
Audit of the Maintenance of the Bridges of Orange County



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Orange County, Florida**

www.occompt.com



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Mission

The mission of the Orange County Comptroller's Office is to serve the citizens of Orange County and our customers by providing responsive, ethical, effective, and efficient protection and management of public funds, assets, and documents, as specified in the Florida Constitution and Florida Statutes.

Vision

The vision of the Orange County Comptroller's Office is to be recognized as a highly competent, cohesive team leading the quest for continuing excellence in the effective safeguarding and ethical management of public funds, assets, and documents.



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OFFICE OF THE COMPTROLLER

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October 7, 2021

Jerry L. Demings, County Mayor
And
Board of County Commissioners

We have conducted an audit of the Orange County bridge maintenance program. The audit was limited to a review of the inspection and maintenance of County owned bridges. The period audited was January 2017 through December 2019.

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

As the report recommendations related to three different Departments, three separate responses have been included in this report. Only recommendation five relates to the Orange County Convention Center and the Parks and Recreation Division. As such, they are only responding to that recommendation. Public Works' response addresses all of the recommendations.

We appreciate the cooperation of County personnel from all three departments during the course of the audit.

Phil Diamond, CPA
County Comptroller

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Chris Testerman, Deputy County Administrator
Daren Gray, Deputy County Administrator
Joseph Kunkel, P.E., Director, Public Works Department
Lonnie Bell, Director, Community and Family Services Department
Mark Tester, Director, Orange County Convention Center
Matt Suedmeyer, Manager, Orange County Parks and Recreation Division

Why This Audit Is Important

Orange County is responsible for maintaining hundreds of County owned roadways and pedestrian bridges. Residents and visitors depend on the County to ensure these bridges are well maintained and safe for travel.

Although FDOT inspects bridges longer than 20 feet every two years, it is Orange County's responsibility to review these reports and make any necessary repairs to protect travelers. In addition to FDOT inspected bridges, Orange County is responsible for inspecting and maintaining pedestrian bridges and any bridges less than 20 feet long.

Bridge problems that are not detected or timely repaired affect the safety of pedestrians and motorists.

The Objectives of Our Audit

The objectives of the audit were to:

- Determine whether Public Works effectively managed the bridge maintenance program including inspection, repair, and maintenance of vehicle and pedestrian bridges;
- Determine whether pedestrian bridges maintained by the Orange County Convention Center and the Parks and Recreation Department were inspected, and repairs were timely performed; and,
- Ensure all major drainage structures were timely inspected.

What We Found

The Roads and Drainage Division Was Not Monitoring or Repairing 28 of 100 FDOT Inspected Bridges (Page 13)

After Public Works assigned bridge maintenance responsibilities to its Roads and Drainage Division in 2017, Roads and Drainage did not receive 28 of 100 bridge

inspection reports. As a result, the deficiencies associated with the 28 reports were never monitored or repaired.

Pedestrian Bridges Were Not Inspected by a Qualified Structural Engineer (Page 22)

Orange County has 21 pedestrian bridges that should be inspected by qualified structural engineers. These bridges are located at the Orange County Convention Center, within Orange County Parks or along roadways. Only three of the 21 pedestrian bridges are inspected by FDOT. There was no evidence that any of the remaining eighteen pedestrian bridges were inspected by qualified structural engineers. Additionally, issues identified on the FDOT inspections were not tracked or repaired by any Orange County Department.

Bridge Repairs Were Not Prioritized and Timely Completed (Page 14)

Without a structural engineer to prioritize bridge repairs, repairs were not timely completed. For a sample of 31 bridges, 81% were not evaluated by an engineer to prioritize repairs. The 31 FDOT bridge inspections reviewed included 177 separate issues that needed prioritization. Of the 177 issues, 92 had not been completed by 2020. Of the 73 issues corrected, 50% related to graffiti, clearing vegetation and replacing reflectors.

Bridge Repair Issues Were Not Accurately Documented (Page 18)

After inspections are received, bridge issues are listed on a Master Tracking Sheet. Master Tracking Sheet information was not accurately recorded. Of 159 issues we reviewed, 24 included incorrect repair status. Additionally, 16 were marked complete with no evidence of completion. Finally, 72 issues had other tracking issues, such as differences in completion dates.

Routine Maintenance Was Not Performed to Prevent Additional Repair Costs (Page 20)

Routine maintenance like removing graffiti, vegetative growth, and debris does not require specialized training. However, some maintenance identified in 2017 inspections had not been performed by January 2020. When routine maintenance is not performed increased repair costs can result.

Procedures for Field Assessments of Major Drainage Structures Were not Documented or Implemented Consistently (Page 25)

Public Works requires annual inspections of all major drainage structures. Without adequate documentation, inspections were performed inconsistently and documentation of the inspections was not maintained.

Written Procedures Have Not Been Developed for the Bridge Management Program (Page 26)

Public Works does not have written procedures for the bridge management program.

