97-10, § 1(3-10.3(E)(2)(c)), 7-3-1997; Ord. No. 06-14, § 12, 8-1-2006)

Sec. 102-221. - Unsafe structures.

If the chief building official determines that any structure within a designated historic site or designated historic district is unsafe pursuant to the applicable sections of the Code of Ordinances, the chief building official will immediately notify the historic architectural review commission of the findings. The unsafe condition shall include structures deemed by the chief building official to be undergoing demolition by the property owner's neglect of maintenance responsibilities. Where appropriate and in accordance with applicable ordinances, the chief building official will attempt to have the owner or other appropriate party repair the structure rather than order it to be demolished and will take into consideration any comments and recommendations by the historic architectural review commission. However, the provisions contained within sections 102-187 through 102-190 and this division 3 shall not apply to the chief building official's declaration that a building is unsafe, nor will the chief building official be precluded from taking such steps as may be required by applicable ordinances to protect the public health and safety of the community. The historic architectural review commission may also endeavor to negotiate with the owner and interested parties, provided such actions do not interfere with procedures in the applicable ordinances.

(Ord. No. 97-10, § 1(3-10.3(E)(2)(g)), 7-3-1997)

553.80 Enforcement.—

(1) Except as provided in paragraphs (a)-(g), each local government and each legally constituted enforcement district with statutory authority shall regulate building construction and, where authorized in the state agency's enabling legislation, each state agency shall enforce the Florida Building Code required by this part on all public or private buildings, structures, and facilities, unless such responsibility has been delegated to another unit of government pursuant to s. 553.79(9).

(a) Construction regulations relating to correctional facilities under the jurisdiction of the Department of Corrections and the Department of Juvenile Justice are to be enforced exclusively by those departments.

(b) Construction regulations relating to elevator equipment under the jurisdiction of the Bureau of Elevators of the Department of Business and Professional Regulation shall be enforced exclusively by that department.

(c) In addition to the requirements of s. 553.79 and this section, facilities subject to the provisions of chapter 395 and parts II and VIII of chapter 400 shall have facility plans reviewed and construction surveyed by the state agency authorized to do so under the requirements of chapter 395 and parts II and VIII of chapter 400 and the certification requirements of the Federal Government. Facilities subject to the provisions of part IV of chapter 400 may have facility plans reviewed and shall have construction surveyed by the state agency authorized to do so under the requirements of part IV of chapter 400 and the certification requirements of the Federal Government.

(d) Building plans approved under s. 553.77(3) and state-approved manufactured buildings, including buildings manufactured and assembled offsite and not intended for habitation, such as lawn storage buildings and storage sheds, are exempt from local code enforcing agency plan reviews except for provisions of the code relating to erection, assembly, or construction at the site. Erection, assembly, and construction at the site are subject to local permitting and inspections. Lawn storage buildings and storage sheds bearing the insignia of approval of the department are not subject to s. 553.842. Such buildings that do not exceed 400 square feet may be delivered and installed without need of a contractor's or specialty license.

(e) Construction regulations governing public schools, state universities, and Florida College System institutions shall be enforced as provided in subsection (6).

(f) The Florida Building Code as it pertains to toll collection facilities under the jurisdiction of the turnpike enterprise of the Department of Transportation shall be enforced exclusively by the turnpike enterprise.

(g) Construction regulations relating to secure mental health treatment facilities under the jurisdiction of the Department of Children and Families shall be enforced exclusively by the department in conjunction with the Agency for Health Care Administration's review authority under paragraph (c).

The governing bodies of local governments may provide a schedule of fees, as authorized by s. 125.56(2) or s. 166.222 and this section, for the enforcement of the provisions of this part. Such fees shall be used solely for carrying out the local government's responsibilities in enforcing the Florida Building Code. The authority of state enforcing agencies to set fees for enforcement shall be derived from authority existing on July 1, 1998. However, nothing contained in this subsection shall operate to limit such agencies from adjusting their fee schedule in conformance with existing authority.

(2)(a) Any two or more counties or municipalities, or any combination thereof, may, in accordance with the provisions of chapter 163, governing interlocal agreements, form an enforcement district for the purpose of enforcing and administering the provisions of the Florida Building Code. Each district so formed shall be registered with the department on forms to be provided for that purpose. Nothing in this subsection shall be construed to supersede provisions of county charters which preempt municipal authorities respective to building codes.

(b) With respect to evaluation of design professionals' documents, if a local government finds it necessary, in order to enforce compliance with the Florida Building Code and issue a permit, to reject design documents required by the code three or more times for failure to correct a code violation specifically and continuously noted in each rejection, including, but not limited to, egress, fire protection, structural stability, energy, accessibility, lighting, ventilation, electrical, mechanical, plumbing, and gas systems, or other requirements identified by rule of the Florida Building Commission adopted pursuant to chapter 120, the local government shall impose, each time after the third such review the plans are rejected for that code violation, a fee of four times the amount of the proportion of the permit fee attributed to plans review.

(c) With respect to inspections, if a local government finds it necessary, in order to enforce compliance with the Florida Building Code, to conduct any inspection after an initial inspection and one subsequent reinspection of any project or activity for the same code violation specifically and continuously noted in each rejection, including, but not limited to, egress, fire protection, structural stability, energy, accessibility, lighting, ventilation, electrical, mechanical, plumbing, and gas systems, or other requirements identified by rule of the Florida Building Commission adopted pursuant to chapter 120, the local government shall impose a fee of four times the amount of the fee imposed for the initial inspection or first reinspection, whichever is greater, for each such subsequent reinspection.

(3)(a) Each enforcement district shall be governed by a board, the composition of which shall be determined by the affected localities.

(b)1. At its own option, each enforcement district or local enforcement agency may adopt rules granting to the owner of a single-family residence one or more exemptions from the Florida Building Code relating to:

a. Addition, alteration, or repairs performed by the property owner upon his or her own property, provided any addition or alteration shall not exceed 1,000 square feet or the square footage of the primary structure, whichever is less.

b. Addition, alteration, or repairs by a nonowner within a specific cost limitation set by rule, provided the total cost shall not exceed $5,000 within any 12-month period.

c. Building and inspection fees.

2. However, the exemptions under subparagraph 1. do not apply to single-family residences that are located in mapped flood hazard areas, as defined in the code, unless the enforcement district or local enforcement agency has determined that the work, which is otherwise exempt, does not constitute a substantial improvement, including the repair of substantial damage, of such single-family residences.

3. Each code exemption, as defined in sub-subparagraphs 1.a., b., and c., shall be certified to the local board 10 days prior to implementation and shall only be effective in the territorial jurisdiction of the enforcement district or local enforcement agency implementing it.

(4) When an enforcement district has been formed as provided herein, upon its registration with the department, it shall have the same authority and responsibility with respect to building codes as provided by this part for local governing bodies.

(5) State and regional agencies with special expertise in building code standards and licensing of contractors and design professionals shall provide support to local governments upon request.

(6) Notwithstanding any other law, state universities, Florida College System institutions, and public school districts shall be subject to enforcement of the Florida Building Code under this part.

(a)1. State universities, Florida College System institutions, or public school districts shall conduct plan review and construction inspections to enforce building code compliance for their building projects that are subject to the Florida Building Code. These entities must use personnel or contract providers appropriately certified under part XII of chapter 468 to perform the plan reviews and inspections required by the code. Under these arrangements,

the entities are not subject to local government permitting requirements, plans review, and inspection fees. State universities, Florida College System institutions, and public school districts are liable and responsible for all of their buildings, structures, and facilities. This paragraph does not limit the authority of the county, municipality, or code enforcement district to ensure that buildings, structures, and facilities owned by these entities comply with the Florida Building Code or to limit the authority and responsibility of the fire official to conduct firesafety inspections under chapter 633.

2. In order to enforce building code compliance independent of a county or municipality, a state university, Florida College System institution, or public school district may create a board of adjustment and appeal to which a substantially affected party may appeal an interpretation of the Florida Building Code which relates to a specific project. The decisions of this board, or, in its absence, the decision of the building code administrator, may be reviewed under s. 553.775.

(b) If a state university, Florida College System institution, or public school district elects to use a local government's code enforcement offices:

1. Fees charged by counties and municipalities for enforcement of the Florida Building Code on buildings, structures, and facilities of state universities, state colleges, and public school districts may not be more than the actual labor and administrative costs incurred for plans review and inspections to ensure compliance with the code.

2. Counties and municipalities shall expedite building construction permitting, building plans review, and inspections of projects of state universities, Florida College System institutions, and public schools that are subject to the Florida Building Code according to guidelines established by the Florida Building Commission.

3. A party substantially affected by an interpretation of the Florida Building Code by the local government's code enforcement offices may appeal the interpretation to the local government's board of adjustment and appeal or to the commission under s. 553.775 if no local board exists. The decision of a local board is reviewable in accordance with s. 553.775.

(c) The Florida Building Commission and code enforcement jurisdictions shall consider balancing code criteria and enforcement to unique functions, where they occur, of research institutions by application of performance criteria in lieu of prescriptive criteria.

(d) School boards, Florida College System institution boards, and state universities may use annual facility maintenance permits to facilitate routine maintenance, emergency repairs, building refurbishment, and minor renovations of systems or equipment. The amount expended for maintenance projects may not exceed $200,000 per project. A facility maintenance permit is valid for 1 year. A detailed log of alterations and inspections must be maintained and annually submitted to the building official. The building official retains the right to make inspections at the facility site as he or she considers necessary. Code compliance must be provided upon notification by the building official. If a pattern of code violations is found, the building official may withhold the issuance of future annual facility maintenance permits.

This part may not be construed to authorize counties, municipalities, or code enforcement districts to conduct any permitting, plans review, or inspections not covered by the Florida Building Code. Any actions by counties or municipalities not in compliance with this part may be appealed to the Florida Building Commission. The commission, upon a determination that actions not in compliance with this part have delayed permitting or construction, may suspend the authority of a county, municipality, or code enforcement district to enforce the Florida Building Code on the buildings, structures, or facilities of a state university, Florida College System institution, or public school district and provide for code enforcement at the expense of the state university, Florida College System institution, or public school district.

(7) The governing bodies of local governments may provide a schedule of reasonable fees, as authorized by s. 125.56(2) or s. 166.222 and this section, for enforcing this part. These fees, and any fines or investment earnings related to the fees, shall be used solely for carrying out the local government's responsibilities in enforcing the Florida Building Code. When providing a schedule of reasonable fees, the total estimated annual revenue derived from fees, and the fines and investment earnings related to the fees, may not exceed the total estimated annual

costs of allowable activities. Any unexpended balances shall be carried forward to future years for allowable activities or shall be refunded at the discretion of the local government. The basis for a fee structure for allowable activities shall relate to the level of service provided by the local government and shall include consideration for refunding fees due to reduced services based on services provided as prescribed by s. 553.791, but not provided by the local government. Fees charged shall be consistently applied.

(a) As used in this subsection, the phrase "enforcing the Florida Building Code" includes the direct costs and reasonable indirect costs associated with review of building plans, building inspections, reinspections, and building permit processing; building code enforcement; and fire inspections associated with new construction. The phrase may also include training costs associated with the enforcement of the Florida Building Code and enforcement action pertaining to unlicensed contractor activity to the extent not funded by other user fees.

(b) The following activities may not be funded with fees adopted for enforcing the Florida Building Code:

1. Planning and zoning or other general government activities.
2. Inspections of public buildings for a reduced fee or no fee.
3. Public information requests, community functions, boards, and any program not directly related to enforcement of the Florida Building Code.
4. Enforcement and implementation of any other local ordinance, excluding validly adopted local amendments to the Florida Building Code and excluding any local ordinance directly related to enforcing the Florida Building Code as defined in paragraph (a).

(c) A local government shall use recognized management, accounting, and oversight practices to ensure that fees, fines, and investment earnings generated under this subsection are maintained and allocated or used solely for the purposes described in paragraph (a).

(d) The local enforcement agency, independent district, or special district may not require at any time, including at the time of application for a permit, the payment of any additional fees, charges, or expenses associated with:

1. Providing proof of licensure pursuant to chapter 489;
2. Recording or filing a license issued pursuant to this chapter; or
3. Providing, recording, or filing evidence of workers' compensation insurance coverage as required by chapter 440.

(8) The Department of Agriculture and Consumer Services is not subject to local government permitting requirements, plan review, or inspection fees for agricultural structures, such as equipment storage sheds and pole barns that are not used by the public.

History.—s. 11, ch. 74-167; s. 3, ch. 75-111; s. 5, ch. 77-365; s. 3, ch. 85-97; s. 805, ch. 97-103; ss. 50, 51, ch. 98-287; ss. 85, 86, ch. 2000-141; ss. 34, 35, ch. 2001-186; ss. 3, 4, ch. 2001-372; s. 87, ch. 2002-1; s. 27, ch. 2002-20; s. 12, ch. 2005-147; s. 64, ch. 2006-1; s. 15, ch. 2008-191; s. 37, ch. 2010-176; s. 127, ch. 2014-17; s. 276, ch. 2014-19; s. 23, ch. 2014-154; s. 21, ch. 2016-129; s. 10, ch. 2017-149.

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THE CITY OF KEY WEST

Director of Building
P.O.Box 1409, Key West, FL 33040

ORDER TO REPAIR, ALTER, OR IMPROVE BUILDINGS

COMES NOW, Ron Wampler, as the Chief Building Official for the City of Key West, by and through his authority pursuant to the Florida Building Code, F.S. 553.80, and Ch. 14, Art. III of the Code of Ordinances for the City of Key West and files this Order to Repair, Alter, or Improve Buildings as per Sec. 14-107, Code of Ordinances for the City of Key West and in support thereof would state the following:

1. A hearing was conducted before Ron Wampler, Chief Building Official for the City of Key West on Monday, February 12th, 2018 at 3:00 p.m. pursuant to Sec. 14-106 of the Code of Ordinances for the City of Key West.
2. At said hearing the following conditions were found by the undersigned to exist at the City property known as the Diesel Generating Plant, Key West, FL 33040 consisting of five buildings:
    - Buildings 2, 3, 4, and 5 are seriously and structurally unsound as reported by Atlantic Engineering Services (AES) in their document dated August 2016.
    - Buildings 2, 3, 4 have deteriorated or open roofs causing accelerated deterioration.
    - Buildings 2, 3, 4 and 5 have deteriorating exterior brick and/or concrete exterior walls.
3. The following are the corresponding corrective measures to be taken at the listed property:
    - Demolition of Building 5 to provide a fire lane between the existing Keys Energy Electrical Substation and the Diesel Generating Plant Buildings.
    - Demolition of Buildings 3 and 4 to protect the life, safety and health of those residents along Fort and Geraldine Streets.
    - Repairs to Buildings 1 and 2 to include:
        1. Storm resistant roofing to Building 2 both covering and structural.
        2. Closing of all openings in Buildings 1 and 2 to improve storm resistance.
        3. Structural repairs to Buildings 1 and 2 exterior walls to consist of historic brick and mortar compatible with the existing.
        4. All exterior repairs are to be approved by the Historic Architectural Review Commission (HARC).

Buildings 1 and 2 have been vacant and derelict for over 30 years and have no valid Certificate of Occupancy. The above orders will result in 'shell buildings' with no occupancy or use until proper permit application has been made to involve full compliance with the current edition of the Florida Building

Code and applicable City Ordinances. The property owner shall have until 5:00 p.m. on June 1st, 2019 to complete the items herein to the satisfaction of the Chief Building Official.

If the Property has **not** been brought into compliance to the satisfaction of the Chief Building Official on said date and time as listed in paragraph 4, above, further action may be taken including but not limited to: injunctive relief, removal of the electrical meter or preventing ingress and egress to said building or any other remedy appropriate under law.

HAND DELIVERED TO: James Bouquet

BY: RWW

Under penalty of perjury, I declare that the above captioned notice was so delivered on this 21st day of February, 2018

RW Wampler 2/21/18

Ron Wampler CFM CBO Date

THE CITY OF KEY WEST

Director of Building
P.O.Box 1409, Key West, FL 33040

February 22nd, 2018

Old Island Restoration Foundation, Inc.
Attn.: Chris Hamilton, Pres.
322 Duval Street
Key West, Florida 33040

Re: Unsafe Structures: 5 Buildings known as the KW Diesel Generating Plant (see enclosed).

The contributing structures at the listed address are not habitable and are becoming unstable due to age and neglect. Several have openings in the roof and walls allowing precipitation to enter and accelerate the disintegration process. These structures have been posted 'Unsafe'.

City of Key West Ordinances Chapter 14 Buildings and Building Regulations, Section 14-76. Notification of demolition in the historic district requires the Chief Building Official to give written notice to your organization that demolition of said structure is a possibility. Your organization has thirty (30) days from receipt of this letter to respond to me in writing if you intend to negotiate in regards to the repair or relocation of said structure. It shall be the duty of the Chief Building Official to diligently examine all dwellings and buildings located in the City for the purpose of locating and taking action with respect to such dwellings and buildings as appear to be unfit for human habitation and such buildings as appear to be dangerous.

