



Gillette & Associates, Inc.

Civil & Environmental Engineering • Mechanical & Structural Engineering • Construction Management

March 15, 2019

Mr. Dale Martin
City Manager
City of Fernandina Beach, Florida
204 Ash Street
Fernandina Beach, FL 32034

RE: Dune Walkways & Crossovers
Various Locations
North & South Fletcher Avenue
Fernandina Beach, Florida

Mr. Martin:

Attached is the preliminary assessment report for the beach access walkways owned by the City of Fernandina Beach and noted in Appendix A of the attached report. The report should help to clarify and assess the required walkway repairs and/or replacement to ensure public safety. Per the requirements of the Florida Building Code 2017, the report is addressed to the Building Official, Mr. Terry Cotter.

Thank you for the opportunity to serve you. If you have any questions, please feel free to contact us at 904-261-8819.

Respectfully Submitted,

Asa R. Gillette, P.E.
Principal
Gillette and Associates, Inc.

cc: Terry Cotter, C.O.F.B. Building Official
file



Gillette & Associates, Inc.

Civil & Environmental Engineering • Mechanical & Structural Engineering • Construction Management

Prepared for: City of Fernandina Beach
Mr. Terry Cotter, CBO, FPM
Interim Building Official
204 Ash Street
Fernandina Beach, Florida

Situation: Beach Access Walkways
Preliminary Assessment
City of Fernandina Beach, Florida

Jobsite: Beach Access Walkways
North and South Fletcher Avenue
Fernandina Beach, FL 32034

Date: March 15, 2019

Prepared by Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL 32034
Phone: 904-261-8819
Certificate of Authorization No. 9332



1.0 OVERVIEW & PROJECT DESCRIPTION

The scope of the project was initially to be limited to identification of the boardwalks which pose the most threat to public safety and should be closed. However, some degree of examination is required for all boardwalks to determine those items of immediate attention and determine detriment to public welfare. It should be noted that this report is not a comprehensive study of all the beach boardwalks, which was outside of the scope of work.

Appendix A contains an overall summary table and relative ranking of each boardwalk based on visual observation and inspection. Of the beach accesses listed in Appendix A, fourteen (14) do not contain elevated boardwalks and are not applicable to the scope of this report. Therefore, this report will be applicable to the remaining twenty-seven (27) elevated boardwalk systems.

2.0 INTERPRETATION AND VISUAL EVALUATION

2.1 Inspection of Boardwalks

Each boardwalk was visually inspected and evaluated as shown in Appendix A. Inspections would be considered subjective in nature and are based on professional experience, utilizing the following codes and literature:

- Florida Building Code, 6th Edition (2017), Existing Structures (FBCES 2017)
- Florida Building Code, 6th Edition (2017), Building (FBCB 2017)
- American Institute of Timber Construction, 4th Edition (AITC)
- American Institute of Steel Construction, 9th Edition (AISC)

Visual inspection of the boardwalks included decking, railing, joists, girders, pilings and connectors (i.e. bolts, nuts, washers, clips, screws, nails, etc.). No destructive or outside testing was performed. We also measured handrail height, net width and guardrail to verify compatibility with the FBC 2017 provided any structural repair thresholds are exceeded per the FBCES 2017.

The boardwalks have been constructed at different times in the past, but they resemble similar design and construction techniques consisting of round pilings driven into the dune system which supports the deck and railing systems. Some variation of this utilizing square posts can be seen on a few walkways. Most consist of cross-bracing of pilings where heights exceed about four to five feet above grade, with a few warranting cross-bracings that is not currently present.

2.2 Evaluation Methodology

The primary reference used to evaluate the walkways was the Florida Building Code (2017), Existing Structures volume, Chapter 4, Section 404, Repairs. This section breaks the damage into basically two categories based on substantial structural damage, vertical elements of the lateral force-resisting system and gravity load-carrying components. Substantial structural damage is defined as satisfying one or both of the following conditions. A reduction of lateral load carrying capacity by more than 33-percent from its pre-damaged condition. A reduction of any vertical component carrying gravity load that supports more than 30 percent of the total area of the structure's floor, is reduced by more than 20 percent from its pre-damaged condition. If these

conditions are met, an evaluation by a State of Florida registered design professional shall be performed and submitted to the Building Official.