Overall Evaluation (Page 12)

Based on the results of our testing, Public Works did not appropriately oversee the bridge maintenance program during the audit period. We noted multiple areas for improvement in the Recommendations section of this report.

The Current Bridge Maintenance Environment

During the audit period, we identified a significant number of issues related to the bridge maintenance program. After we brought these issues to the attention of management, it addressed many changes that we recommended prior to the issuance of this report. We commend management for this proactive approach to correcting issues.

One specific change to highlight is the addition of a structural engineer dedicated to bridge maintenance. This engineer reviews each FDOT inspection, prioritizes bridge repairs based on the severity of issues, and establishes repair timelines.



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Background

Every day, Orange County residents and visitors travel on more than six hundred Orange County bridges and major drainage structures. These travelers rely on consistent bridge inspections, maintenance, and repairs to ensure bridge safety. Bridge inspections identify structural risks and other issues that should be addressed. Timely maintenance and repairs prevent deficiencies from increasing public safety risks and future repair costs.

The Federal Highway Administration (FHWA) developed bridge inspection program regulations as a result of the Federal-Aid Highway Act of 1968 that required the Secretary of Transportation to establish national bridge inspection standards (NBIS). The NBIS' primary purpose is to provide guidance for locating and evaluating bridge deficiencies to ensure public safety. Later, NBIS requirements were established for bridges greater than 20 feet on all public roads. The NBIS requires that bridges be inspected within 90 days of opening and at least every 24 months after that.

The Florida Department of Transportation (FDOT) is responsible for inspecting Orange County bridges that are longer than 20 feet. FDOT hires inspectors to inspect each bridge every two years¹. Although FDOT is responsible for inspecting these bridges, Public Works is responsible for performing recommended repairs. The FDOT inspection reports are sent to two separate Public Works divisions — the Engineering Division and the Roads and Drainage Division. Pedestrian bridges not built along or over a state highway and shorter bridges are inspected by Orange County. However, Orange County is not responsible for repairing and maintaining federal highway bridges, state-owned bridges, and private bridges, such as railroad bridges.

Roads and Drainage is responsible for tracking, performing, and hiring necessary contractors to perform repairs. Roads and Drainage lists the FDOT identified deficiencies and corrective actions on a Master Tracking Sheet (MTS) to track repair assignment and completion by in-house teams or outside contractors.

¹ Bridges with a sufficiency rating less than 60 must be inspected annually.



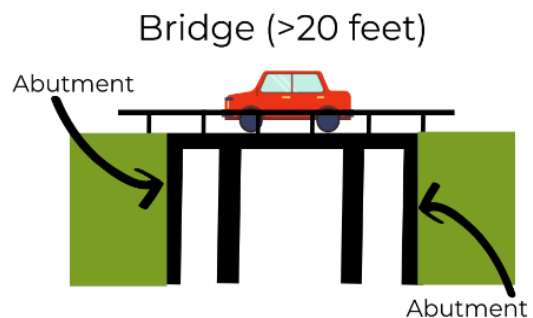
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A redacted excerpt from the January 2020 MTS is shown below:

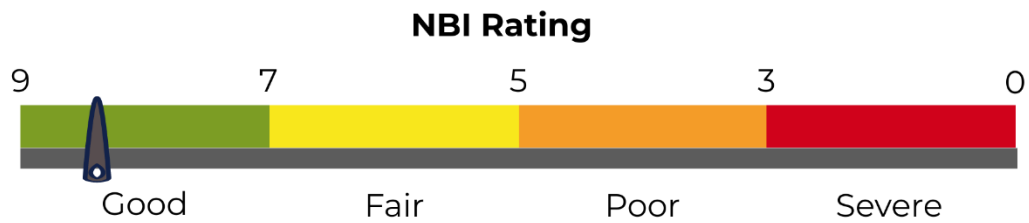
Bridge No: [REDACTED]		Structure Name: [REDACTED]					
Serial Number	Deficiencies	FDOT Inspection Date	Assigned To	Assigned Date	Completed Date	Remarks	
1	Properly attach the bridge number plaque to the south barrier over Abutment 1.	November 14, 2017	In House			In House Crew has not began work	
2	Remove vegetation on Bent 2, 3 and 6 caps.	November 14, 2017	In House			In House Crew has not began work	
3	Repair cracks in the caps at the top of both slope protections.	November 14, 2017	In House			In House Crew has not began work	
4	Install scour protection along the toe of the west slope protection.	November 14, 2017	In House			In House Crew has not began work	
5	Remove the turbidity barrier along Bent 2.	November 14, 2017	In House			In House Crew has not began work	
6	Repair the undermining along the south edge of the east approach slab.	November 14, 2017	In House			In House Crew has not began work	
7	Repair the undermining of the southeast approach sidewalk at approach slab transition.	November 14, 2017	In House			In House Crew has not began work	
8	Remove the graffiti throughout the structure.	November 14, 2017	Paintquest LLC		8/17/18	Complete	
Element	Deficiencies						
8099 PS Conc Slab	Repair the transverse cracks in the asphalt surfacing over the expansion joints.	November 13, 2019					
8290 Channel	Repair the undermining along the toe of the west slope protection.	November 13, 2019					
321 R/Conc Approach Slab	Repair the undermining along the south edge of the east and west approach slabs.	November 13, 2019					
234 R/Conc Cap	Remove vegetation on the bent caps.	November 13, 2019					
8396 Other Abutment Slope Pro	Repair cracks in the caps at the top of the east and west slope protections.	November 13, 2019					
Non-Structural Items	Deficiencies						
Approach Sidewalks	Repair the undermining of the southeast approach sidewalk at approach slab transition.	November 13, 2019					
Graffiti	Cover the graffiti throughout the structure.	November 13, 2019					