Sincerely,

Ron Wampler, CFM
Chief Building Official

(305) 809-3738
Email: rwampler@cityofkeywest-fl.gov

THE CITY OF KEY WEST

Director of Building
P.O.Box 1409, Key West, FL 33040

February 22nd, 2018

Historic Florida Keys Foundation
D. E. Silvia, PhD., Exec. Dir.
510 Greene Street
Key West, Florida 33040

Re: Unsafe Structures: 5 Buildings at KW Diesel Generating Plant (re: enclosure)

The contributing structures at the listed address are not habitable and are becoming unstable due to age and neglect. Several have openings in the roof and walls allowing precipitation to enter and accelerate the disintegration process. These structures have been posted 'Unsafe'.

City of Key West Ordinances Chapter 14 Buildings and Building Regulations, Section 14-76. Notification of demolition in the historic district requires the Chief Building Official to give written notice to your organization that demolition of said structure is a possibility. Your organization has thirty (30) days from receipt of this letter to respond to me in writing if you intend to negotiate in regards to the repair or relocation of said structure. It shall be the duty of the Chief Building Official to diligently examine all dwellings and buildings located in the City for the purpose of locating and taking action with respect to such dwellings and buildings as appear to be unfit for human habitation and such buildings as appear to be dangerous.

Sincerely,

Ron Wampler, CFM
Chief Building Official

(305) 809-3738
Email: rwampler@rwampler@cityofkeywest-fl.gov

ATLANTIC
ENGINEERING
SERVICES

Structural Condition Assessment
Key West Diesel Plant
Key West, Florida

Prepared For

AMEC Foster Wheeler Environmental & Infrastructure, Inc.
5845 NW 158th Street
Miami Lakes, Florida 33014

Prepared By

Atlantic Engineering Services of Jacksonville
6501 Arlington Expressway, Building B, Suite 201
Jacksonville, FL 32211

AES Project No. 316-048
August 3, 2016

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jax@aespj.com
www.aespj.com

August 3, 2016

Mr. Greg W. Corning, P.E.
AMEC Foster Wheeler Environmental & Infrastructure, Inc.
5845 NW 158th Street
Miami Lakes, Florida 33014-6721

Re: Structural Condition Assessment
Key West Diesel Plant
Key West, Florida

AES Project: #316-048

Dear Greg:

Atlantic Engineering Services of Jacksonville (AES) has completed its structural condition assessment of the Key West Diesel Plant also known as the Angela Street Diesel Plant, which is located at the corner of Fort Street and Geraldine Street, along the extension of Fort Street to Angela Street in Key West, Florida. Our assessment consisted of a visual review of the abandoned Diesel Plant structure on June 21, 22 and 23, 2016, along with carbonation and chloride testing. Concrete chloride testing was performed by AMEC Foster Wheeler Environmental Infrastructure, Inc. and carbonation testing was performed by AES. Present at the site was Mr. Mark J. Keister, P.E.

BACKGROUND

The Key West Diesel Plant also known as the Angela Street Diesel Plant was the original site of a manufactured gas plant operated by the former Key West Gas Light Company dating back to the late 1880's. By 1887, the name of the Key West Gas Light Company had changed to the Key West Gas and Electric Light Company, and in 1889 discontinued the manufacturing of gas on the property and erected an electrical lighting power house. In 1898, Key West Electric Company was incorporated and carried on electric generation at the site. In 1943, the city of Key West acquired the Key West Electric Company and the electric company was subsequently referred to as the City Electrical System. Diesel Plant operations ceased in the late 1960's and in 2002 the name of the company was changed to Keys Energy Services. Keys Energy Services is the current owner of the property with the Diesel Plant abandoned and an electrical substation occupying the remainder of the site.

The abandoned Diesel Plant consists of four (4) connected one-story, buildings with the three (3) eastern buildings housing four (4) electric dynamos and the southwestern building having a lower roof that probably housed a shop and support spaces. The northernmost eastern building (Building I) houses one (1) dynamo and consists of a high new pre-engineered wood truss framed roof with plywood sheathing and metal roofing supported by perimeter multi-wythe brick walls and interior steel beams and columns (see Photographs 1 and 2). The easternmost center building (Building II) houses two (2) dynamos and consists of metal roofing on plywood sheathing, on wood joists and beams supported by heavy timber trusses and steel beams and columns that support crane beams (see Photographs 3 and 4). The heavy timber roof trusses are supported by perimeter multi-wythe brick walls. The southernmost eastern building (Building IV) houses one (1) dynamo and consists of metal roofing on wood sheathing on wood joists and beams supported by heavy timber trusses, and perimeter low multi-wythe brick walls and upper concrete walls (see Photographs 5 and 6).

Below the roof structure is a gantry crane supported by a steel crane beam and steel columns independent of the perimeter brick walls. To the east of this building is an exterior concrete exhaust structure (Building V), which consists of a concrete roof slab with concrete parapets supported by concrete walls (see Photographs 7 and 8). The southwestern building (Building III) consists of metal roofing on wood sheathing on wood joists, and beams supported by interior steel beams and columns and perimeter multi-wythe brick walls, CMU walls and concrete walls (see Photographs 9 and 10).

All of the dynamos are in pits filled with water and there is extensive trenching with fuel and coolant supply lines around the dynamos, which is also filled with water. In the eastern center building (Building II), there is an interior concrete platform with perimeter steel framed concrete platforms, which appears to have been a central control area (see Photograph 11). In the southwestern building (Building III), there are shallow trenches and numerous equipment foundations. It is unknown what the foundations are, but they are either piles bearing on shallow rock or shallow foundations bearing on the shallow rock.

OBSERVATIONS

Our structural condition assessment consisted of a visual review of the structure. The survey plans (see Appendix A), approximately locates the deteriorated areas pinpointed during our survey. Concrete carbonation testing was determined at four (4) locations and concrete chloride testing was also determined at four (4) locations. The testing locations are noted on the survey plans (see Appendix A). The results for the concrete carbonation testing are shown in Appendix B and the results for chloride testing results are also shown in Appendix B.

Fresh concrete has a PH of approximately 12 to 13, which creates a layer of passivity on embedded reinforcing that protects the reinforcing from corrosion. With exposure to atmospheric carbon dioxide, concrete PH slowly decreases over time as carbon dioxide penetrates the concrete. When the concrete PH reduces to a value of about 9 to 10, the passivating layer protecting the reinforcing is destroyed and the reinforcing can corrode due to exposure to oxygen and water. The PH at all four (4) locations is 9.5 or lower at the face of reinforcing and the concrete is no longer protecting the reinforcing from corrosion near the surface of the concrete.

Chlorides in concrete greatly accelerate corrosion and the lower the concrete PH, the greater the impact of chloride induced corrosion. Chloride content in concrete exposed to moisture should be less than .15% of Cl to weight of cement and the chloride corrosion threshold is 1.2 lbs. of chloride per cubic yard of concrete, which works out to .0317% Cl for concrete weighing 140 lbs. /cubic yard. Of the four (4) samples tested for chlorides, all exceeded the chloride corrosion threshold with three (3) being very high in chloride content.

1. The northernmost, eastern building (Building I) has been recently re-roofed and the original wood structure supported by the steel beams and trusses have been replaced with plywood sheathing and wood trusses. The new roofing and roof structure is in excellent condition except that the roofing screws are not stainless steel and are corroding (see Photograph 12). The original steel beams, trusses and columns are in good condition with surficial corrosion except for one (1) column, which has a badly corroded base with more than 20% material loss (see Photograph 13). The slab on grade is cracked and uneven and there is a large crack at the interior door to the adjacent building, and several of the western window sills are spalled with corroded reinforcing and the remainder are cracked (see Photographs 14, 15 and 16).

The exterior masonry walls are in good condition but there are numerous cracks, corroded embedments, deteriorated mortar, corroded lintels, deteriorated face brick, brick cracks with vegetation and random cracks in the concrete water table (see Photographs 17, 18, 19, 20, 21, 22 and 23). At the western return metal panel wall, there is a badly corroded angle purlin and a large column spall with corroded reinforcing and an area of missing metal wall panel (see Photographs 24, 25 and 26). The remaining metal panels are corroded and in poor condition (see Photograph 27).

II. The eastern center building (Building II) is in much worse condition than the Building I with metal roofing in extremely poor condition with large areas of missing metal roofing and large areas of deteriorated roof decking (see Photograph 28). The roof wood structure is in good condition as well as the steel structure with surficial corrosion except for several badly corroded columns and post bases with more than 20% material loss (see Photographs 29 and 30).

The stair to the concrete platform has badly corroded stair stringer bases with more than 20% material loss and the concrete platform has extensive large concrete spalls with exposed corroding reinforcing (see Photographs 31, 32 and 33). The exterior masonry walls are in good condition, but there are numerous cracks, corroded embedments, deteriorated mortar, deteriorated face brick, infilled arch brick with no lintel, large areas of missing brick, corroding lintels and brick cracks with vegetation (see Photographs 34, 35, 36, 37, 38 and 39).

III. The southwestern building (Building III) is in worse condition than Building I, but in better condition than the Building II and Building IV. The western metal roof is in good condition with several areas of corroded metal roofing and corroded roofing screws. The eastern metal roof is in poor condition with areas of missing roofing, extensive metal roofing deterioration and areas of deteriorated wood decking (see Photograph 46). The roof wood joists, beams, steel beams and columns are in good condition with surficial steel corrosion on the steel members and a deteriorated wood beam kicker (see Photograph 47). The slab on grade is cracked and uneven and the exterior high concrete has large areas of spalling concrete and a spalling concrete lintel (see Photographs 48 and 49). The exterior CMU and brick has several cracks, corroded embedments and delaminating stucco.

IV. The southernmost eastern building (Building IV) is in worse condition than Building II with a large area of missing metal roofing and wood sheathing, a deteriorated bottom roof truss chord and a wall opening with numerous loose and missing bricks with bricks falling (see Photographs 40, 41 and 42). The wood roof joists are in poor condition but the wood trusses appear in good condition. The steel structure is in good condition with surficial corrosion but many of the steel column bases are severely corroded with more than 20% material loss (see Photograph 43). The exterior masonry walls are in good condition but there are numerous cracks, corroded embedments, deteriorated mortar and loose and missing face brick. The upper concrete walls have large areas of honey combed concrete and an area of spalled concrete with corroded reinforcing (see Photographs 44 and 45).

V. The concrete exhaust building (Building V) is in good condition with corroded steel ladders; a badly corroded pipe support, a cracked housekeeping pad and a hairline crack in the roof parapet (see Photographs 50, 51, 52 and 53). The exterior pit and chute walls are in poor condition with cracked and spalling concrete with corroding reinforcing (see Photograph 54). All of the interior pits are full of water and breeding mosquitos. The interior trench and pit edge angles are in poor condition and badly corroded (see Photograph 55). All of the dynamos are in poor condition and badly corroded (see Photograph 56).

EVALUATION AND RECOMMENDATIONS

Building I is in good condition with the exterior masonry requiring repair and several window lintels requiring replacement. The steel structure is in good condition with surficial corrosion except for one (1) column that needs reinforcement due to excessive corrosion at its base. All of the steel needs to be cleaned of corrosion and coated with a corrosion inhibiting coating. The slab on grade is cracked and uneven and is due for replacement. The exterior masonry requires repointing and all of the corroded embedments and steel lintels need to be cleaned of corrosion and coated with a corrosion inhibiting coating. The deteriorated face brick needs to be removed and replaced and the vegetation in the wall cracks needs to be removed and the cracks repointed. At the western return metal panel wall, the badly corroded angle purlin needs replacement as well as the wall metal panels. The concrete spall in this wall also requires repair.

The remainder of the buildings are in worse condition than Building I with Building IV being in the worst condition with a portion of missing roof. These buildings are stable but require new roofs with extensive roof sheathing replacement and some wood structure reinforcement and replacement. At the areas of missing and badly deteriorated roofing, these roofs could sustain significant damage in a severe wind event losing the remainder of their roofing and sheathing. In general, the steel structure is in good condition with surficial corrosion but several columns will need reinforcement due to excessive corrosion at their bases. All of the steel needs to be cleaned of corrosion and coated with a corrosion inhibiting coating. At Building IV, the wall opening with numerous loose and missing bricks and falling bricks needs to be shored or repaired immediately to prevent further deterioration of the wall. The exterior masonry walls are in good condition except for the northwest corner of Building II where there is a large area of missing brick that needs to be rebuilt. The remaining walls need to be repointed, deteriorated face brick removed and replaced and the vegetation in the wall cracks removed and the cracks repointed. Like Building I, all of the corroded embedments and steel lintels need to be cleaned of corrosion and coated with a corrosion inhibiting coating. In many of the arched brick openings, brick has been infilled with no lintel installed. This infill brick is being held in place by the mortar alone and in areas is cracking. This infill brick needs to be removed or steel lintels installed to support it. At Building II, the concrete platform is in poor condition with large spalls and the concrete carbonated to the reinforcing with the concrete containing high levels of chlorides. If it is the owner's desire to rehabilitate this platform when the concrete is repaired, it should be treated with a penetrating corrosion inhibitor or an active cathodic protection system installed. Due to the thickness of the platform walls, both will be expensive, therefore strong consideration should be taken for demolishing this platform. The exterior concrete walls and pits, except for Building V, are in poor condition requiring extensive repair. Like the Building II concrete platform, the concrete contains high levels of chlorides and once repaired, the walls should be treated with a penetrating corrosion inhibitor or an active cathodic protection system installed, and the exterior concrete coated with a penetrating sealer. The exterior pits and chutes are abandoned and should be cleaned of debris, the top of the deteriorated walls demolished to 8" below grade and filled with clean fill or stone. All of the interior trench and pit edge angles are in poor condition and badly corroded. All of the dynamo pits are full of water and breeding mosquitos. When the deteriorated dynamos are removed, the pits need to be pumped empty of water. The pits and trenches need to be dewatered, cleared of debris with the edge angles removed, and the pits and trenches filled with clean fill or stone with a concrete slab on grade placed, drilled and adhesived into the pit and trench walls level with the surrounding concrete slabs on grade. If any of the dynamos are kept for display, their pits should be pumped empty of water and filled and capped as described above.

CONCLUSIONS

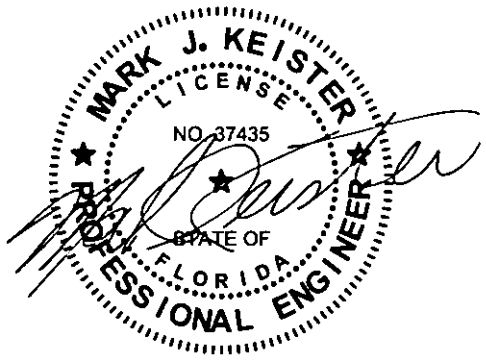
Building I is in good condition having been re-roofed but does require repair as outlined above. The remainder of the buildings are in worse condition, with Building IV being in the worst condition with a large portion of roof missing and a wall opening with numerous loose, missing and falling bricks. This opening needs to be shored or repaired immediately. These buildings are stable but they need to be re-roofed and damaged sheathing and roofing members replaced. At the areas of missing and badly deteriorated roofing, these roofs could sustain significant damage in a severe wind event losing the remainder of their roofing and sheathing. The exterior masonry requires extensive repointing and isolated areas of rebuilding. All of the concrete has a high chloride content and the walls and center building platform requires extensive concrete repair. Strong consideration should be taken for removing this platform in lieu of repair. All of the structural steel requires cleaning of corrosion and coating with a corrosion inhibiting coating. Many of the column bases require reinforcement due to excessive corrosion. The exterior walls have a great deal of corroding embedments, which require cleaning of corrosion and coating with a rust inhibitive coating. All of the dynamo pits are full of water and their pits should be filled and capped. All of the remaining pits and trenches should also be dewatered, filled and capped as well as the exterior chutes and pits.

It has been a pleasure serving you as a consulting structural engineer. Please contact our office if there are any questions regarding this correspondence, or if you need any additional information.