All the boardwalks are constructed in segments (, with each segment between pilings/posts considered an independent floor system or structure since each is independently supported by the pilings/posts. Substantial structural damage to connectors (i.e. carriage bolts) or load carrying members (i.e. girders) at each piling/support would affect at least 50-percent of the support capacity of the deck segment. Since each boardwalk section would be considered an independent floor system, substantial structural damage would be applicable for each section. There is some interconnection of members between section via decking, nails and bolts.

2.3 Inspection Observations

All boardwalks inspected have some form of dune intrusion and repairs, some more extensive than others. Where the dune system had completely overtaken the deck or support systems, no visual observation could be made of the connectors or other members. It is safe to assume that walkway material and connectors for these areas would be compromised from the intended design.

Appendix A contains the following tables and figures showing listing of inspection results, simple sketch of a typical boardwalk and typical pictures of corrosion and deterioration.

- Table 1 – Overall Summary of Beach Boardwalks
- Table 2 – Beach Boardwalks in Need of Immediate Repair & Replacement
- Figure 1 – Typical Boardwalk Plan and Section.
- Figure 2 – Typical Corroded Connectors & Deteriorated Boardwalk Sections

Summary of overall ratings are defined as follows:

- 1 – very good to excellent condition; resembling new or recent construction
- 2 – good to above average condition; no structural deficiencies
- 3 – fair to average condition with repairs warranted; no significant structural deficiencies
- 4 – below average to poor condition with repairs required as soon as possible; structural deficiencies present with elements of substantial structural damage; consideration given to close to the public for immediate repairs
- 5 – very poor condition with significant structural deficiencies and substantial structural damage; consideration given to close to the public for complete replacement or removal

Boardwalk systems ranked as a four (4) or five (5) suffer from connector degradation due to corrosion, along with repairs required for the deck, supports and/or railing system. Most have experienced significant nut, washer and bolt head corrosion such that some connections have completely corroded apart. These damage connectors are also associated with the guardrail system. These deficient connectors and gravity carrying members would qualify as suffering substantial structural damage as defined in Section 2.2 above. Therefore, those sections would need to be repaired or replaced as soon as possible.

It was observed that much of the connector corrosion was concentrated on the north side of the boardwalk and effected mostly the eastern portions. Connector damage seemed to decrease west of the first or second frontal dune systems. There is some interconnection of members between sections via decking, nails and bolts. However, most of these items have suffered significant damage such that they offer little load capacity.

Boardwalk systems ranked as one (1), two (2) or three (3) would be considered acceptable for use at this time. It should be noted that this ranking does not exempt repair or upgrade of certain items as required by general maintenance inspection. Individual analysis of each walkway system would be required to determine all maintenance and compliance items and would need to be coordinated with City staff.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

Twenty-seven (27) elevated boardwalks were reviewed for structural stability and public safety and given a ranking from one (1) to five (5) (best to worst respectively) to determine which boardwalks contain significant structural damage to be closed to the public. Twelve (12) walkways have rankings of four (4) or five (5) and contain enough damage that they warrant being closed to the general public until repairs or replacement are performed. The access numbers recommended for closure and immediate repair are 6N, 4N, 10, 27, 28, 29, 30, 36, and 39. The access numbers recommended for closure until replacement can be performed are 35S, 38 and 40.

Walkways with a ranking of four (4) contain enough deficiencies to warrant closure but could have sections repaired or replaced until a time line for a more comprehensive repair or replacement evaluation can be performed with City staff. Walkways with a ranking of five (5) have too many deficiencies to warrant repair and should be replaced. It should be noted that all but five of the walkways (main beach, seaside park, 22, 23 and 33) are at or approaching the end of the life expectancy of the wood and connectors. Based on conversation with City staff, most of the boardwalks were installed in the late 1980's and early 1990's. Therefore, it is reasonable to assume most of the boardwalks are at the end of their life expectancy are due to be replaced.

3.2 Recommendations

The above mentioned twelve (12) beach access boardwalks are recommended to be closed for repair or replacement based on structural deficiencies in connection hardware, deck supports and/or handrail degradation. These boardwalks contain areas of deficiency that would qualify as substantial structural damage as stated in the FBCEB, 2017 and Section 2 above. We recommend the City immediately begin to plan for repairs and/or replacement for the twelve boardwalks listed above. We have had preliminary discussions with City staff regarding solutions and recommend that immediate planning and coordination with the Building Official be started for sequencing of closure and repairs of the boardwalks. Per the Florida Building Code, and in conjunction with this report, all final closure and safety determination to be by the Building Official.