FDOT Bridge Inspection Standards

FDOT standards classify a structure as a bridge if it carries moving loads over an obstruction or depression using supports and, measures over 20 feet in length between the abutments. Pedestrian bridges built along or over state highways or roads also require FDOT inspection. FDOT inspections provide information regarding the structural soundness of bridges. As part of the inspections, bridge components are rated using the National Bridge Inventory (NBI) 0 to 9 rating scale. Inspectors rate each bridge's primary elements — deck, superstructure, and substructure.



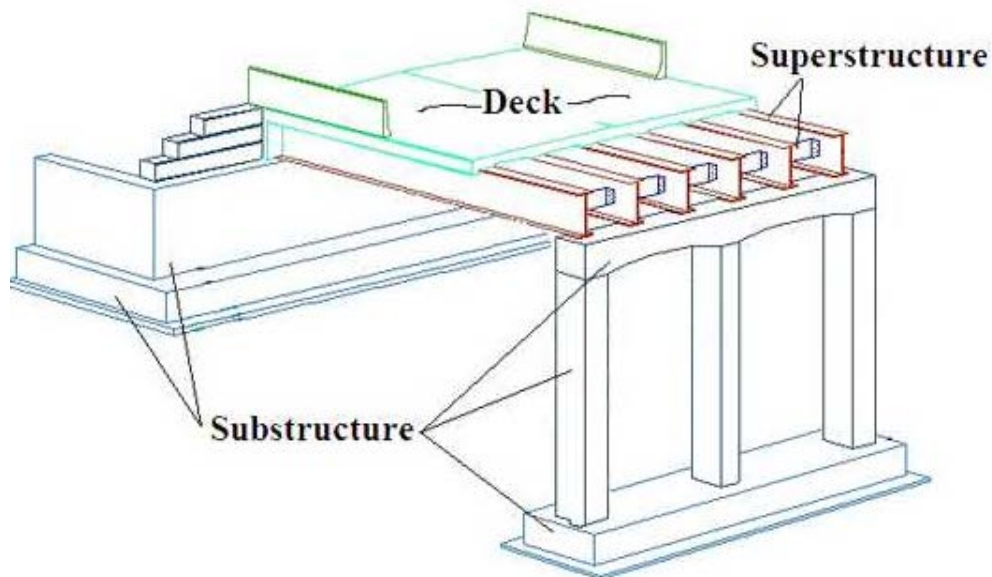
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Deck: The portion of the bridge that directly carries traffic.

Superstructure: The portion of the bridge that supports the deck and connects one substructure element to another.

Substructure: The portion of the bridge that supports the superstructure and distributes all bridge loads to below-ground bridge footings.

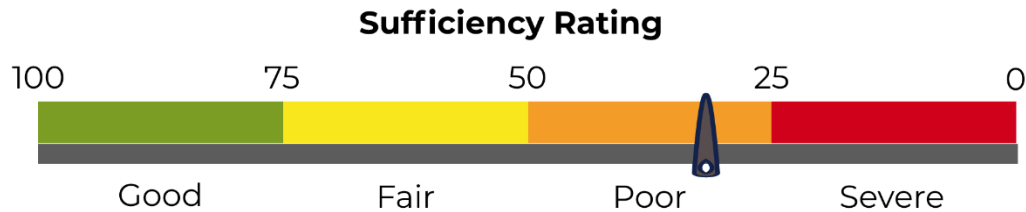




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Sufficiency Rating

The NBI ratings assigned to each of the three elements are used as part of the calculation of an overall sufficiency rating for the bridge. The sufficiency rating is a numerical rating between 0 and 100 with 100 representing the best rating.



A bridge sufficiency rating is a calculated numeric value used to indicate the sufficiency of a bridge to remain in service. However, given the many complex parts of a bridge, the sufficiency rating alone does not necessarily mean a bridge is safe or unsafe. Public Works uses the bridge sufficiency ratings, combined with other factors, to determine whether bridges should be repaired or replaced. Bridges with sufficiency ratings of less than 50% or with major structural issues are assigned to the bridge replacement program. As of March 2021, there were two Orange County bridges with sufficiency ratings less than 50 and four additional bridges with sufficiency ratings less than 65.