Very truly yours,
ATLANTIC ENGINEERING SERVICES OF JACKSONVILLE
FLORIDA CERTIFICATE OF AUTHORIZATION #791

Mark J. Keister, P.E.
Principal

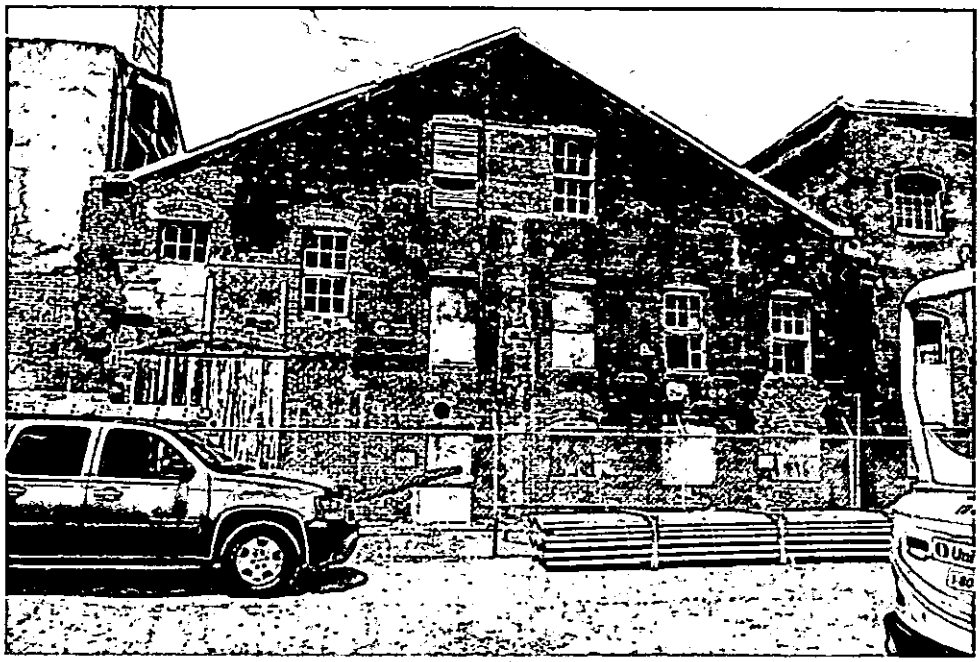
MJK/drg



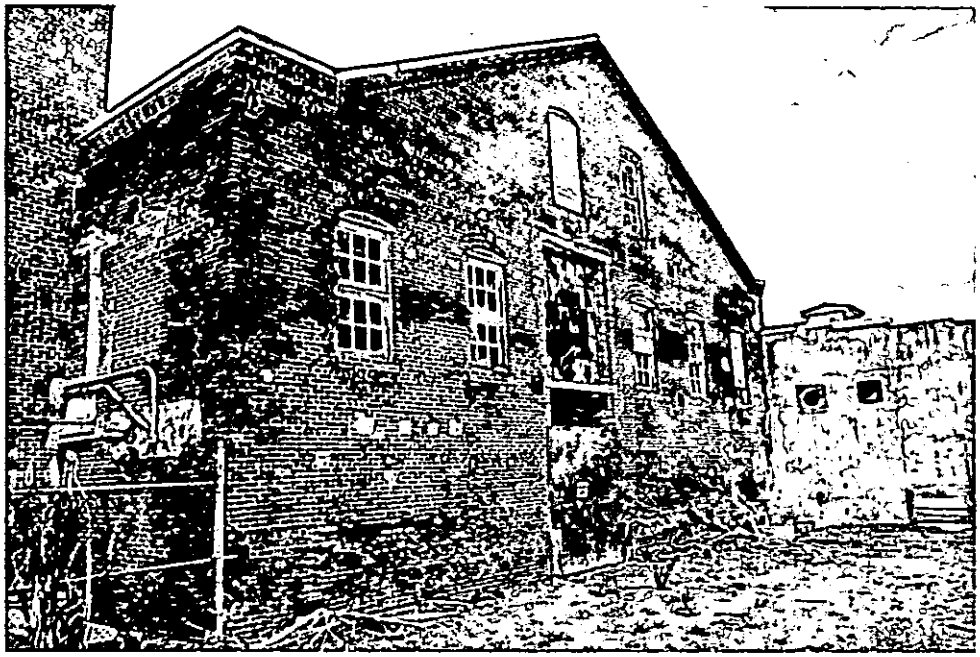
08/08/16

PHOTOGRAPH 1 (BUILDING I)

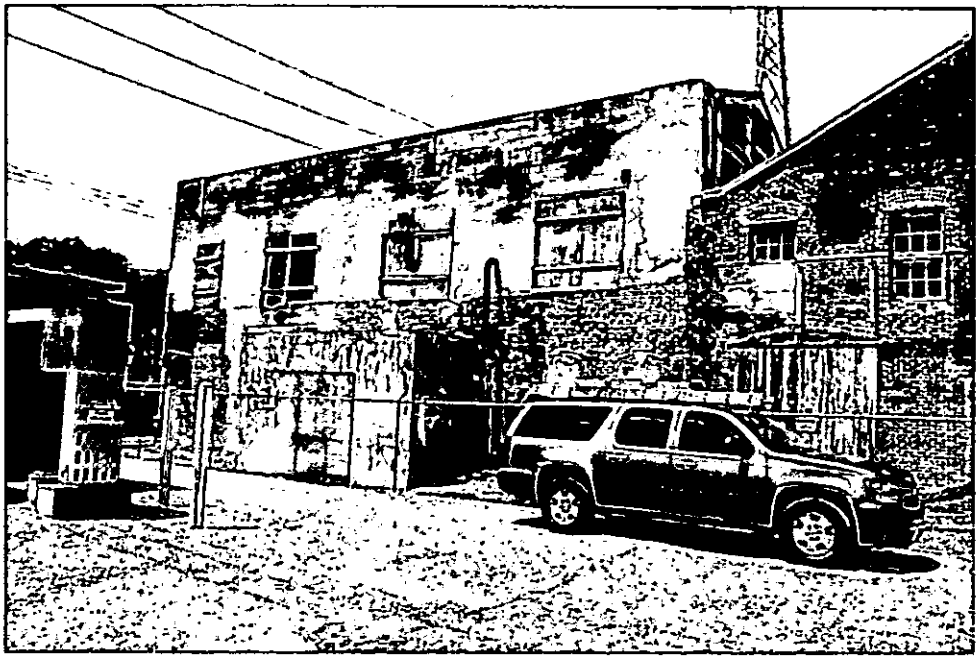
PHOTOGRAPH 2 (BUILDING I)



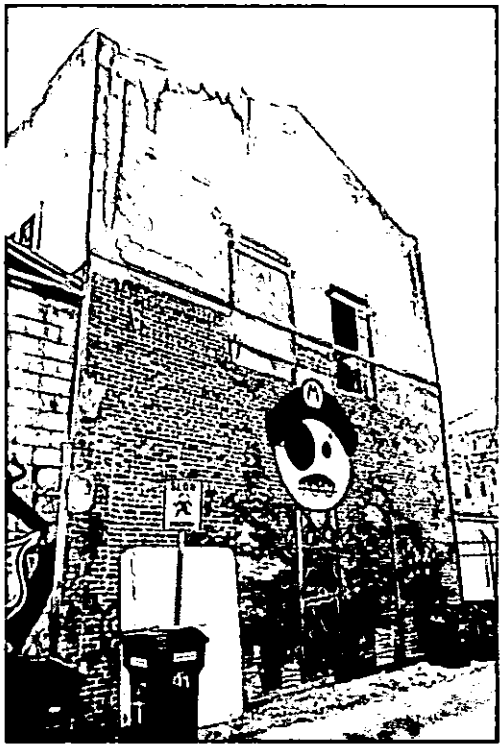
PHOTOGRAPH 3 (BUILDING II)



PHOTOGRAPH 4 (BUILDING II)

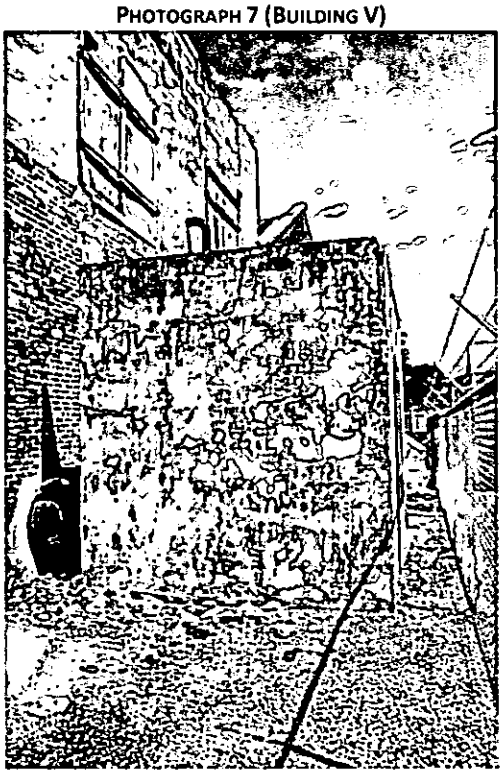


PHOTOGRAPH 5 (BUILDING IV AND V)

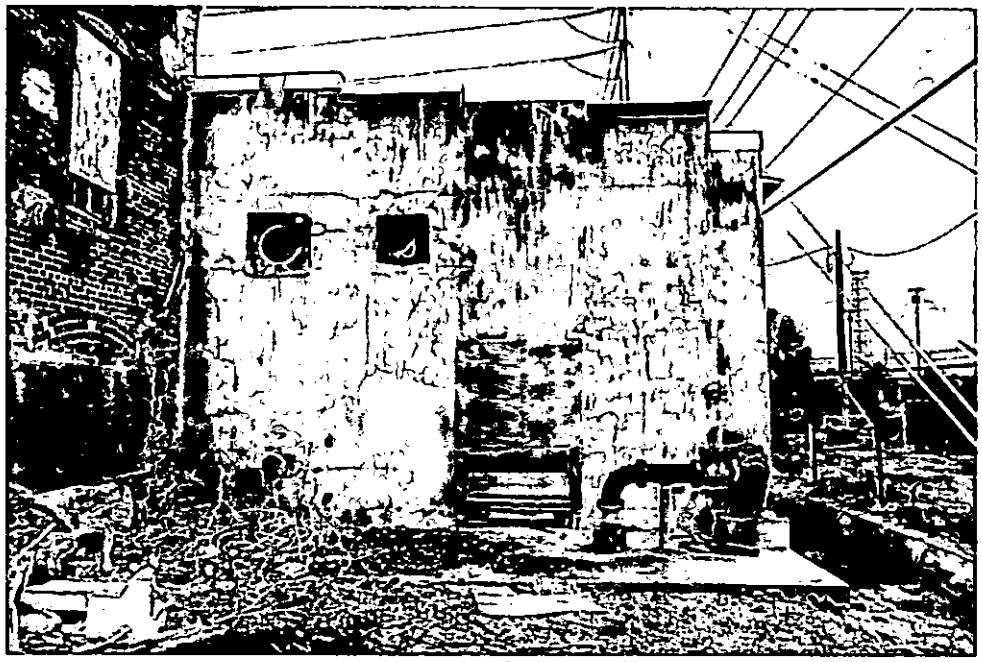


PHOTOGRAPH 6 (BUILDING IV)

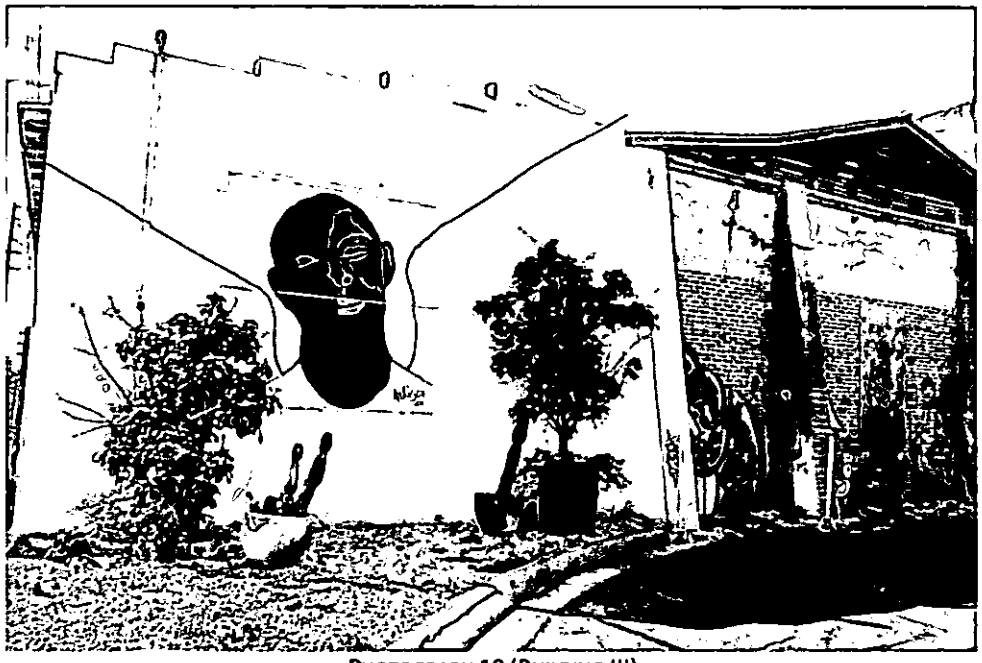
PHOTOGRAPH 7 (BUILDING V)



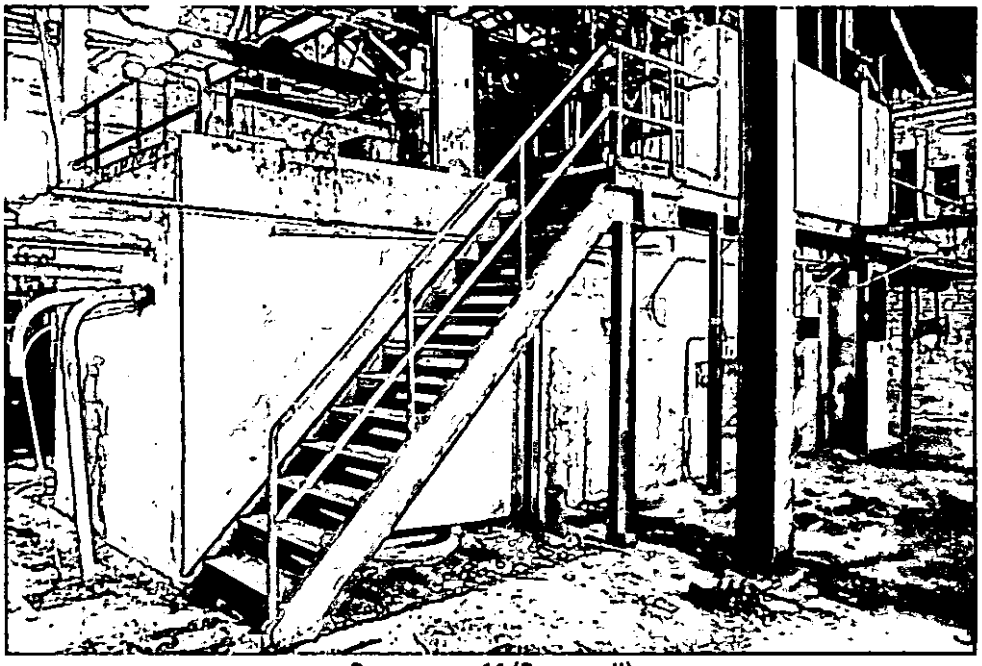
PHOTOGRAPH 8 (BUILDING V)



PHOTOGRAPH 9 (BUILDING III)



PHOTOGRAPH 10 (BUILDING III)



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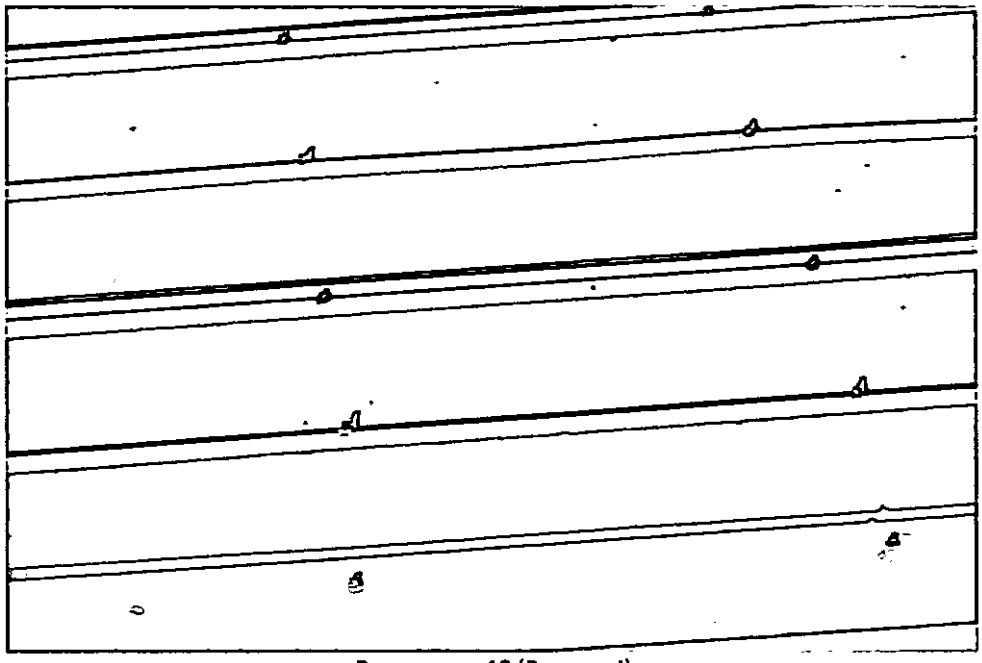
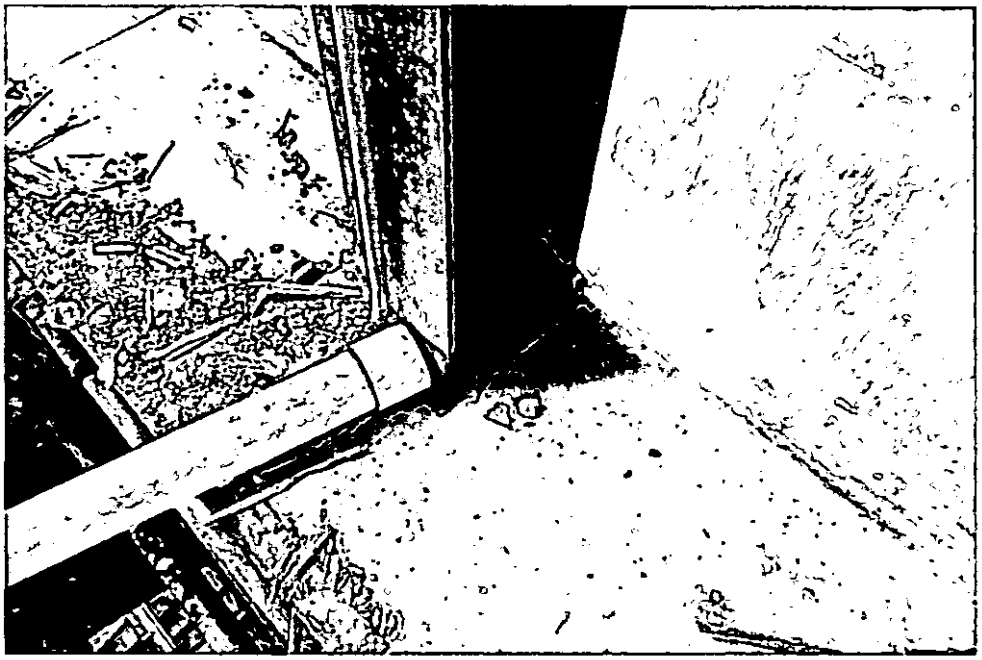