ATTACHMENT A

Table 1 – Overall Summary of Beach Boardwalks

Table 2 – Beach Boardwalks in Need of Immediate Repair & Replacement

Figure 1 – Typical Boardwalk Plan and Section

Figure 2 – Typical Corroded Connectors

C.O.F.B. - Beach Access Review - Summary Table
 Gillette and Associates, Inc.
 3/14/2019

Overall Summary of Beach Boardwalks

access i.d.	street	"cattle trail"?	length (ft)	shelters or deck	stairs	ADA compliant	handrail height (in)	walkway clear width (in)	percentage encumbered by dune	O/A appearance	O/A Rank (1 - 5)
16N	Ferriera	N	50	0	Y	N	41	45.5	20%	fair	3
12N	North Beach Park	N	330	2	N	Y	41.5	57.5	5%	fair	3
6N	west 3rd	N	15	0	Y	N	33	58	80%	poor	4
4N	west 1st	N	30	0	Y	N	35.5	57.5	50%	poor	4
main beach	Dolphin	N	515	3	Y	Y	42	93	10%	good	2
9	Jasmine	N	20	0	Y	N	35.5	59	75%	fair	3
10	Wisconsin	N	80	0	Y	N	37.5	45.5	20%	poor	4
13	Jefferson	N	45	0	Y	N	40	55	20%	good	3
seaside pk.	Sadler	N	300	6	N	Y	42	59	25%	good	2
22	C	N	205	0	N	N	41.5	53	10%	good	2
23	D	N	245	0	Y	N	33.5	65	10%	good	2
24	Askins	N	285	0	Y	N	35	45.5	5%	fair	3
25	Mizel	N	230	0	Y	N	36	54	10%	fair	3
27	Allen	N	235	0	N	N	36	56.5	20%	fair to poor	4
28	North Casino	N	230	0	N	N	36	58	75%	poor	4
29	South Casino	N	240	0	N	N	36	59	50%	fair to poor	4
30	Simmons	N	220	0	Y	N	36	59	25%	fair to poor	4
31	Hutchins	N	210	0	Y	N	37	45	30%	good to fair	3
33	Oklawaha	N	245	0	Y	N	39	45	0%	very good	1
34	Mantanzas	N	370	0	Y	N	42	59	50%	good to fair	3
35	Manatee	N	235	0	Y	N	36	60	20%	fair	3
35S	Suwanee	N	260	0	Y	N	40	55	50%	very poor	5
36	Kissimmee	N	250	0	Y	N	40	55	10%	good to fair	4
37	Alachua	N	460	0	N	Y	43	55	10%	fair	3
38	Osceola	N	160	0	Y	N	40	57	20%	very poor	5
39	Ozello	N	255	0	Y	N	40	55	15%	poor	4
40	Pasco	N	200	1	N	N	42	54	25%	very poor	5

Rank

- 1 very good to excellent condition; resembles new or recent construction
- 2 good to above average condition; no structural deficiencies
- 3 fair to average condition with repairs warranted; no structural deficiencies
- 4 below average to poor condition with repairs required as soon as possible; structural deficiencies present; should be closed to the public for immediate repairs
- 5 very poor condition with significant structural deficiencies; should be closed to the public