Orange County Bridges with Sufficiency Ratings Under 65

BRIDGE	ROADWAY	YEAR BUILT	SUFFICIENCY RATING
754005	Buck Road	1932*	36.7
754003	Bates Road	1962	41.9
754059	Wallington Drive	1961	53.7
754024	Harrell Road	1968	56.2
754078	Sun Vista Way	1988	59.1
754090	Alafaya Trail	1988	61.4

* Reconstructed in 1956

Condition State Rating

In addition to a bridge's overall sufficiency rating, each deficiency identified is listed on the FDOT inspection report. Deficiencies are assigned a Condition State (CS)



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rating from 1 (best) to 4 (worst)². One bridge could have multiple deficiencies reported with varying CS ratings. The CS rating could be used to help prioritize repairs.



In addition to the sufficiency rating, the Inspector determines whether the bridge is functionally obsolete or structurally deficient. According to FDOT, functionally obsolete means that the bridge design is outdated. For example, narrow shoulders, narrow lanes, or older traffic barriers that no longer meet current standards can make a bridge functionally obsolete. Functionally obsolete bridges should be scheduled for rehabilitation or replacement as budgets permit.³

Orange County currently has eight functionally obsolete bridges. (Shown Below)

Bridge	Year Built	Roadway	Sufficiency Rating
754005	1932*	Buck Road	36.7
754003	1962	Bates Road	41.9
754078	1988	Sun Vista Way	59.1
754158	2000	So Econ Trail	75.6
754027	1962	Kelvington Drive	76.6
754110	1998	Oak Ridge Road EB	78.6
754068	1981	Hoffner Avenue	79.3
754134	2003	Skyview Drive	81.8

* Reconstructed in 1956

Structurally Deficient means that the inspector has identified a deficiency in the deck, substructure, or superstructure with an NBI rating of 4 or less. Structurally deficient bridges may affect public safety or require a reduction in load capacity. The Buck Road Bridge was structurally deficient from 2015 to 2020 when repairs were completed so that it was no longer considered structurally deficient.

² Non-structural deficiencies are not assigned a CS rating.

³ [Florida Department of Transportation - Office of Maintenance Bridge Info \(fdot.gov\)](https://www.fdot.gov/maintenance/bridges/)

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Pedestrian Bridges

Pedestrian bridges are bridges that are only used by pedestrians, skaters, and bicycle riders. The County has 21 pedestrian bridges.

Pedestrian bridges built along or over State highways or roads require FDOT inspection. FDOT inspects these bridges on a 24-month cycle. Three of the 21 pedestrian bridges meet the criteria for FDOT inspection.

Eighteen Orange County pedestrian bridges are not inspected by FDOT. Thirteen of the eighteen are located in County parks or on trails. Four pedestrian bridges connect Convention Center concourses and local business partners. The remaining pedestrian bridge is alongside an FDOT-qualifying vehicular bridge.

Pedestrian Bridge Structure



4 Convention Center pedestrian bridges not inspected by FDOT

1 Public Works pedestrian bridge not inspected by FDOT

13 Parks pedestrian bridges not inspected by FDOT

3 Parks pedestrian bridges inspected by FDOT

Major Drainage Structures

Roads and Drainage is responsible for inspecting and monitoring the 528 major drainage structures that are less than 20 feet in length. Since these structures are less than 20 feet, they are not classified as bridges — even though they may function as bridges. All of these 528 Public Works major drainage structures are culverts. The FHWA recommends that all culverts be inventoried and periodically inspected.

Bridge Structures (< 20 feet)



Public Works Inventory Includes 528 Structures

The major drainage structures are divided between eight districts, overseen by four senior foremen. Roads and Drainage policies require an annual inspection of all major drainage structures maintained by the County.



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Audit Scope

The scope of the audit included all vehicle bridges, pedestrian bridges, and major drainage structures that Orange County is responsible for maintaining. The audit period was from January 2017 to December 2019.

Audit Objective

The objectives of the audit were to:

- Determine whether Public Works effectively managed the bridge maintenance program including inspection, repair, and maintenance of vehicle and pedestrian bridges;
- Determine whether pedestrian bridges maintained by the Orange County Convention Center and the Parks and Recreation Department were inspected, and repairs were timely performed; and,
- Ensure all major drainage structures were timely inspected.

Audit Methodology

To meet the audit objectives, we performed the following procedures:

- Identified Orange County bridges maintained by Public Works, Parks and Recreation, and the Orange County Convention Center.
- Determined whether all County bridges were inspected at appropriate intervals.
- Evaluated Roads and Drainage's accuracy in tracking and completing recommended corrective actions noted in the 2017 FDOT inspection reports for a sample of 31 bridges.
- Determined whether all major drainage structures were inspected at appropriate intervals.
- Determined whether all pedestrian bridges were inspected in accordance with industry best practices.



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Our office also contracted with a professional engineering firm (Engineer) to evaluate selected bridge reports for deficiencies that may endanger public safety. The Engineer reviewed FDOT inspection reports and performed limited inspections related to three bridges. The Bridge Inspection Reports that FDOT issued to the County in 2017 were used to identify deficiencies that had not been addressed by January 2020.

