ARTIBUS DESIGN
ENGINEERING AND PLANNING

Structural Evaluation Report

for existing one-story ground level commercial building

Property Address:
"Piano Shop"
907 Caroline St,
Key West, FL 33040

AD Job#: 1804-15
City of Key West P.O.: 086088

Artibus Design
April 2018

DRAFT

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Serge Mashtakov, PE, FL License No. 71480

_____
Date

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Figure 1. Site Map

Introduction

Existing building is one-story ground level structure with wood frame flat roof. Front section of the building is currently under lease to house a retail space. Rear end of the building is used as maintenance shop and storage for port needs. Left and rear side of the building have attached roof overhangs. Small storage shed addition is located on the back.

Building has a history of disrepair and significant renovations where proposed in the past. An opinion of current condition, repairs together with a probable cost estimate and "50% rule" evaluation are requested by the City.

This report is based on the information gathered during the site inspection by Serge Mashtakov P.E. on March 29th, 2018.

Inspection Procedure

Structure was visually inspected from inside and outside. Only exposed elements were inspected, subgrade conditions and any covered elements were not inspected.

Background and Findings

Existing commercial building is approximately 30ft wide by 60.5ft long CMU (concrete masonry unit) structure with unreinforced blockwork topped by cast-in-place tie-beam and short parapet wall. Building height is approximately 12.5ft to the top of parapet wall. Roof system consists of (3)2x10 wood beam running along the middle of the building and supported by 3" dia. Round steel columns and exterior walls on the ends. Flat roof rafters 2x10 wood members @ 16" o.c. are supported by the central beam and have ends embedded into concrete above the tie-beam.

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Figure 2. Existing Structure Floor Plan.

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Figure 3. Front Elevation. Visible concrete damage – cracks along tie-beam above windows.



Figure 4. Partial right side elevation. More cracks in the tie-beam. Damaged jalousie style glazing with window a/c units.

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Figure 5. Partial right side elevation (middle of building). Large area covered with plywood which prevents damaged concrete debris from falling. Old paint and more damaged windows.



Figure 6. Same as above. Close-up view. Tie-beam with extensive damage and window sealed with duck tape.

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Figure 7. Same as above. Rear of the building right side. Large parts of the tie-beam collapsed, and damaged reinforcement exposed to the elements.



Figure 8. Overall right side elevation with rear wood frame shed.

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Figure 9. Rear elevation with pergola style and shed roof on the side. Rear of the shed is obstructed by storage container. Wood pergola and side roof are in poor shape but stable. Left side of the building is obstructed by the landscaping.



Figure 10. Maintenance shop - Interior view with damaged top of tie-beam and heavily damaged roof rafter. Damaged wood roofing deck.
Please note electrical conduits along the tie-beam.

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Figure 11. Same as above. Heavy concrete damage, damaged rafters and more electrical conduits.



Figure 12. Roofing deck with hole demonstrating heavy termite damage to deck boards in some locations.

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Figure 13. Termite damage to the middle roof beam and attached electrical components.



Figure 14. Heavy spalling damage above the side entrance into the gift shop. Large sections of concrete debris are unsecured and may fall creating life & health safety hazard. Roofing above with a patchwork of non-conforming improvements. More electrical components in the way of repairs.

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Figure 15. Heavy termite damage to the rafters (interior of the gift shop).



Figure 16. More electrical conduits, outlets and lights at the level of tie-beam and roof rafters requiring repairs.

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Conclusions and Recommendations

In my professional opinion overall condition of the building is poor. Concrete tie-beam around entire building perimeter needs to be replaced together with the parapet wall above. All roof rafters are currently supported by the embedment into the concrete which will have to be removed. New ledger will be required around the building perimeter and all rafters shall be sistered with PT wood lumber since so many locations of heavy damage were discovered – it is likely that all rafters are termite damaged to some extent.

In my professional opinion up to 30% of the roof decking board require replacement, which will require new roofing system to be installed (replacement of the parapet wall would require such work as well).

Currently the roof of the principal structure consists of a single ply membrane installed over flat roof deck. New roofing membrane will require a tapered insulation to provide minimum 2% slope to the rear of the building.

It is likely that most of the existing windows and doors will not survive the demolition of the tie-beam and will need replacement.

Electrical distribution system will need to be replaced entirely – since most of the conduits are attached directly to the tie-beam or roof rafters to be repairs.

In my professional opinion, parts of the tie-beam with extensive damage and loose concrete chunks need to be secured by the means of removing loose elements and installation of heavy plywood sheathing. Such temporary shoring is required to minimize life and health safety of the building occupants and public.

907 Caroline St - Piano Shop
Opinion of Probable Cost

Item No	Work Description	Estimated Unit Cost	Quantity	Unit	Total
1	Mobilization & Demobilization	$30,000.00	1	EA	$30,000.00
2	Light Shoring/reshoring of the existing roof structure and walls	$2.00	1815	SQ.FT.	$3,630.00
3	Concrete Spalling Repair/Replacement of all tie-beam and headers	$350.00	420	CU.FT.	$147,000.00
4	Installation of new perimeter ledger (2) 2x10 PT SP#2 and hardware 180 LF	$15.00	180	LF	$2,700.00
5	Sistering of all rafters 2x10 PT SP#2 and hardware	$9.00	1290	LF	$11,610.00
6	Sistering of middle beam with (2) 2x10 PT SP#2 and hardware	$15.00	60	LF	$900.00
7	Replacement of damaged roof deck (up to 30%)	$7.50	500	SQ.FT.	$3,750.00
8	New roofing system over tapered insulation	$40.00	1800	SQ.FT.	$72,000.00
9	New parapet wall coping	$65.00	150	LF	$9,750.00
	Stucco of new concrete and misc stucco repairs	$6,000.00	1	L.S.	$6,000.00
	Priming and painting building (two coats latex paint)	$15,000.00	1	L.S.	$15,000.00
10	Replacement of small windows (right side only, assuming others can remain). Impact aluminum, current NOA.	$900.00	4	EA	$3,600.00
11	Misc electrical work - maintaining all existing fixtures, panel and service (rough estimate)	$15,000.00	1	EA	$15,000.00

$320,940.00

Contingensy and unforceen items	15%	$48,141.00
Engineering and Project administration	5%	$16,047.00

TOTAL ESTIMATE **$385,128.00**

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In accordance with Monroe County Property Appraiser's Office data, Market depreciated value of the structure is at $145,382 (2017). Even with the assumption that the current structure value can be brought up by 20%. The total depreciated value of existing building would be at $174,458.

Current Florida Building Code require complete code compliance for structures if the total value of the improvements exceed 50% of the depreciated value of the structure. In our case the total value of work allowed by code within 5-year period would be approximately $87,200. Which is grossly smaller than our Opinion of Probable Cost even if some items (such us roofing, small windows) are removed.

The greatest challenge in bringing the existing building to a current code compliance will be flood proofing of the structure. Existing finished floor is estimated to be at 3.57ft NGVD and building is in flood Zone AE9. The Design Flood Elevation to which the building will need to be flood proofed is 9.0ft +1ft=10ft, which is +/-6.43ft.

The flood proofing will require complete replacement of foundations and grade slab, replacement of wall (currently is an unreinforced block) and installation of flood proofing panels on all openings. Such efforts can't be justified for the preservation of this structure unless it holds some historic or otherwise unknown to us value.

In my professional opinion the structure is a total loss, demolition and new construction should be considered.

Sincerely,
Artibus Design LLC
Serge Mashtakov, P.E.
President

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