C.O.F.B. - Beach Access Review - Comment Table
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access i.d.	street	"cattle trail"?	Rank (1 - 5)	comments
16N	Ferriera	N	3	top of dune at and above landing; stair treads in fair shape; top & midrails in fair condition; east stairs buried in dune
12N	North Beach Park	N	3	picket and rail repair needed; reanchor handrail at east ramp to beach; girders & bracing in good shape; in need of general maintenance
6N	west 3rd	N	4	stair treads on west side recently replaced; most of crossover covered in dune; railing in bad shape; planking on exist. railing holding back dune
4N	west 1st	N	4	midrail missing or not attached; most of crossover covered in dune; railing in bad shape; planking on exist. railing holding back dune
main beach	Dolphin	N	2	dune has taken over east ends of beach out-ramps and south ramp to sidewalk; northern area is open, existing boardwalk w/existing sun shelter
9	Jasmine	N	3	east ramp covered by dune; center landing about 75% covered by dune; railing needs work
10	Wisconsin	N	4	east end of ramp buried in dune; top & mid rails in poor shape & needs replacement; connectors rusted; not in good shape
13	Jefferson	N	3	top & midrails in good shape; east side of stairs in dune; deck in good shape
seaside pk.	Sadler	N	2	wood around shower area warrants repair; dune has taken over beach access ramp and some walkways; minor repairs warranted
22	C	N	2	railing & deck coating still in tact; underside of deck in good shape; dune overtaking east end of deck; good shape
23	D	N	2	railing & decking in good shape; coating in-tact; east end of deck taken over by dune; underside of framing in good shape
24	Askins	N	3	west section w/o guardrail; top & mid rails in decent shape; good dune clearance; settlement on north side of west end of ramp; non-level surfaces
25	Mizel	N	3	top rail avg shape w/some warping; east end covered by dune; connectors fairly corroded; repairs needed
27	Allen	N	4	previous repairs evident; railing and decking in poor shape; connectors severely corroded; lg. amt. of girders splitting; end of life.
28	North Casino	N	4	deck boards in poor condition; dune at or near lg. amt. of boardwalk; girders in poor shape; 4x4 post piles for h/r; 6" dia pile for deck; severe d
29	South Casino	N	4	deck boards in poor condition; top and midrails in fair to poor condition; surf. coating mostly gone; girders in poor shape; connectors highly corroded
30	Simmons	N	4	deck boards and top rails in fair to poor shape; girders in average shape; connectors/hardware corroded; top rail lacks sufficient lateral support
31	Hutchins	N	3	some top rail replaced; deck boards not in good shape; hardware on north side corroded; girder has single carriage bolt w/2 nails
33	Oklawaha	N	1	appears to be new or relatively new; no issues
34	Mantanzas	N	3	deck boards need repair; girder hardware corroded on north side; railing, girders and joists in good shape;
35	Manatee	N	3	railing and deck boards in good shape; girders in decent shape; connectors on north side of walkway severely corroded; 4x4 post-piles for h/r; 6" piles for deck
35S	Suwanee	N	5	dune overtaking east stairs & center of boardwalk; h/r stiffened to hold back dune; railing in bad shape; girders splitting; connectors highly corroded
36	Kissimmee	N	4	some repair evident; railing and deck in fair shape; connectors severely corroded (mostly north side); x-bracing recommended; girders fair to poor shape
37	Alachua	N	3	top and mid rails in good shape; decking, joists and girders in good shape; s.s. hardware good; east-most deck section listing severely;
38	Osceola	N	5	top & midrails in fair shape; hardware & connectors severely corroded on north side and overall in poor shape; girders cracking & splitting; decking in fair shape
39	Ozello	N	4	top& midrail in fair shape; hardware & connectors severely corroded & in poor shape; girders splitting; needs x-bracing; joists in decent shape
40	Pasco	N	5	west section w/o guardrail; top & mid rails in poor shape; decking in poor shape; 4x4 post system; very noticable sway; hardware & connectors in fair condition;

C.O.F.B. - Beach Access Review - Summary Table
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Beach Boardwalks in Need of Immediate Repair or Replacement