Overall Evaluation

Based on the results of our testing, Public Works did not appropriately oversee the bridge maintenance program during the audit period. We noted multiple areas for improvement in the Recommendations section of this report.

The Current Bridge Maintenance Environment

During the audit period, we identified a significant number of issues related to the bridge maintenance program. After we brought these issues to the attention of management, it addressed many changes that we recommended prior to the issuance of this report. We commend management for this proactive approach to correcting issues.

One specific change to highlight is the addition of a structural engineer dedicated to bridge maintenance. This engineer reviews each FDOT inspection, prioritizes bridge repairs based on the severity of issues, and establishes repair timelines.

1. All Bridge Inspections and Deficiencies Should Be Monitored and Addressed

The Florida Department of Transportation (FDOT) hires independent inspectors to inspect all Orange County bridges on public roads that are more than 20 feet long. The bridges must be inspected within 90 days after opening and at least every 24 months thereafter. The inspectors provide inspection reports that documents each deficiency, its severity, and recommended corrective actions. FDOT sends all bridge inspection reports to Public Works. Roads and Drainage then lists the deficiencies and corrective actions from FDOT inspection reports on the Master Tracking Sheet (MTS).

Inspection Reports Were Not Received by Roads and Drainage and Deficiencies Were Never Monitored or Repaired

The bridge maintenance program was assigned to the Roads and Drainage Division in 2017. Roads and Drainage then created the MTS. We performed testing to ensure that Roads and Drainage received all FDOT inspection reports. We compared the listing of 100 bridges that required inspection to the bridges listed on the MTS and identified 28 bridges that were missing from the MTS.

After discussing this issue with Roads and Drainage, we determined that 28 inspection reports were never received by Roads and Drainage. As a result, 28 of 100 Orange County bridges were not monitored or repaired by Roads and

Drainage until we advised the Division of these missing inspection reports. After we brought this issue to management's attention, Roads and Drainage requested the additional

28 of 100
Orange County bridges were
not monitored or repaired by
Roads & Drainage

bridge inspection reports from FDOT and added the 28 missing bridges to the MTS. We did not review the 28 missing bridge inspection reports. However, we did note that four of the bridges' sufficiency ratings were less than 80.

As part of our audit, we also compared specific repair issues included in the FDOT inspection reports to the issues listed on the MTS for 25 different bridges — a total

of 159 issues. We determined that 3 of the 159 issues were not included on the MTS. If all repair issues are not included on the MTS, then the omitted repairs will not be fixed.

Recommendation No. 1:

Roads and Drainage should:

- A) Maintain a complete inventory of all Orange County bridges that require inspection;
- B) Confirm that inspection reports are received every 24 months for all bridges that require inspection; and,
- C) Develop and implement procedures to ensure that all inspection repair issues are included on the MTS.

Management's Response:

Concur. See [Appendix B](#) for full response.

2. Bridge Repairs Should Be Timely Completed

FDOT bridge inspection reports list deficiencies related to each bridge's structural and nonstructural components. Deficiencies are assigned Condition State (CS) ratings on the inspection report⁴. The CS ratings measure each problem's severity. These ratings should be used in conjunction with other bridge health indicators to determine repair priorities. For bridges that FDOT repairs, it uses a priority ranking system based on a number of factors to establish repair deadlines for each deficiency. FDOT's recommended repair completion times are:

Priority Ranking	Priority Ranking Description	Work Completion Guidelines
1	Emergency	60 days
2	Urgent	180 days
3	Routine	365 days
4	Informational	None

⁴ Non-structural deficiencies are not assigned a CS rating.

In contrast, Roads and Drainage did not have a priority ranking process for repairs because it did not have structural engineering expertise to prioritize and assign repair deadlines during the audit period.

We reviewed a sample of 177 issues reported on the 2017 FDOT inspections for 31 Orange County bridges to determine whether repairs were evaluated. As of May 2020, 25 of 31 bridges (81%) had not been evaluated by an engineer to prioritize needed repairs. Five of the bridges reviewed, were evaluated by an external engineering firm to prioritize repairs.⁵

An additional four bridges — not included in our sample — were also sent to an external engineering firm to prioritize repairs. In total, during the two years after inspection only nine of the 100 bridges were evaluated by an engineer to prioritize repairs.

{ **81%** of sampled bridges had not been evaluated for work prioritization as of May 2020 }

Adoption and adherence to a formalized repair process, including priority rankings with repair deadlines should be included on the MTS. Management should periodically review repairs to ensure timely completion.