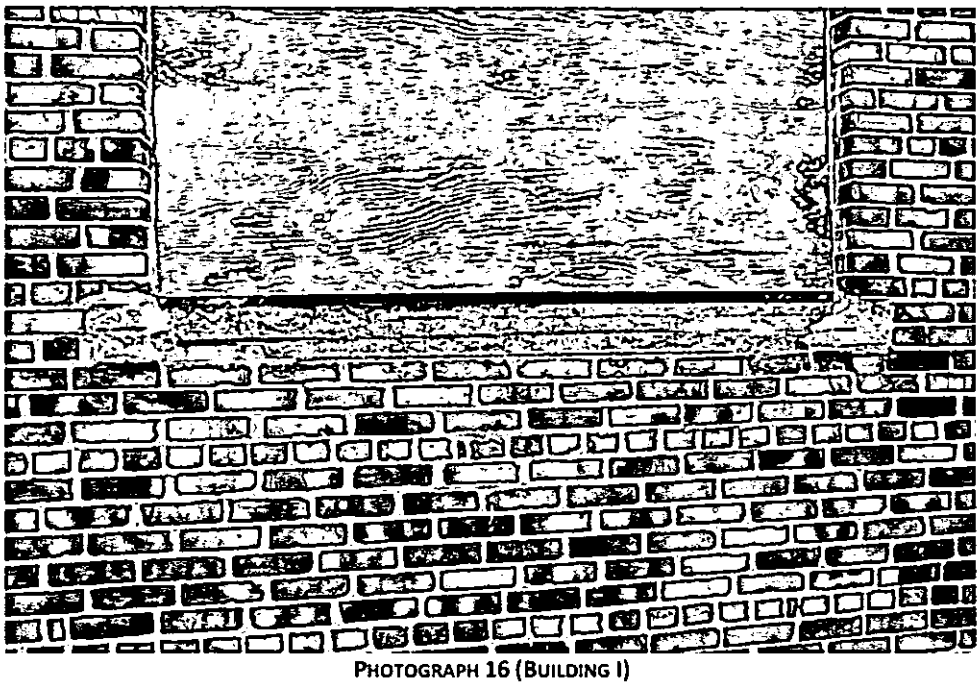
PHOTOGRAPH 12 (BUILDING I)



PHOTOGRAPH 13 (BUILDING I)

PHOTOGRAPH 14 (BUILDING I)

PHOTOGRAPH 15 (BUILDING I)



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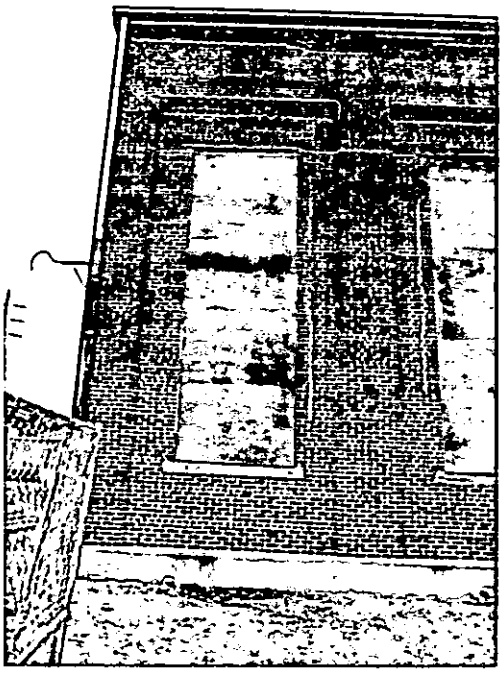

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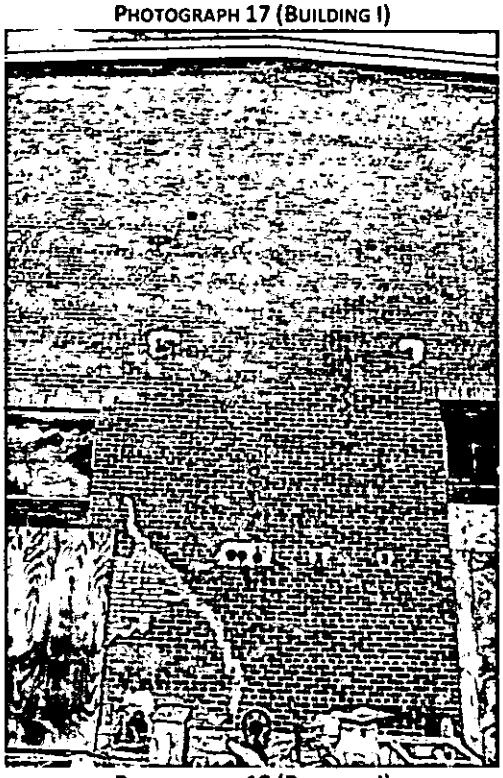
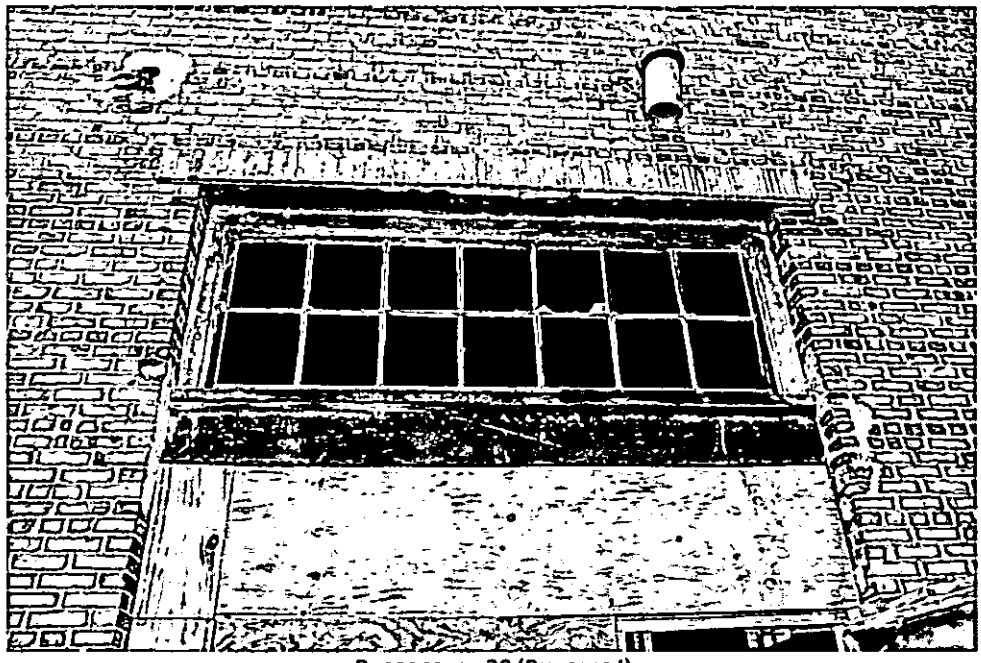


PHOTOGRAPH 18 (BUILDING I)

PHOTOGRAPH 19 (BUILDING I)



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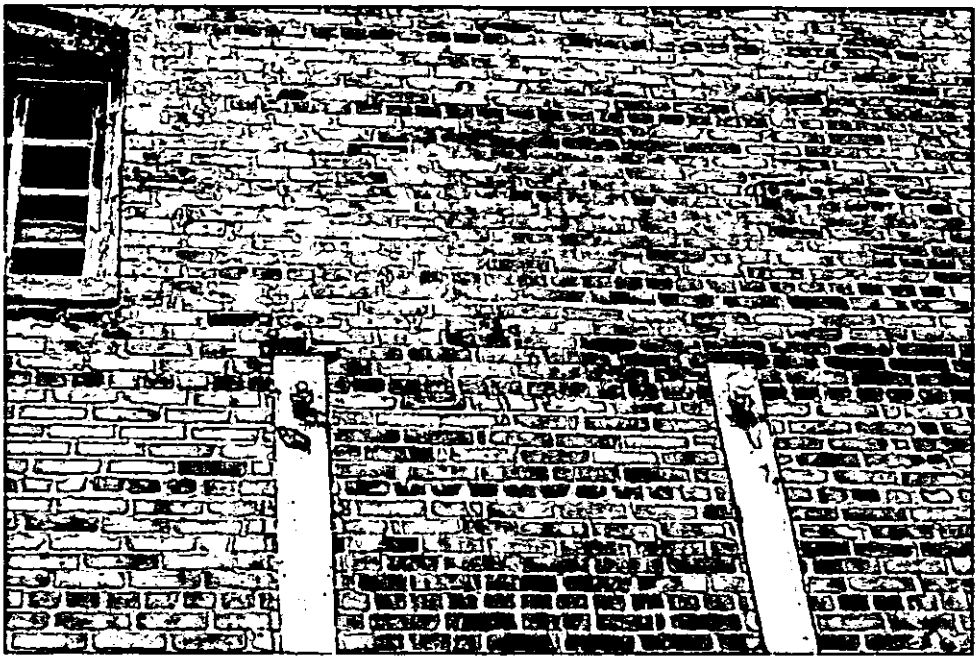

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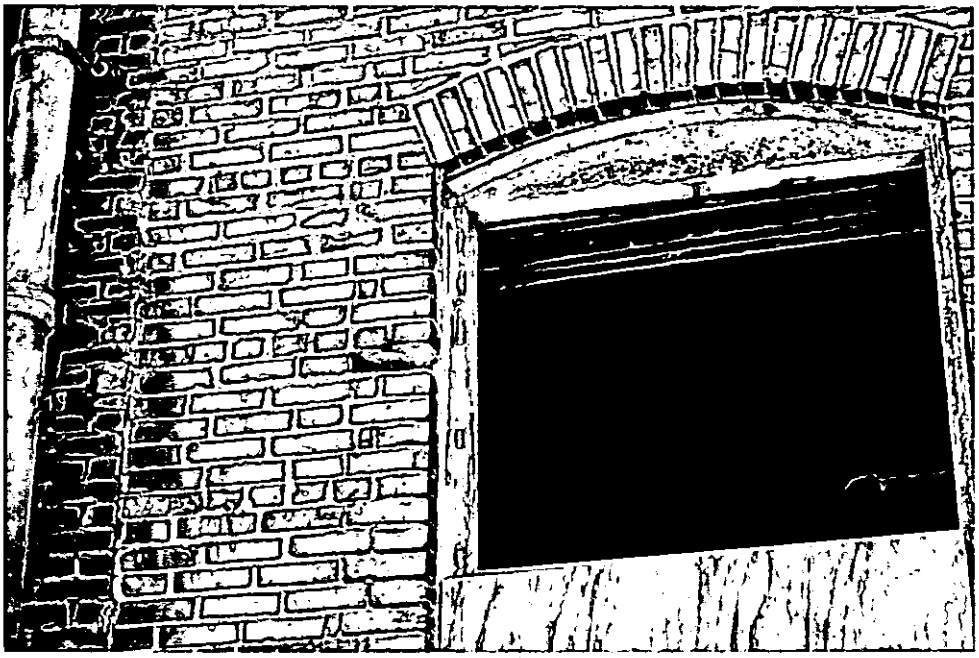

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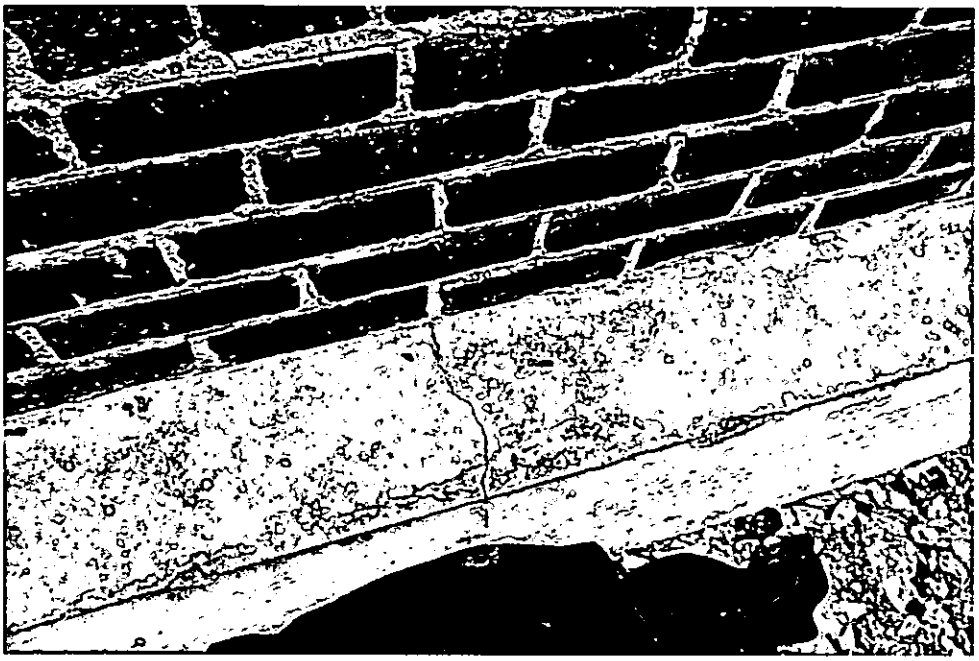

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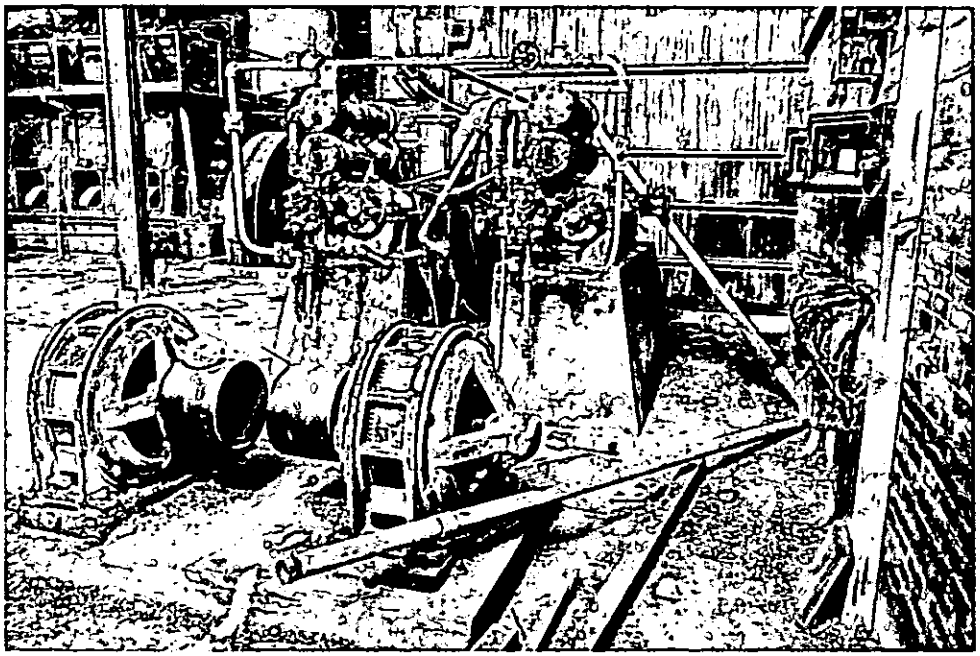