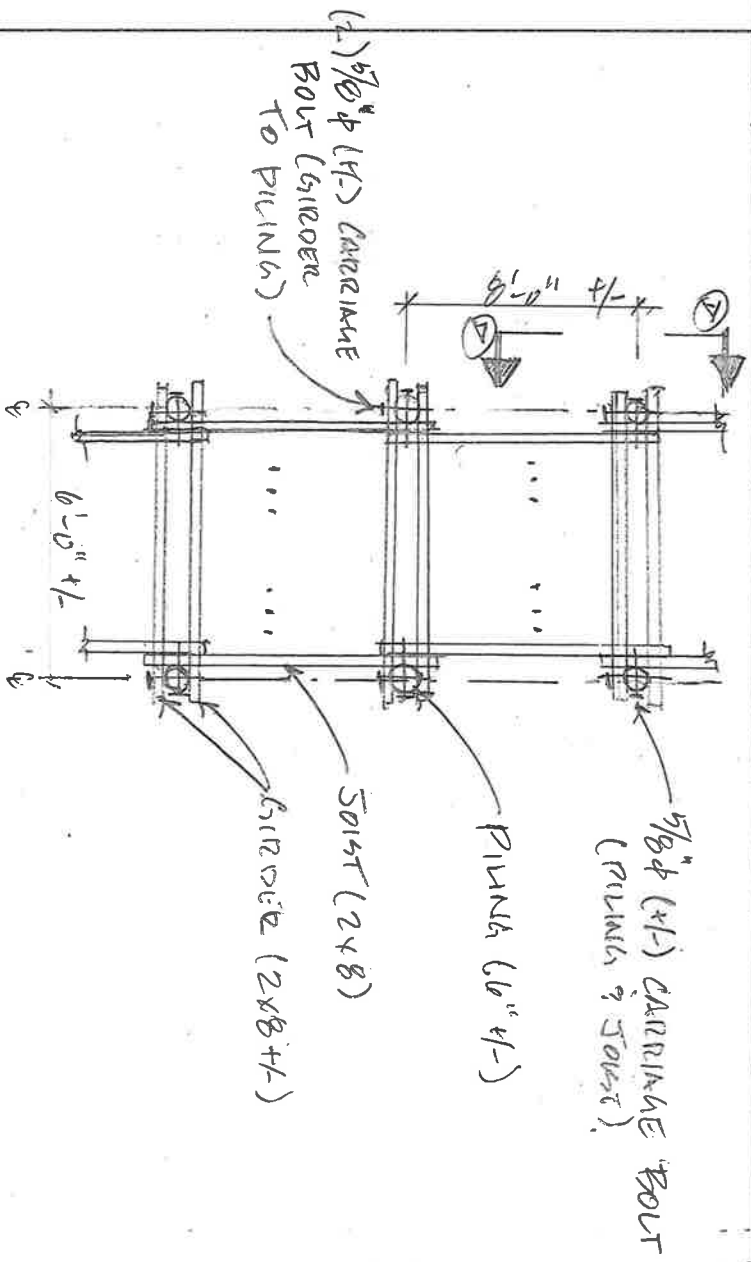
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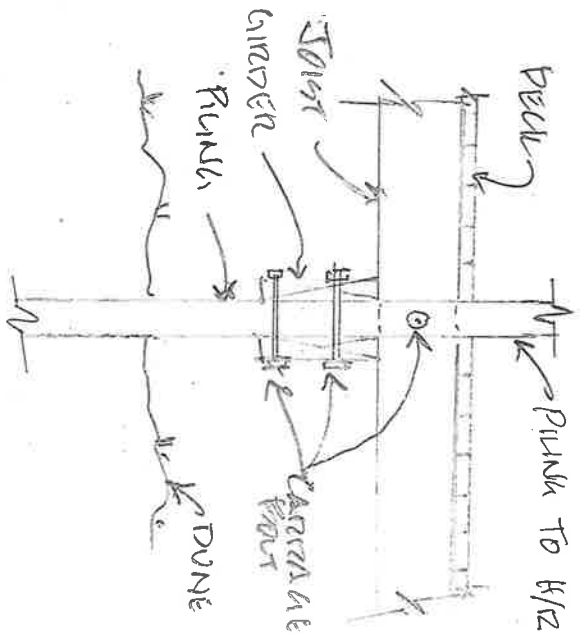
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38	Osceola	N	5	top & midrails in fair shape; hardware & connectors severely corroded on north side and overall in poor shape; girders cracking & splitting; decking in fair shape
39	Ozello	N	4	top& midrail in fair shape; hardware & connectors severely corroded & in poor shape; girders splitting; needs x-bracing; joists in decent shape
40	Pasco	N	5	west section w/o guardrail; top & mid rails in poor shape; decking in poor shape; 4x4 post system; very noticable sway; hardware & connectors in fair condition;



PLAN
(NTS)



SECTION A-A
(NTS)



Corroded Bolts and Nuts at Girder



Corroded Bolt Heads at Girder



Corroded Bolt Heads at Joist to Piling



Corroded Bolt Heads at Guardrail to Piling

FIGURE 2
Typical Corroded Connectors