Bridge Repairs

Some repairs made did not appear to address inspection report deficiencies. For example, two bridges had significant deficiencies based on sufficiency ratings lower than 50. One bridge has been below 50 since 2011 and the other since 2015. The County paid a firm \$181,535 in 2020 to complete needed repairs on these two bridges. Inspections performed in 2020 — after the repairs — showed one bridge had no change in sufficiency rating, but was no longer classified as structurally deficient because its NBI rating improved. The other bridge showed no improvement in ratings.⁶

⁵ One bridge in our sample of 31 bridges was demolished

⁶ Bates Road sufficiency rating of 41.9 and Buck Road sufficiency rating of 36.7 in September 2020

From the sample of 177 deficiencies on 31 bridges, we noted that there was evidence that 73 of the 177 issues were corrected between 2017 and January 2020. However, of the 73 corrected repairs, nearly 50% related to minor issues like graffiti, clearing vegetation, removing debris, and replacing reflectors. The following chart shows the CS rating for the 92 repairs that were never completed, of the 177 issues sampled⁷:

Repairs Not Completed

By CS Rating, for issues noted during 2017-2018 inspections



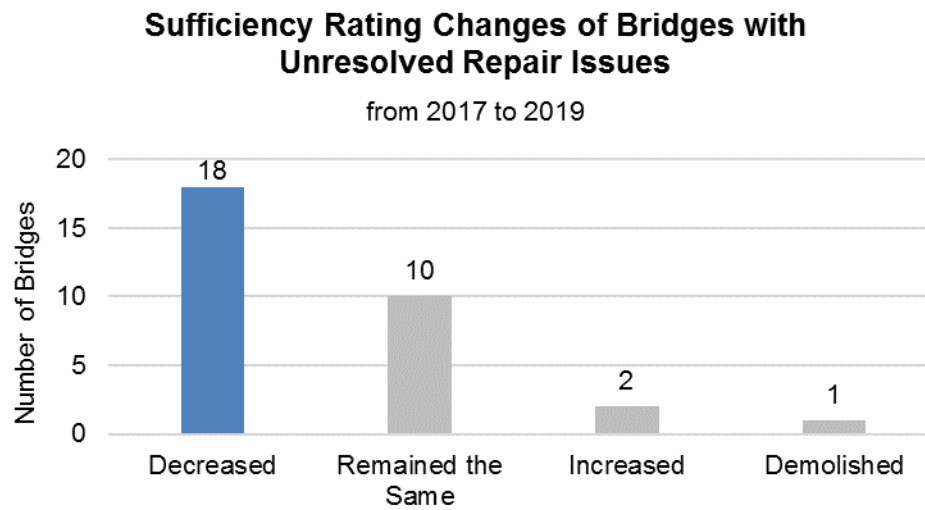
The Public Works Department has contracts to address graffiti and guardrail issues. However, the Public Works Department did not (and does not) have contracts for completing significant bridge repairs. The lack of contracts contributed to repair delays. According to management, a term contract was submitted to Procurement in May 2019. However, a contract has not yet been awarded.

Declining Sufficiency Ratings

FDOT inspectors assign sufficiency ratings to bridges. If repairs are not made as recommended, sufficiency ratings will likely decline over time. In fact, 18 of the 30⁸ bridges with unresolved issues showed sufficiency rating decreases between the 2017 and 2019 inspections. The chart below shows the impact of repair delays.

⁷Four of the remaining 12 related to a demolished bridge and the other eight we could not determine whether the corrective action was completed.

⁸ One bridge in our sample of 31 bridges was demolished



In addition, timely repairs could avoid increased repair costs, reduce potential safety risks to Orange County citizens, and help maintain bridge structural integrity.



This picture shows joint deterioration that has worsened and caused exposure of reinforcement due to failed repairs.

Source: Engineer Report, 2020.

Recommendation No. 2:

The Roads and Drainage Division should:

- A) Develop a system for prioritizing necessary repairs for deficiencies identified on inspections;
 - B) Implement procedures to ensure that necessary repairs are completed in a timely manner;
 - C) Include priority rankings and repair deadlines for each applicable bridge deficiency in the master tracking sheets (MTS);
 - D) Procure contracts to ensure necessary bridge repairs are completed in a timely manner; and,
 - E) Implement periodic management reviews of all outstanding repairs to ensure structural repairs are timely completed.
-

Management's Response:

Concur. See [Appendix B](#) for full response.

3. Bridge Deficiency Documentation Should Be Improved

After FDOT bridge inspections are received, each deficiency is added to the MTS. Based on the scope of repair, Roads and Drainage then determines whether the repairs can be completed in-house or if a contractor with additional expertise should be hired based on the scope of the repairs. Roads and Drainage uses work orders to track in-house repairs and delivery orders to track contractor repairs. Work start and end dates for repairs are recorded in the MTS. In addition, photographs evidencing repair completion are attached to the work or delivery orders.

We selected a sample of 25 bridges. The 2017 inspections showed a total of 159 issues associated with these bridges. We compared the Roads and Drainage's

MTS to supporting documentation for each of the 159 issues and identified the following discrepancies on the MTS:

- In 24 instances, incorrect repair statuses were listed;
- In 72 instances, other tracking issues existed, such as differences in recorded completion dates.
- In 16 instances, issues listed on the MTS were marked as “complete” although there was no photographic evidence of completion.

In addition to the repair status discrepancies, we determined that two separate MTS’s were used by employees to track bridge repair status. We compared the two separate MTS and found the following differences:

- Inconsistent completion statuses were shown for 15 issues.
- Differing work start dates, work end dates, or repair status comments were shown for 17 issues.