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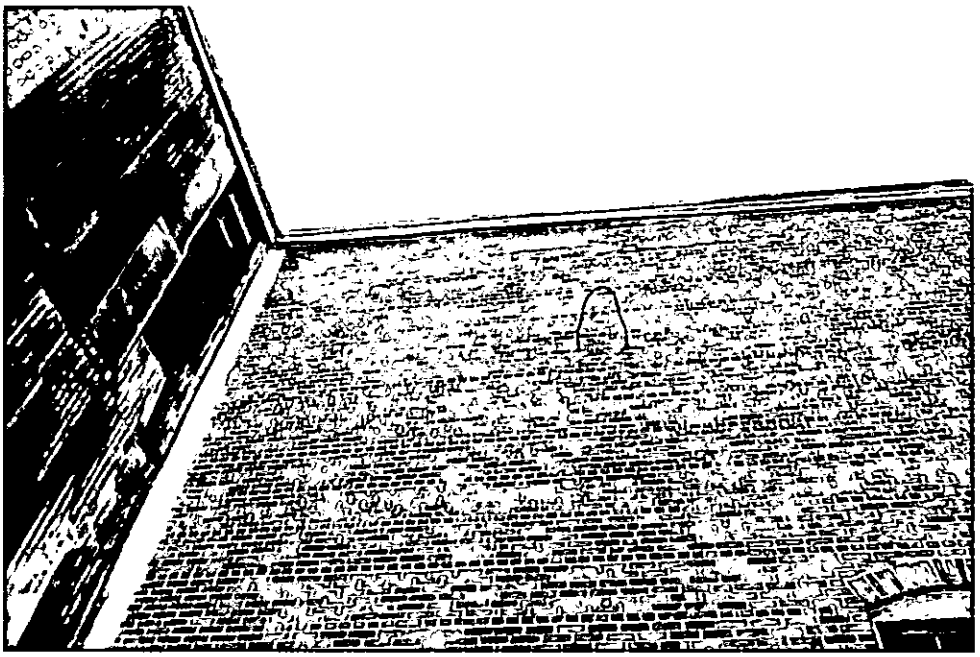
PHOTOGRAPH 25 (BUILDING I)



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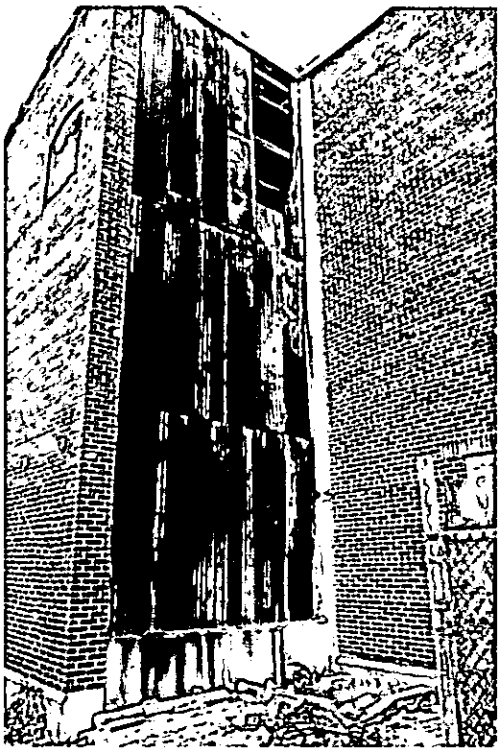


PHOTOGRAPH 27 (BUILDING I)

PHOTOGRAPH 28 (BUILDING II)

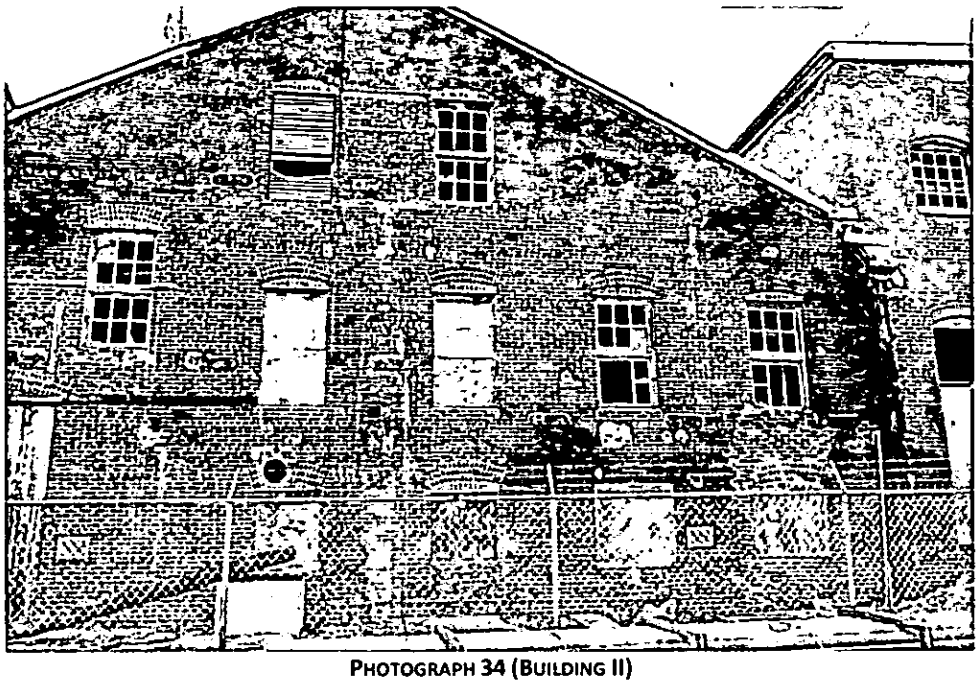
PHOTOGRAPH 29 (BUILDING II)

PHOTOGRAPH 30 (BUILDING II)

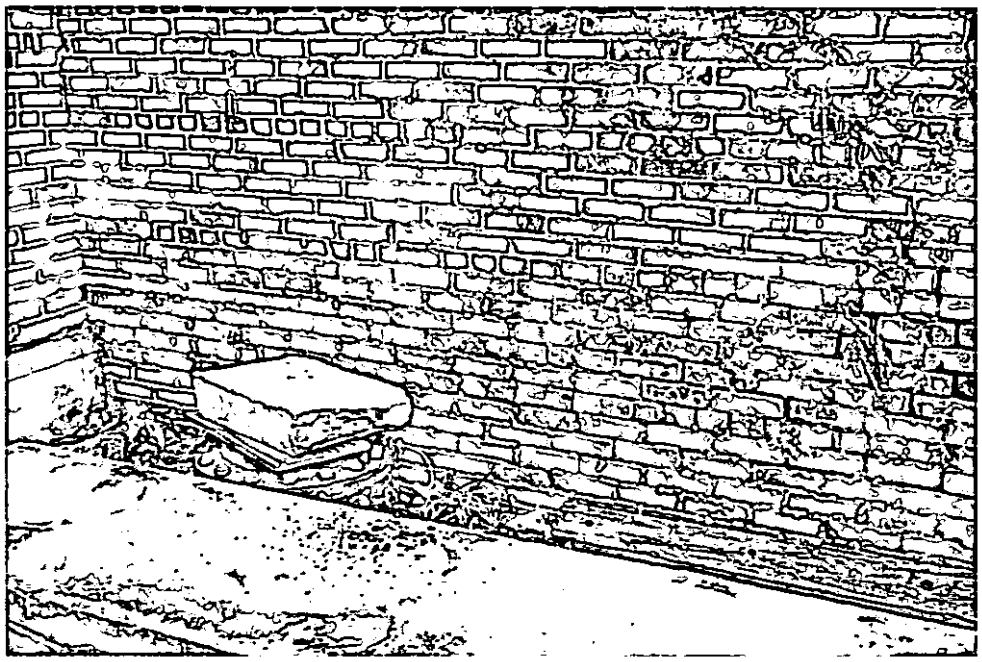
PHOTOGRAPH 31 (BUILDING II)

PHOTOGRAPH 32 (BUILDING II)

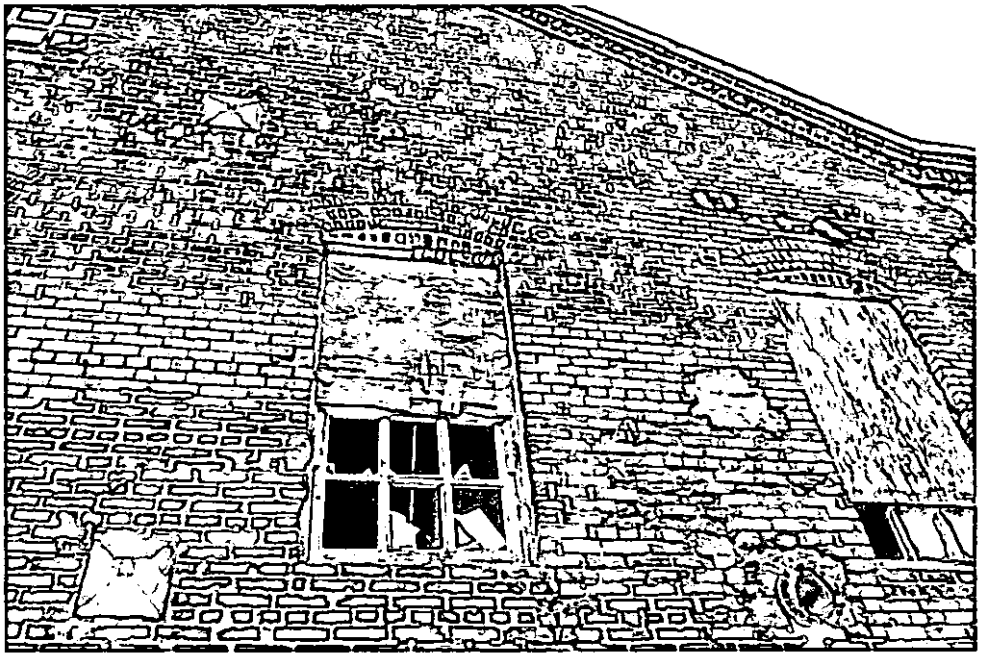
PHOTOGRAPH 33 (BUILDING II)



PHOTOGRAPH 34 (BUILDING II)



PHOTOGRAPH 35 (BUILDING II)



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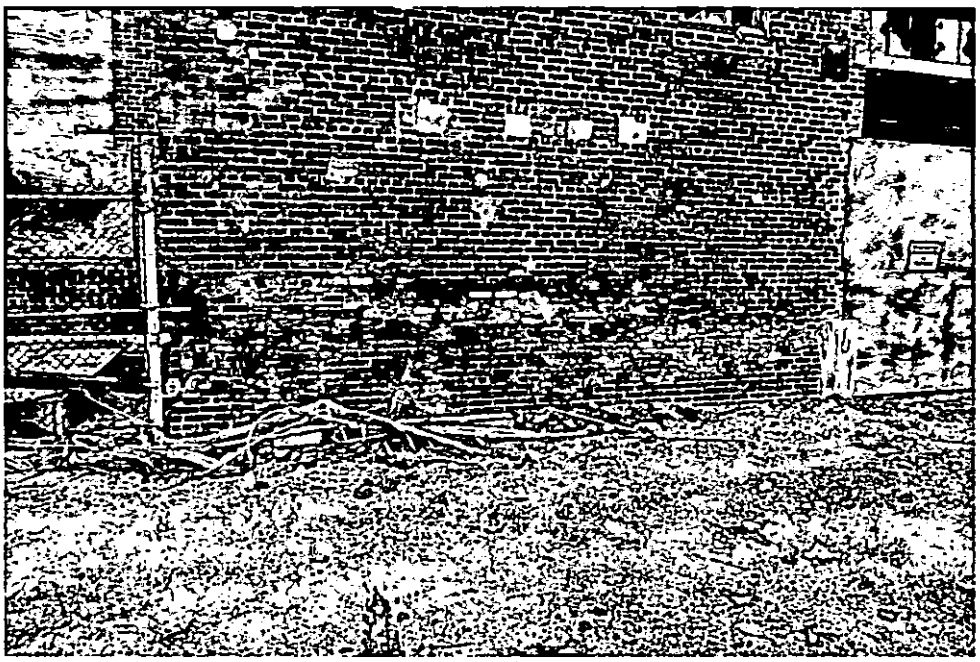

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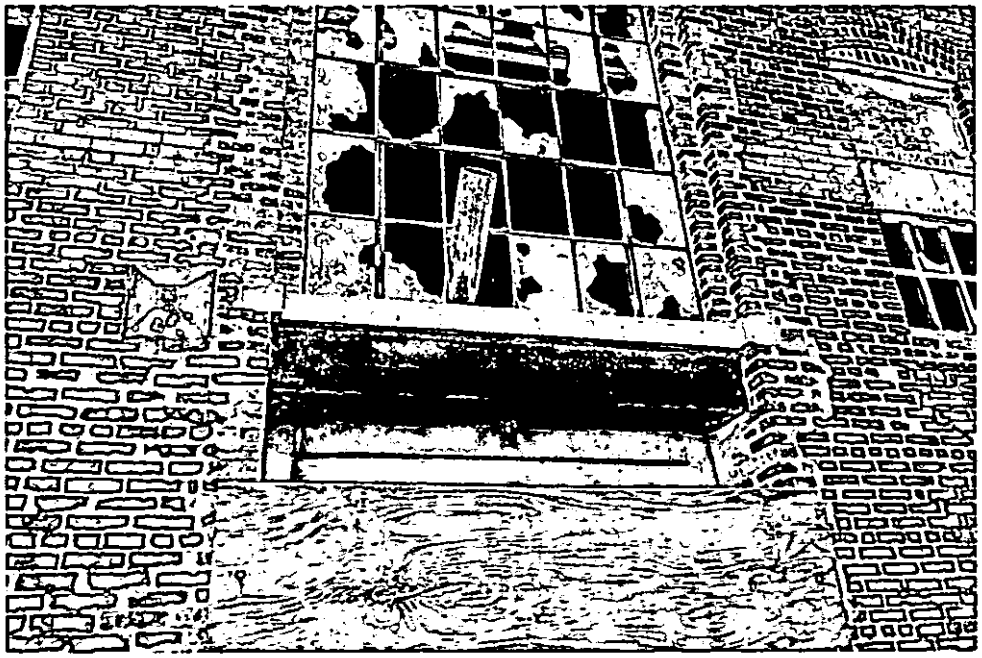

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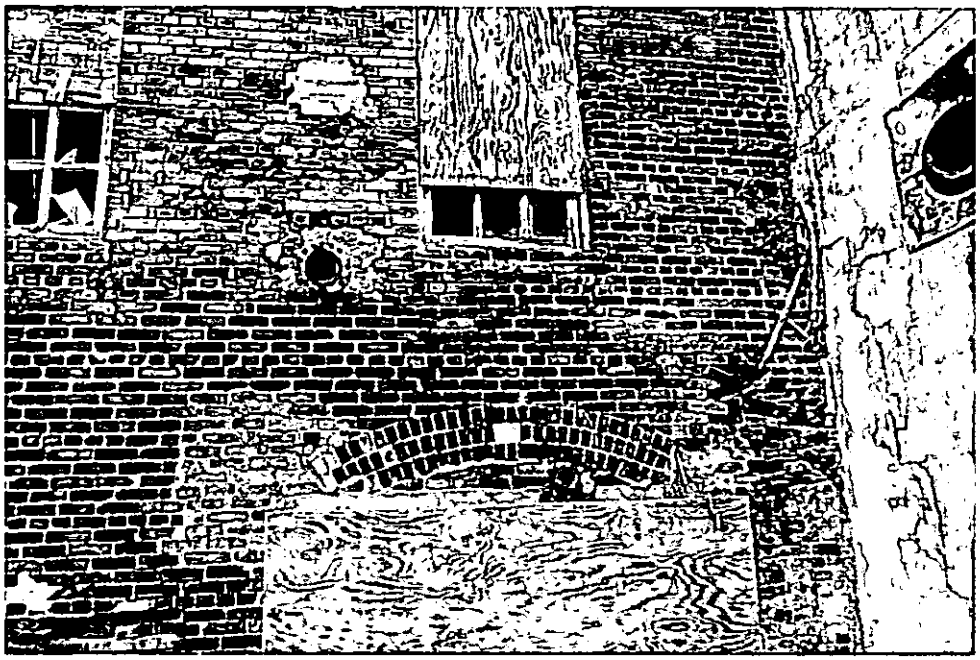
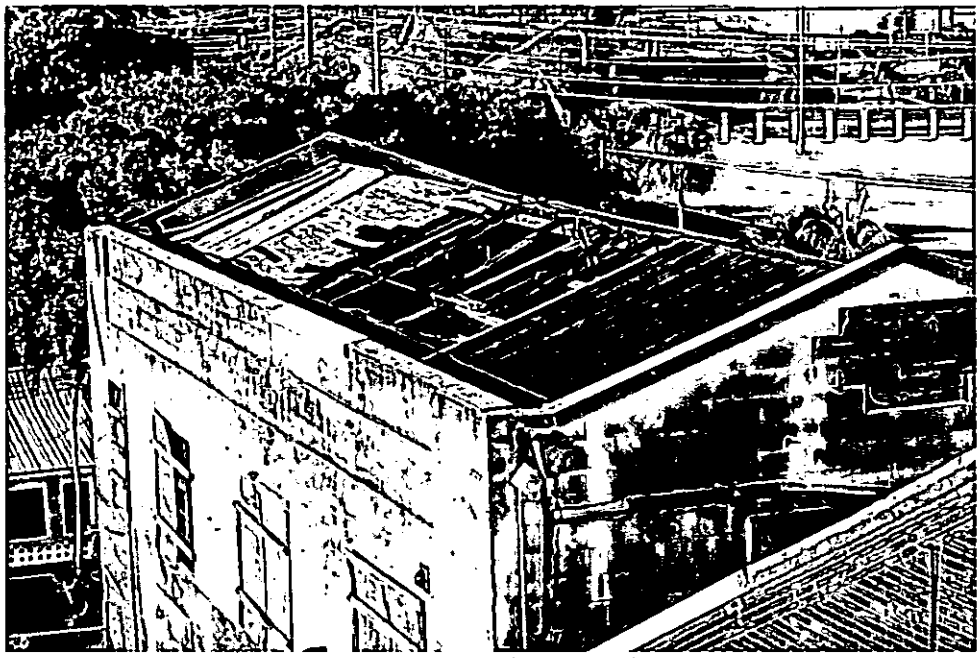