These inaccuracies can result in inefficient use of County resources, as well as delayed repairs. Effective tracking of bridge deficiencies is crucial to the timely completion of repairs and efficient use of County resources.

Recommendation No. 3:

Roads and Drainage should:

- A) Ensure bridge maintenance issues are tracked on a single MTS;
- B) Develop and implement additional procedures to ensure that Master Tracking Sheet data is recorded accurately; and,
- C) Periodically review MTS data to ensure data is complete and accurate.

Management’s Response:

Concur. See [Appendix B](#) for full response.

4. Routine Maintenance Should Be Performed to Prevent Additional Repair Costs

During our review, we identified several deficiencies noted on inspections that could be recurring issues. These issues included graffiti, vegetation growth, and debris.



After reviewing the 2017 and 2019 inspection reports for 31 bridges, we identified 23 recurring issues on both these inspection reports. Only 14 of the 23 issues had been addressed before the next inspection.

The following MTS excerpt shows an inspection performed on September 23, 2017 with recurring issues. These recurring issues included removing dirt and debris from deck top, removing dirt and debris from expansion joints, removing vegetation from weep holes and joints. Although these repairs do not require specialized training or expertise, the status as of January 2020 was “Crew has not started work.”

Bridge No:	Structure Name:					
Serial Number	Deficiencies	FDOT Inspection Date	Assigned To	Assigned Date	Completed Date	Remarks
1	Remove dirt and debris from deck top.	September 23, 2017	In House			Crew has not started work
2	Repair the spall/delamination on the south deck fascia at End Bent 1.	September 23, 2017	In House			Crew has not started work
3	Remove the dirt and debris from the expansion joints.	September 23, 2017	In House			Crew has not started work
4	Repair the spall/delamination on the southwest wingwall at the barrier at End Bent 1.	September 23, 2017	In House			Crew has not started work
5	Remove vegetation from weep holes and joints on the slope protection at each end bent.	September 23, 2017	In House			Crew has not started work
6	Repair delamination on the left barrier at End Bent 1.	September 23, 2017	In House			Crew has not started work
7	Replace lower right horizontal fence rail at End Bent 1.	September 23, 2017	In House			Crew has not started work

In addition, the professional engineering firm contracted by our office (Engineer) inspected three bridges with recurring issues. These included clogged drains vegetation growth, and debris accumulation. The Engineer noted elements on all three inspected bridges had further deteriorated because routine maintenance was not performed.

{ The Engineer noted elements on all three inspected bridges had further deteriorated because **routine maintenance was not performed.** }

Clogged drainage structures prevent water from properly draining off bridges. This creates water puddles on bridges. These puddles can allow water to permeate the concrete and promote corrosion of bridge reinforcements. Puddles can also create hydroplaning risks for traffic.

In light of these issues, routine bridge deck maintenance should be regularly performed by Roads and Drainage.

Expansion Joint Issues

Bridge expansion joints permit concrete to expand and contract due to temperature changes. These joints frequently experience recurring issues and typically have short service lives of about two years. Service lives can be drastically shortened when joints become filled with debris or soil, or experience adhesion failure due to natural bridge shifting.

Therefore, performing routine maintenance will allow the County to avoid increased repair costs, reduce safety risks posed to citizens, and enhance bridge health.



Source: Engineer Report, 2020.

Recommendation No. 4:

The Roads and Drainage Division should regularly perform routine maintenance on the bridges of Orange County.

Managements' Response:

Concur. See [Appendix B](#) for full response.

5. County Departments Should Develop Bridge Maintenance Programs that Include Inspections by a Qualified Structural Engineer

Orange County is currently responsible for maintaining 21 pedestrian bridges. Four are located at the Orange County Convention Center, 16 are located within parks or on pedestrian trails maintained by Parks, and one is owned by Public Works.



Source: Orange County Convention Center-West Concourse Pedestrian Bridge (www.occc.net)

Only three of the bridges meet the requirements for FDOT inspection. All three are maintained by Parks. As such, these three bridges are inspected every two years through the FDOT bridge inspection program. However, at the time of audit, there

was no proof that any of the remaining 18 pedestrian bridges have been inspected by a structural engineer. As such, only the three pedestrian bridges that are inspected by FDOT are being inspected.

The Engineer performed a general safety assessment of one pedestrian bridge that FDOT is not responsible for inspecting. The pedestrian bridge was not being maintained by any county department.



Source: Engineer Report, 2020.

During the inspection, the Engineer identified several issues with the pedestrian bridge. One issue was expansion joint sealant issues⁹. This created a dangerously wide opening for cyclists and others, as shown on the right.



As noted above, three of the pedestrian bridges are inspected by FDOT. However, the issues noted during these FDOT inspections are not tracked or addressed by any County department. Unaddressed issues identified on FDOT inspections included joint sealant failures, loose and improperly secured railings, exposed rebar, and others.