PHOTOGRAPH 39 (BUILDING II)

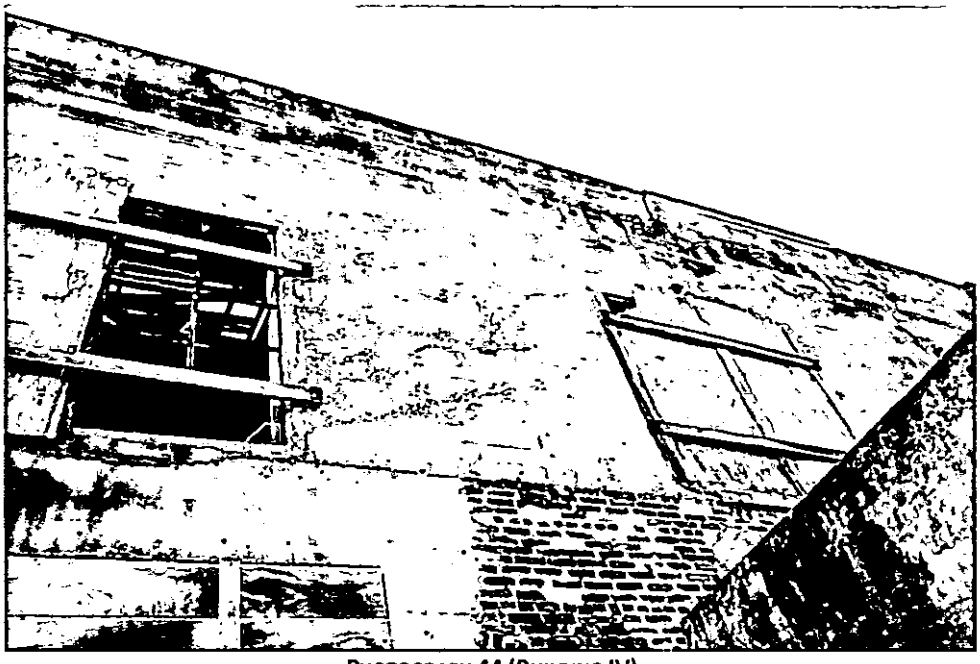


PHOTOGRAPH 40 (BUILDING IV)

PHOTOGRAPH 41 (BUILDING IV)

PHOTOGRAPH 42 (BUILDING IV)

PHOTOGRAPH 43 (BUILDING IV)

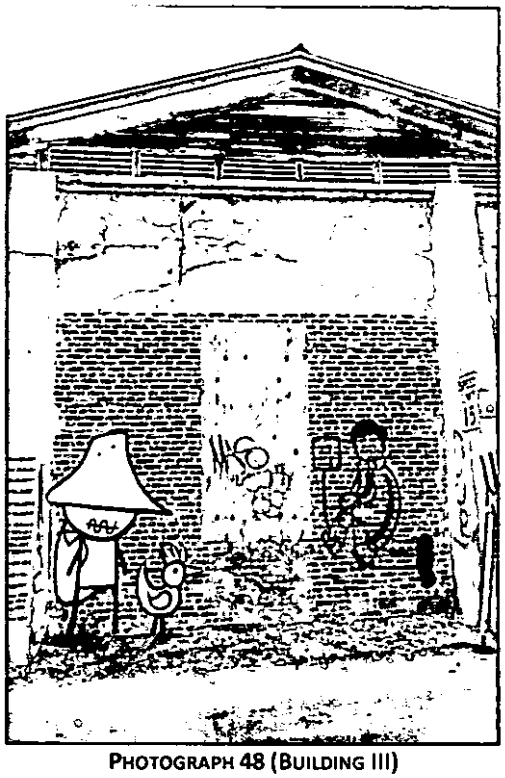


PHOTOGRAPH 44 (BUILDING IV)

PHOTOGRAPH 45 (BUILDING IV)

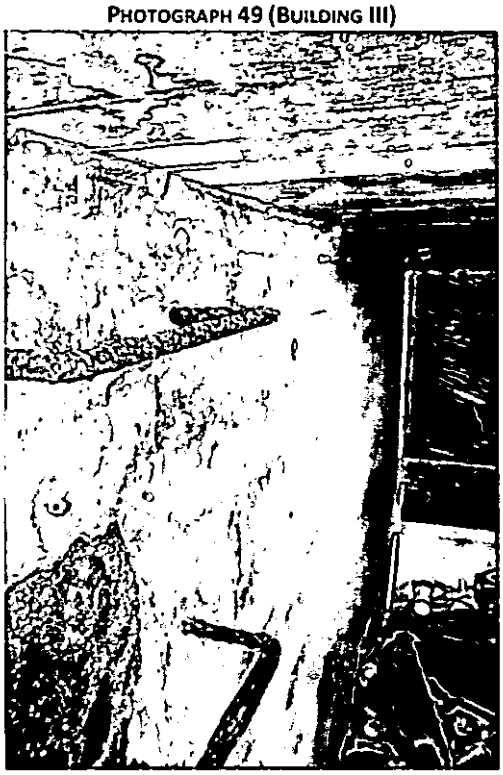
PHOTOGRAPH 46 (BUILDING III)

PHOTOGRAPH 47 (BUILDING III)

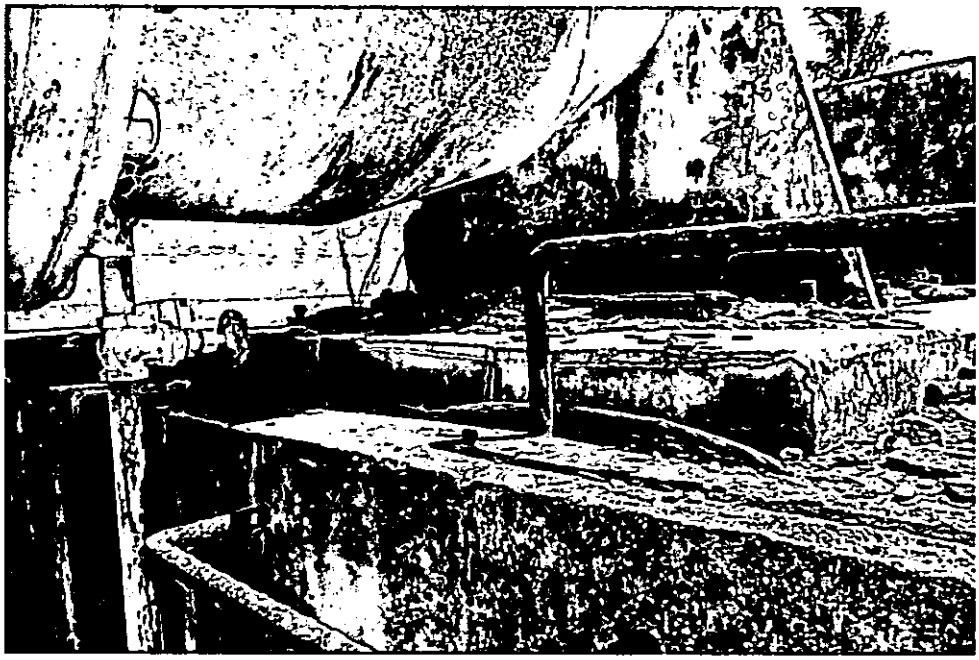


PHOTOGRAPH 48 (BUILDING III)

PHOTOGRAPH 49 (BUILDING III)



PHOTOGRAPH 50 (BUILDING V)



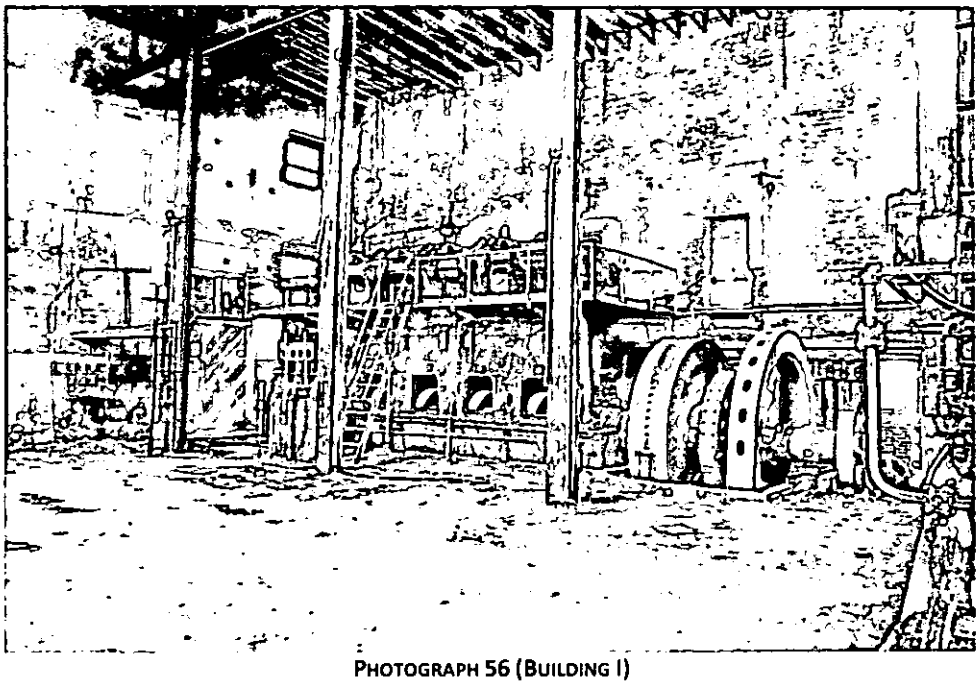
PHOTOGRAPH 51 (BUILDING V)

PHOTOGRAPH 52 (BUILDING V)

PHOTOGRAPH 53 (BUILDING V)

PHOTOGRAPH 54

PHOTOGRAPH 55 (BUILDING III)

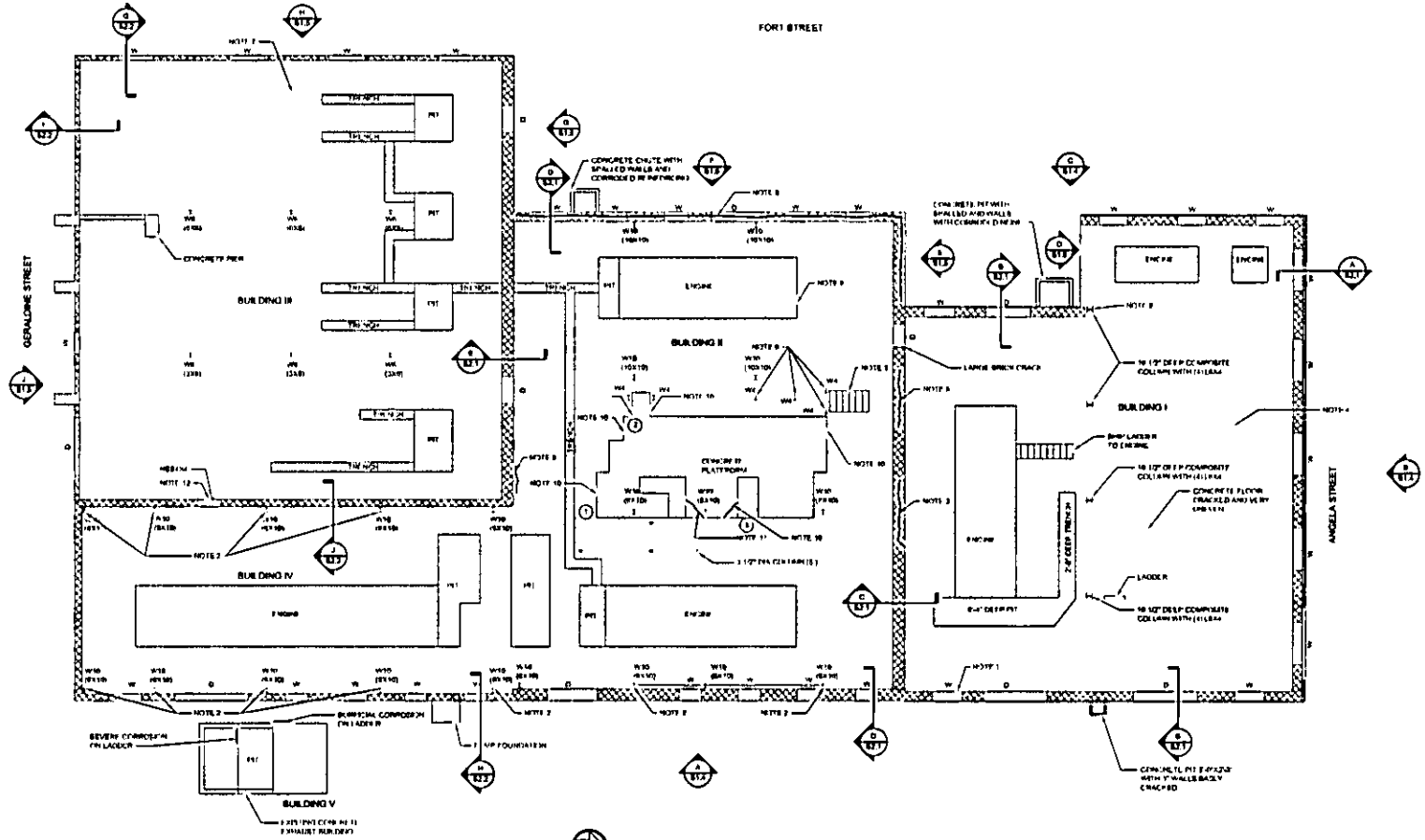


PHOTOGRAPH 56 (BUILDING I)

ATLANTIC
ENGINEERING
SERVICES

APPENDIX A

SURVEY DRAWINGS



EXISTING FLOOR PLAN

SCALE: 1/8"=1'-0"

SURVEY NOTES:

1. DETERIORATED FACE OF BRICK
2. BADLY CORRODED COLUMN BASE AND OR COLUMN
3. CRACKS IN BRICK AT WALL PENETRATIONS AND ELEVATED OPENINGS
4. CONCRETE FLOOR CRACKED AND UNEVEN
5. BADLY CORRODED STAIR STRINGERS AT BASE OF STAIR
6. TRENCH AND PIT EDGE ANGLE BADLY CORRODED
7. CONCRETE FLOOR CRACKED AND UNEVEN - TRENCH AND PIT EDGE ANGLES ARE BADLY CORRODED
8. DETERIORATED MORTAR JOINTS
9. BADLY CORRODED POST BASE
10. LARGE SPALL WITH EXPOSED CORRODING REINFORCING
11. SEVERE CRACK AT CONCRETE BASE
12. BADLY DETERIORATED BRICK AT WALL OPENING
13. SURFICIAL CORROSION ON ALL STRUCTURAL STEEL

(#) CARBONATION AND CHLORIDE TEST

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

Project Status

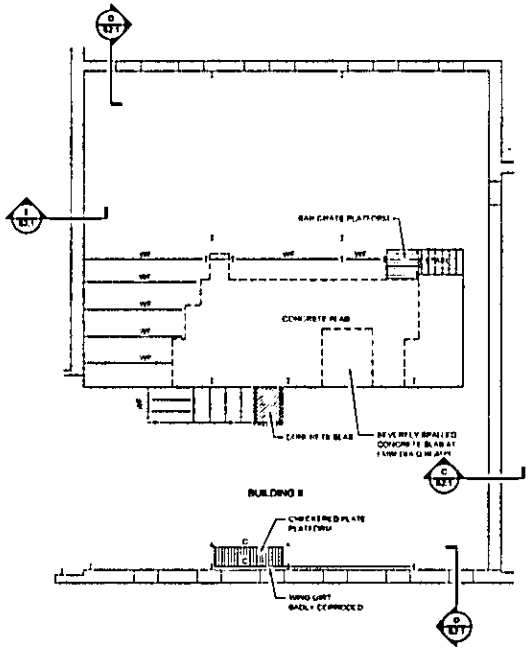
SEAL: MARK J. KEITH P.E. #74438

REVISED / ISSUED FOR:		
REV.	DATE	DESCRIPTION

PROJECT NO. 310-046
DATE: 06.03.2016
DRAWN BY: JEM
CHECKED BY: MJK

SHEET TITLE:
EXISTING FLOOR PLAN

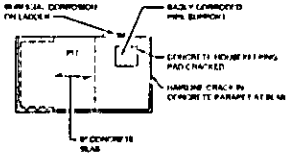
SHEET NO.
S1.1



EXISTING MEZZANINE FLOOR PLAN BUILDING II

SURVEY NOTES:

1. SURFICIAL CORROSION ON ALL STRUCTURAL STEEL.



EXISTING CONCRETE EXHAUST ROOF PLAN BUILDING V

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

Project Status

SEAL: MARK J. KLEISTER PE 37448

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PROJECT NO. 376-048

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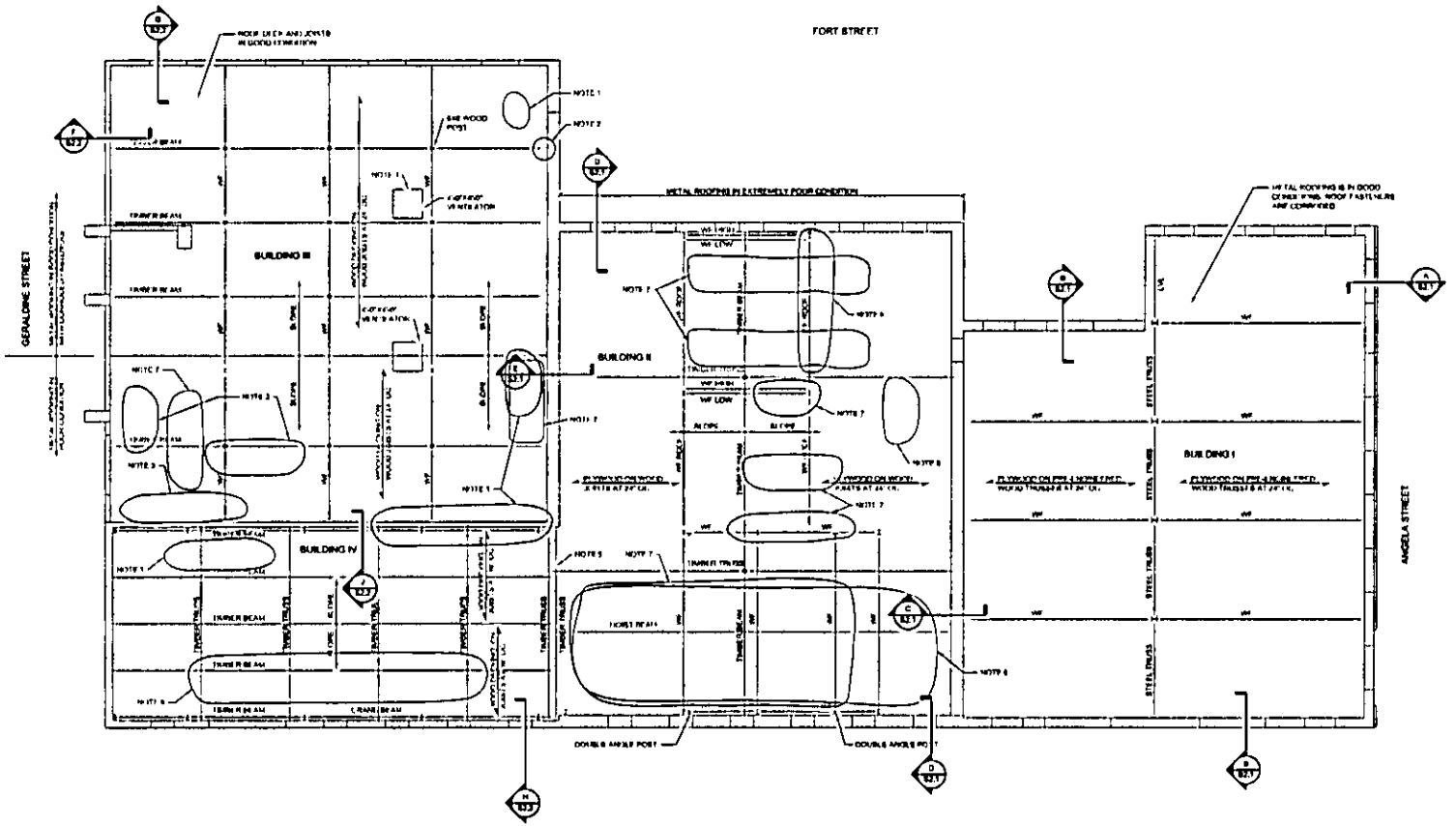
SHEET TITLE:

EXISTING MEZZANINE FLOOR PLAN

SHEET NO.

S1.2

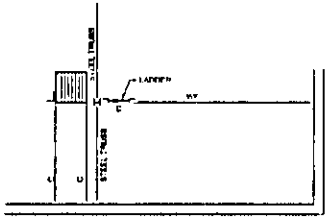


EXISTING ROOF FRAMING PLAN

SCALE: 1/8"=1'-0"

SURVEY NOTES:

1. CORRODED AREA ON METAL ROOFING
2. DETERIORATED BEAM ENDER
3. BADLY DELAMINATED OR MISSING ROOF DECK
4. DETERIORATED ROOF SHEATHING
5. BADLY DETERIORATED BOTTOM TRUSS CHORD
6. DETERIORATED ROOF SHEATHING
7. AREA OF MISSING METAL ROOFING
8. SURFICIAL CORROSION ON ALL STRUCTURAL STEEL
9. BADLY DETERIORATED AND MISSING ROOF DECK, JOINTS AND METAL DECK



ELEVATED PLATFORM BUILDING I

SCALE: 1/8"=1'-0"

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

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SEAL: MARK J. HEISTER PE 37438

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PROJECT NO. 340-049

DATE: 08.03.2016

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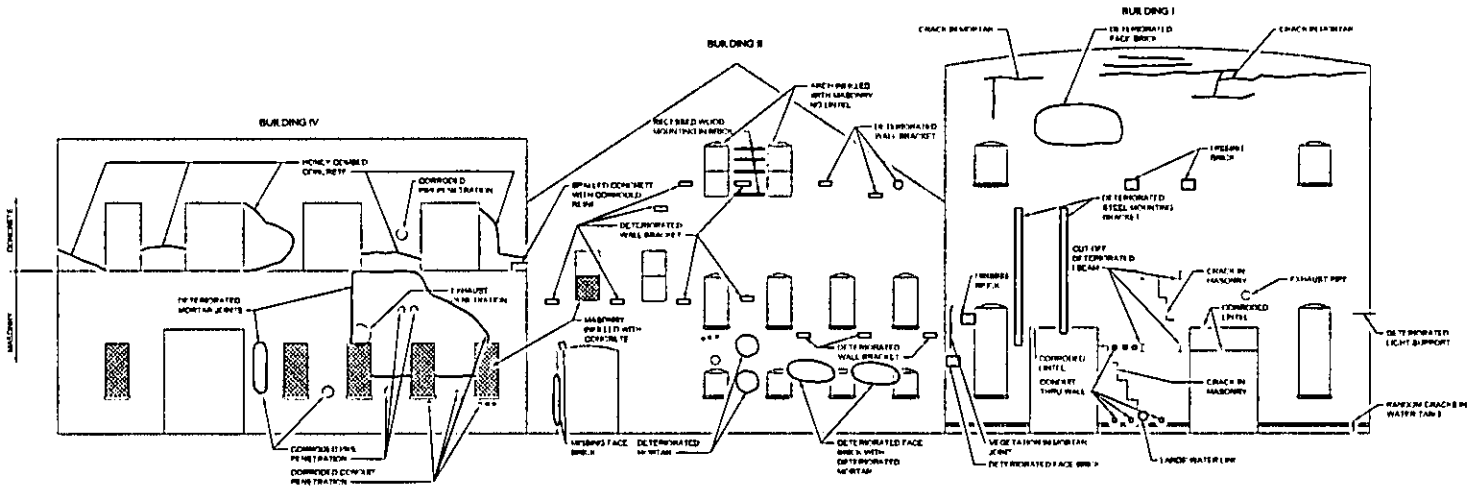
SHEET TITLE:
EXISTING ROOF FRAMING PLAN

SHEET NO.
S1.3



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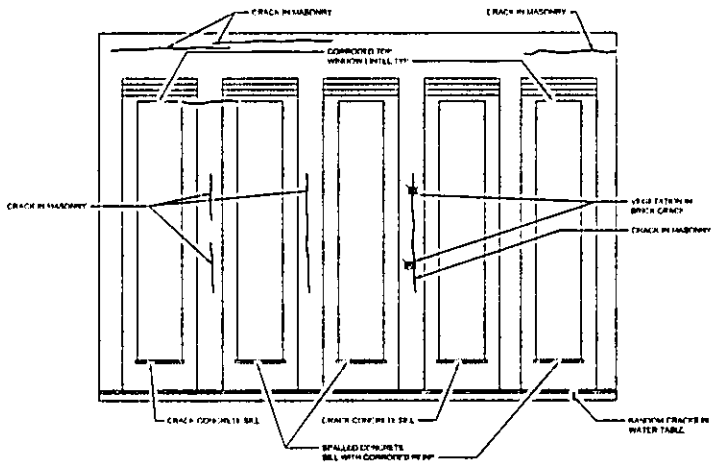
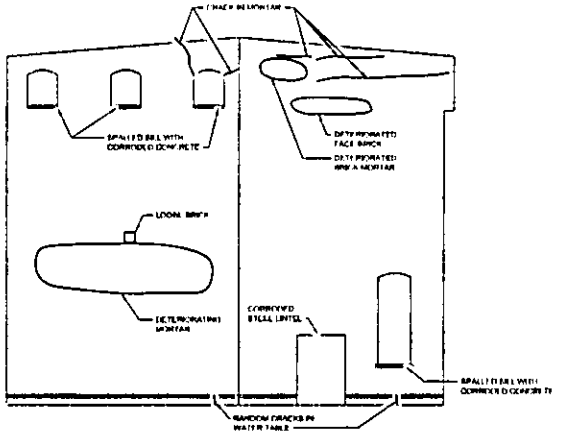


ELEVATION BUILDING III B / S1.2



ELEVATION BUILDING I C / S1.2

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

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SEAL: MARK J. MUSTER PE 37438

REVISED / ISSUED FOR:		
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PROJECT NO. 316-046

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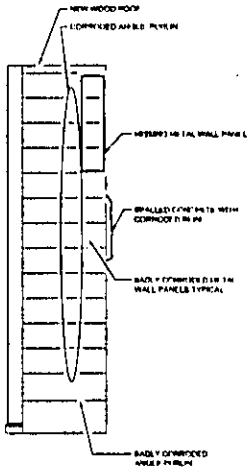
SHEET TITLE:

EXISTING ELEVATIONS

SHEET NO.

S1.4



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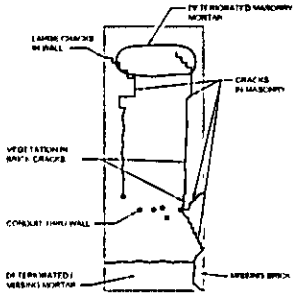

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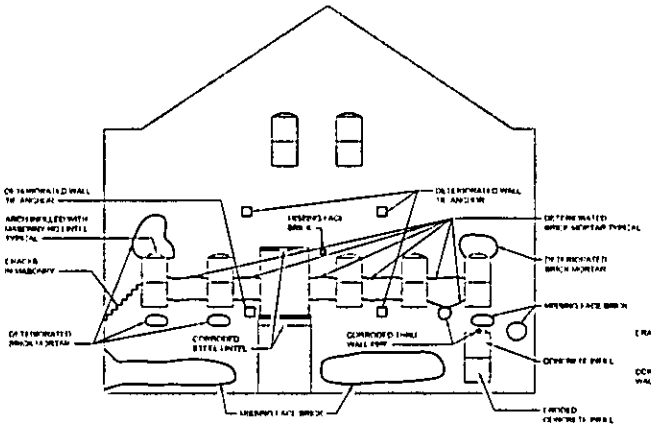

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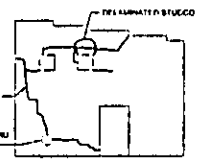

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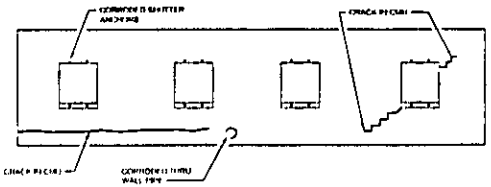
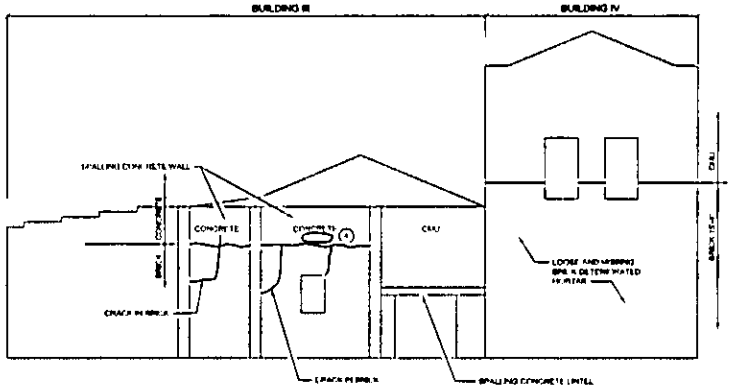


ELEVATION BUILDING III



ELEVATION

A CARBONATION AND CHLORIDE TEST

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ATLANTIC ENGINEERING SERVICES

DIESEL PLANT STRUCTURAL SURVEY
KEY WEST, FLORIDA

Project Status

SEAL: MARK J. KUESTER PE 57438

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PROJECT NO.	316-046
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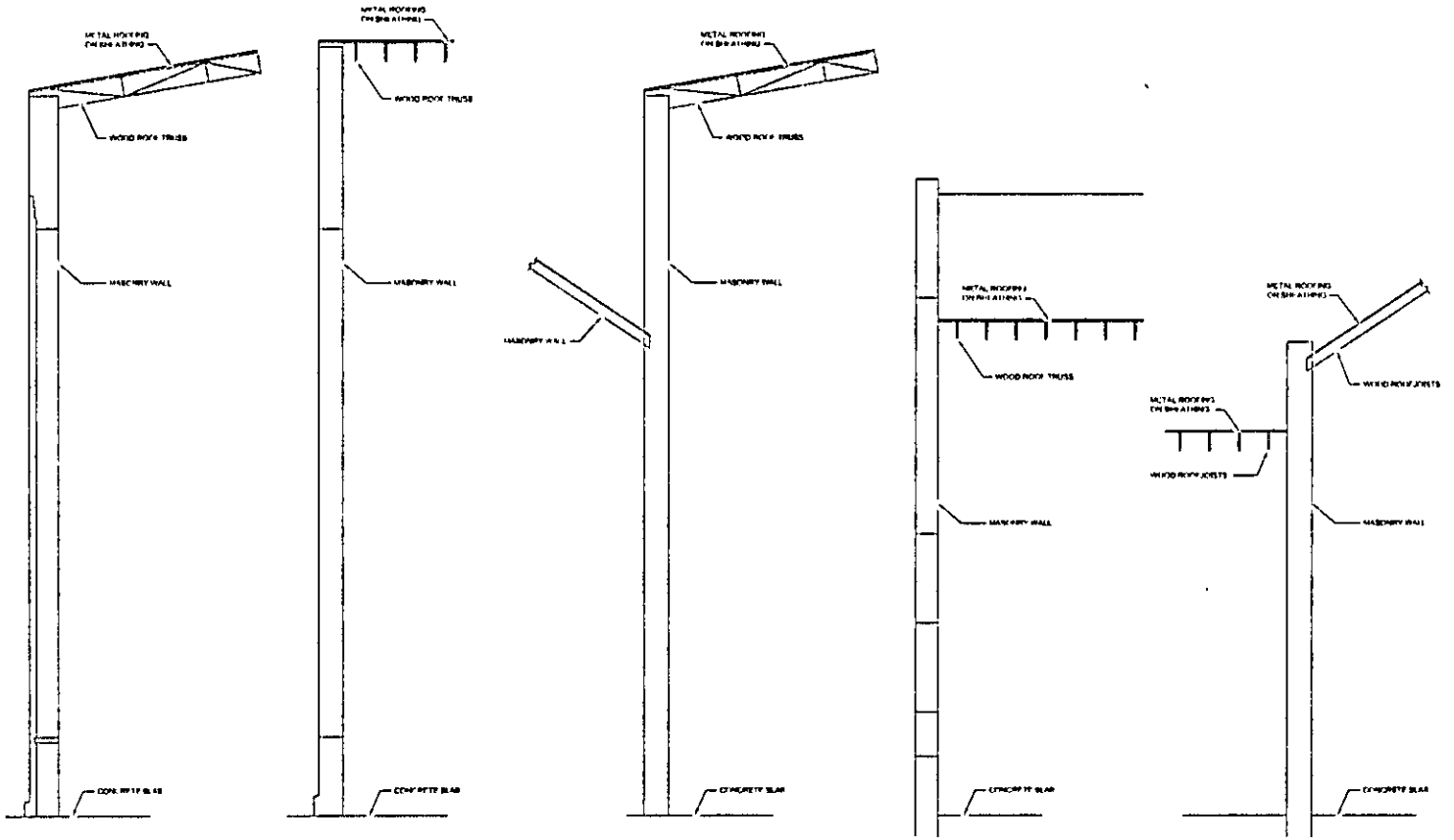
SHEET TITLE:
EXISTING ELEVATIONS

SHEET NO.
S1.5



SECTION A S2.1

SECTION B S2.1

SECTION C S2.1

SECTION D S2.1

SECTION E S2.1

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

Project Status

SEAL: MARK KEISTER PE 37438

REVISED / ISSUED FOR:		
REV	DATE	DESCRIPTION

PROJECT NO. 116-046

DATE: 08.03.2016

DRAWN BY: JEM

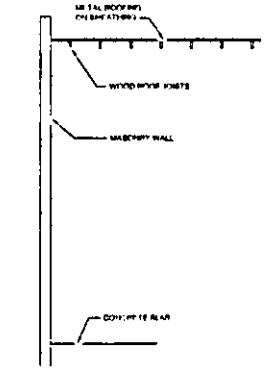
CHECKED BY: MK

SHEET TITLE:

SECTIONS

SHEET NO.

S2.1



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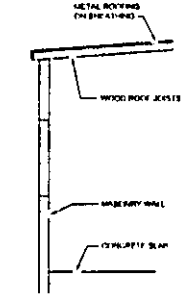
SCALE: 1/4" = 1'-0"



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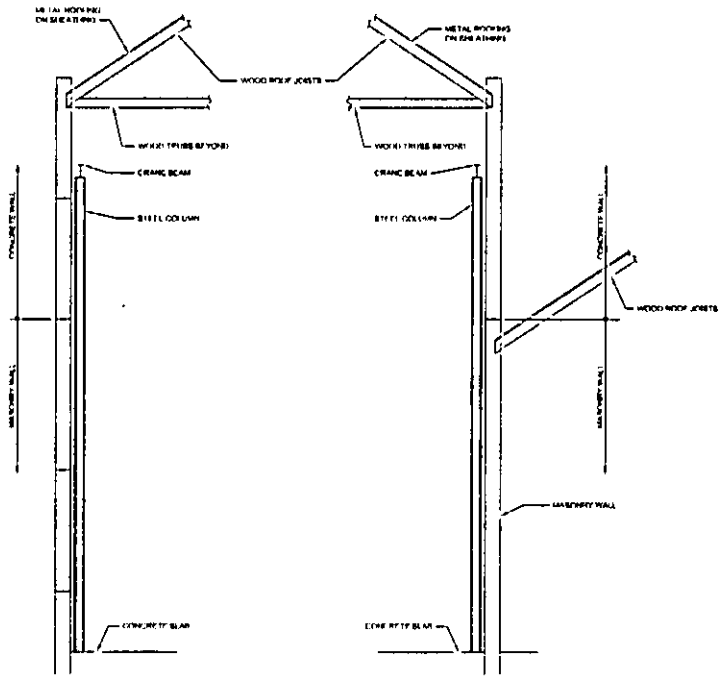

SECTION H
SCALE: 1/4" = 1'-0"

SECTION J
SCALE: 1/4" = 1'-0"

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DIESEL PLANT STRUCTURAL SURVEY

KEY WEST, FLORIDA

Project Status

SEAL: MARK J. KESTER # PE 31438

REVISED / ISSUED FOR	
REV. DATE	DESCRIPTION

PROJECT NO. 14-048
DATE: 08.05.2014
DRAWN BY: JEM
CHECKED BY: MJK

SHEET TITLE:
SECTIONS

SHEET NO.
S2.2

ATLANTIC
ENGINEERING
SERVICES

APPENDIX B

CHLORIDE AND CARBONATION TESTING

REPORT OF ACID SOLUBLE CHLORIDE TESTING

amec foster wheeler

PROJECT: Laboratory Testing

PROJECT NO.: 6738-13-5286

CLIENT: Atlantic Engineering Services

DATE TESTED: July 8, 2016

As requested, AMEC Foster Wheeler has completed testing of 4 concrete fragments received from Atlantic Engineering Services on June 30, 2016 . The samples were crushed and tested in general accordance with Florida Test Method FM 5-516. Results are outlined below.

Choride Content

Sample ID	% Cl	ppm
1 - Ph. 9.5 @ 1.5" below concrete surface at reinforcing	12.98	129814.0
2 - Ph. 6.5 @ 5" below concrete surface at reinforcing	3.601	36007.4
3 - Ph. 8.5 @ 12" below concrete surface at reinforcing	11.10	111003.0
4 - Ph. 7.5 @ 3" below concrete surface at reinforcing	10.46	104594.1

Respectfully submitted

Mike J. Holm, P.E.

ATLANTIC
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APPENDIX C

DEFINITION OF TERMS ASSOCIATED WITH THE DURABILITY OF CONCRETE

DEFINITION OF TERMS ASSOCIATED WITH THE DURABILITY OF CONCRETE
(From ACI 201.1R-08)

1 CRACKING

Crack- A complete or incomplete separation, of either concrete or masonry, into two or more parts produced by breaking or fracturing.

1.1 *Checking*- Development of shallow cracks at closely spaced but irregular intervals on the surface of plaster, cement paste, mortar, or concrete (See also *cracks* and *crazing*).

1.2 *Craze cracks*- Fine random cracks or fissures in a surface of plaster, cement paste, mortar or concrete.
Crazing- The development of craze cracks; the pattern of craze cracks existing in a surface (See also *checking* and *cracks*).

1.3 *D-cracks*- A series of cracks in concrete near and roughly parallel to joints and edges.

1.4 *Diagonal crack*- In a flexural member, an inclined crack, caused by shear stress, usually at approximately 45 degrees to the axis; or a crack in a slab, not parallel to either the lateral or longitudinal directions.

1.5 *Hairline cracks*- Cracks in an exposed-to-view concrete surface having widths so small as to be barely perceptible.

1.6 *Longitudinal cracks*- A crack that develops parallel to the length of the member.

1.7 *Map cracking*- 1) Intersecting cracks that extend below the surface of hardened concrete; caused by shrinkage of the drying surface concrete that is restrained by concrete at greater depths where either little or no shrinkage occurs; vary in width from fine and barely visible to open and well defined; or 2) the chief symptom of a chemical reaction between alkalis in cement and mineral constituents in aggregate within hardened concrete; due to differential rate of volume change in different members of the concrete; cracking is usually random and on a fairly large scale and, in severe instances, the cracks may reach a width of 12.7 mm (0.50 in.) (See also *checking* and *crazing*; also known as *pattern cracking*).

1.8 *Pattern cracking*- Cracking on concrete surfaces in the form of a repeated sequence; resulting from a decrease in volume of the material near the surface, or an increase in volume of the material below the surface, or both (see *map cracking*).

1.9 *Plastic shrinkage cracking*- Cracking that occurs in the surface of fresh concrete soon after it is placed and while it is still plastic.

1.10 *Random cracks*- Uncontrolled cracks that develop at various directions away from the control joints.

1.11 *Shrinkage cracking*- Cracking of a structure or member due to failure in tension caused by external or internal restraints as reduction in moisture content develops, carbonation occurs, or both.

1.12 *Temperature cracking*- Cracking due to tensile failure, caused by temperature drop in members subjected to external restraints or by a temperature differential in members subjected to internal restraints.

1.13 *Transverse cracks*- Cracks that occur across the longer dimension of the member.

2 DISTRESS

Deterioration- 1) Physical manifestation of failure of a material (for example, cracking, delamination, flaking, pitting, scaling, spalling, and staining) caused by environmental or internal autogenous influences on rock and hardened concrete as well as other materials; or 2) Decomposition of material during either testing or exposure to service (See also *disintegration*).

2.1 *Chalking*- Formation of a loose powder resulting from the disintegration of the surface of concrete or an applied coating, such as cementitious coating.

2.2 *Curling*- The distortion of concrete member from its original shape such as the warping of a slab due to differences in temperature or moisture content in the zones adjacent to its opposite faces (See also *warping*).

2.3 *Deflection*- Movement of a point on a structure or structural element, usually measured as a linear displacement or as succession displacements transverse to a reference line or axis.

2.4 *Deformation*- A change in dimension or shape.

2.5 *Delamination*- A separation along a plane parallel to a surface, as in the case of a concrete slab, a horizontal splitting, cracking, or separation within a slab in a plane roughly parallel to, and generally near, the upper surface; found most frequently in bridge decks and caused by the corrosion of reinforcing steel or freezing or thawing; similar to spalling, scaling, or peeling except that delamination affects large areas and can often only be detected by non-destructive tests, such as tapping or chain dragging.

2.6 *Disintegration*- Reduction into small fragments and subsequently into particles (See also *deterioration*).

2.7 *Distortion*- See *Deformation.*

2.8 *Drummy area*- area where there is a hollow sound beneath a layer of concrete due to a delamination, poor consolidation, or void (See also *delamination*).

2.9 *Dusting*- The development of a powdered material at the surface of hardened concrete (See also *chalking*).

2.10 *Efflorescence*- A deposit of salts, usually white, formed on a surface, the substance having emerged in solution from within either concrete or masonry and subsequently been precipitated by a reaction, such as carbonation or evaporation.

2.11 *Exfoliation*- Disintegration occurring by peeling off in successive layers; swelling up, and opening into leaves or plates like a partly opened book.

2.12 *Exudation*- A liquid or viscous gel-like material discharged through a pore, crack, or opening in the surface of concrete.

2.13 *Joint deficiencies*- Expansion, contraction, and construction joints not functioning in intended service conditions.

- **2.13.1** *Joint spall*- A spall adjacent to a joint.
- **2.13.2** *Joint sealant failure*- Joints opened due to a cracked and/or debonded sealant.
- **2.13.3** *Joint leakage*- Liquid migrating through the joint.
- **2.13.4** *Joint fault*- Differential displacement of a portion of a structure along a joint.

2.14 *Leakage*- Contained material is migrating through the concrete member.

- **2.14.1** Leakage, liquid- Liquid is migrating through the concrete.
- **2.14.2** Leakage, gas- Gas is migrating through the concrete.

2.15 *Mortar flaking*- A form of scaling over course aggregate.

2.16 *Peeling*- A process in which thin flakes of mortar are broken away from a concrete surface, such as by deterioration or by adherence of surface mortar to forms as forms are removed.

2.17 *Pitting*- Development of relatively small cavities in a surface; in concrete, localized disintegration, such as a popout; localized corrosion evident as minute cavities on the surface.

2.18 *Popout*- The breaking away of small portions of a concrete surface due to localized internal pressure that leaves a shallow, typical conical, depression with a broken course aggregate at the bottom.

- **2.18.1** *Popouts, small*- Popouts leaving depressions up to 10 mm (0.4 in.) in diameter, or the equivalent.
- **2.18.2** *Popouts, medium*- Popouts leaving depressions between 10 and 50 mm (0.4 and 2 in.) in diameter.
- **2.18.3** *Popouts, large*- Popouts leaving depressions greater than 50 mm (2 in.) in diameter.

2.19 *Scaling*- Local flaking or peeling away of the near-surface portion of hardened concrete or mortar (See also *peeling* and *spalls*).

- **2.19.1** *Scaling, light*- Loss of surface mortar without exposure of coarse aggregate.
- **2.19.2** *Scaling, medium*- Loss of surface mortar 5 to 10 mm (0.2 to 0.4 in.) in depth and exposure of coarse aggregate.
- **2.19.3** *Scaling, severe*- Loss of surface mortar 5 to 10 mm (0.2 to 0.4 in.) in depth with some loss of mortar surrounding aggregate particles 10 to 20 mm (0.4 to 0.8 in.) in depth.
- **2.19.4** *Scaling, very severe*- Loss of coarse aggregate particles as well as surface mortar, generally to a depth greater than 20 mm (0.8 in.).

2.20 *Spall*- A fragment, usually in the shape of a flake, detached from a concrete member by a blow, by the action of weather, by pressure, by fire, or by expansion within the larger mass.

- **2.20.1** *Small spall*- A roughly circular depression not greater than 20 mm (0.8 in.) in depth and 150 mm (6 in.) in any dimension.
- **2.20.2** *Large spall*- May be roughly circular or oval or, in some cases, elongated, and is more than 20 mm (0.8 in.) in depth and 150 mm (6 in.) in greatest dimension.

2.21 *Warping*- Out-of-plane deformation of the corners, edges, and surface of a pavement, slab, or wall panel from its original shape (See also *curling*).

3 TEXTURAL FEATURES AND PHENOMENA RELATIVE TO THEIR DEVELOPMENT.

3.1 *Air void*- A space in cement paste, mortar, or concrete filled with air; an entrapped air void is characteristically 1 mm (0.04 in.) or greater in size and irregular in shape; entrained air void is typically between 10 µm and 1 mm (0.04 mil and 0.04 in.) in diameter and spherical or nearly so.

3.2 *Blistering*- the irregular raising of a thin layer at the surface of placed mortar or concrete during or soon after the completion of the finishing operation; also, bulging of the finish plaster coat as it separates and draws away from the base coat.

3.3 *Bugholes*- Small regular or irregular cavities, usually not exceeding 15 mm (0.6 in.) in diameter, resulting from entrapment of air bubbles at the surface of formed concrete during placement and consolidation (Also known as surface air voids).

3.4 *Cold joint*- A joint or discontinuity resulting from a delay in placement of sufficient duration to preclude intermingling and bonding of the material in two successive lifts of concrete, mortar, or the like.

3.5 *Cold-joint lines*- Visible lines on the surfaces of formed concrete indicating the presence of a cold joint where one layer of concrete had hardened before subsequent concrete was placed.

3.6 *Discoloration*- Departure of color from that which is normal or desired (See also *staining*).

3.7 *Honeycomb*- Voids left in concrete due to failure of the mortar to effectively fill the spaces among coarse aggregate particles.

3.8 *Incrustation*- A crust or coating, generally hard, formed on the surface of concrete or masonry construction or on aggregate particles.

3.9 *Laitance*- A layer of weak material known as residue derived from cementitious material and aggregate fines either: 1) carried by bleeding to the surface or to the internal cavities of freshly placed concrete; or 2) separated from the concrete and deposited on the concrete surface or internal cavities during placement of concrete underwater.

3.10 *Sand pocket*- A zone in concrete or mortar containing fine aggregate with little or no cement material.

3.11 *Sand streak*- A streak of exposed fine aggregate in the surface of formed concrete, caused by bleeding.

3.12 *Segregation*- The differential concentration of the components of mixed concrete, aggregate, or the like, resulting in nonuniform proportions in the mass.

3.13 *Staining*- Discoloration by foreign matter.

3.14 *Stalactite*- A downward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping liquid from the surface of concrete, commonly shaped like an icicle (See also *stalagmite*).

3.15 *Stalagmite*- An upward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping liquid, projecting from the surface of rock or of concrete, commonly roughly conical in shape (See also *stalactite*).

3.16 *Stratification*- The separation of overwet or overvibrated concrete into horizontal layers with increasingly lighter material toward the top; water, laitance, mortar, and coarse aggregate tend to occupy successively lower positions in that order; a layered structure in concrete resulting from placing of successive batches that differ in appearance; occurrence in aggregate stockpiles of layers of differing grading or composition; a layered structure in a rock foundation.

ATLANTIC
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APPENDIX D

EXISTING STRUCTURAL CONDITIONS EVALUATION CRITERIA

AES ATLANTIC ENGINEERING SERVICES

EXISTING STRUCTURAL CONDITIONS
EVALUATION CRITERIA

EXCELLENT	**Meets or exceeds current structural code requirements.** Capable of safely carrying proposed occupancies. No significant vibrations, cracking or deflections. No structural reinforcement or repairs required. Very minor, if any, maintenance required.
GOOD	**Meets current structural code requirements.** Capable of safely carrying proposed occupancies. Deflections, cracking, vibrations may be observable. No structural reinforcement required. Minor structural repairs required. Some significant maintenance repairs required.
FAIR	**Majority of structure meets structural code requirements.** Portions of structure are not capable of carrying proposed occupancies. Deflections, cracking, vibrations, structural distress is observable. Structural reinforcement required in limited portions of the structure. Structural repairs required generally. Many significant maintenance repairs required.
POOR	**Majority of structure does not meet structural code requirements.** Much of the building is not capable of carrying proposed occupancies. Deflections, cracking, vibrations, structural distress commonly observable throughout the structure. Major reinforcement or reconstruction of the structure is required. Major maintenance repairs are required.
EXTREMELY POOR	**Collapse of structure is imminent.** Structure exhibits significant deflections, cracking, vibrations, structural distress. Structure requires extensive reinforcement or reconstruction of impractical scope.

NOTE: Some parts of each definition may not apply.