⁹ Expansion joint sealants help hold parts of the bridge together and allow contraction and expansion of bridge concrete as temperatures change.

The County does not have a pedestrian bridge management program. Although Parks and Convention Center bridges are inspected by employees and routine maintenance is performed, industry best practices state that a sound pedestrian bridge management program should include structural inspections by a qualified engineer on a regular cycle¹⁰ to:

- Ensure public safety and structural capacity;
- Protect public investment;
- Support allocation of sufficient resources; and,
- Effectively schedule maintenance or replacement.

Routine inspection of pedestrian bridges by a qualified structural engineer is critical for public safety and to protect County taxpayers from increased repair costs.

After discussing these issues with Convention Center management, three of the four Convention Center bridges were inspected in May 2021.¹¹ The inspection firm stated in its report that, "...These are simple repairs to some key deficiencies which would have exponential reconstruction cost consequences if not addressed in the immediate timeframe." As Orange County does not have a contract in place for needed repairs, Convention Center management is actively working to hire a firm to fix the bridges. Additionally, Parks hired an Engineering firm in August 2021 to inspect all ten bridges not currently inspected by FDOT.

Recommendation No. 5:

The appropriate Orange County Departments should:

- A) Review and address pedestrian bridge deficiencies noted on Florida Department of Transportation inspections;
 - B) Develop a comprehensive pedestrian bridge management program; and,
 - C) Ensure all pedestrian bridges are regularly inspected.
-

¹⁰ FDOT does not currently have requirements for inspecting pedestrian bridges that are not built along or over State highways or roads.

¹¹ The remaining bridge is less than five years old and will be inspected when the bridge is five years old.

Management's Response:

Concur. See [Appendix B](#), [Appendix C](#), and [Appendix D](#) for full response

6. Procedures for Field Assessments of Major Drainage Structures Should Be Improved

According to Department procedures, a field assessment of all major drainage structures must be performed annually.

During these field assessments, employees are directed to look for:

- Broken/damaged pipes and/or other structures;
- Overgrown vegetation around inlet/outlet pipes that may restrict water flow; and,
- Sediment blocking water flow through the pipes.

All field assessments are documented in reports that include:

- Identification of structures inspected;
- Field assessment photographs;
- Structure status;
- Required maintenance or repair work status; and,
- Photographs taken after service is performed.

The Department has divided the County into eight different maintenance districts. Each district has implemented different procedures for documenting these assessments because adequate written procedures are not available. For example, half the districts only maintained one year of inspection reports. In addition, some assessment photos were either omitted or included inaccurate timestamp dates. For example, one district's 2020 inspection



Source: Public Works Major Drainage Structure Report, 2019.

report included 2019 timestamped photographs. Without current photographs, we could not verify that the 2020 inspections were actually performed. We also noted one 2020 assessment photograph was a google maps image from 2018 and was not taken during a field assessment.

Due to the Department's lack of proper written procedures, documentation requirements and inspection procedures were applied inconsistently. Inconsistent implementation and reporting will make it more difficult to confirm that all structures were properly and timely inspected. As a result, additional drainage structure problems could develop resulting in increased repair costs or public safety concerns.

Recommendation No. 6:

Public Works should enhance written procedures for inspecting major drainage structures to include inspection documentation and record retention requirements.

Management's Response:

Concur. See [Appendix B](#) for full response.

7. Written Procedures Should Be Established To Monitor and Maintain the Bridge Management Program

Roads and Drainage was assigned the bridge management program in 2017. After the transition, Roads and Drainage had significant staff turnover. Due to the loss of institutional knowledge and lack of written procedures, Roads and Drainage had to construct a bridge management program. However, the bridge management program does not document procedures for bridge monitoring and repair.

This report includes numerous issues relating to bridge maintenance. Each of those issues might have been prevented if written procedures were developed as a guide for employees in properly administering the bridge management program.

In order to ensure bridge maintenance is handled consistently and within applicable deadlines, Roads and Drainage procedures should be documented and provide guidance on:

- Requirements for the review and documentation of issues identified in FDOT bridge inspection reports.
- Responsibility and requirements for the tracking of deficiencies, maintenance, and repairs.
- Responsibility for determination of in-house work versus work requiring contract bridge repairs.
- Deadlines for the completion of maintenance and repairs.

Recommendation No. 7:

The Roads and Drainage Division should establish written procedures for the inspection, repair, and maintenance of County bridges.

Management's Response:

Concur. See [Appendix B](#) for full response.



ACTION PLAN

NO.	RECOMMENDATIONS	MANAGEMENT'S RESPONSE		
		CONCUR	PARTIALLY CONCUR	DO NOT CONCUR
1.	Roads and Drainage should:			
A)	Maintain a complete inventory of all Orange County bridges that require inspection;	✓		
B)	Confirm that inspection reports are received every 24 months for all bridges that require inspection; and,	✓		
C)	Develop and implement procedures to ensure that all inspection repair issues are included on the MTS.	✓		
2.	The Roads and Drainage Division should:			
A)	Develop a system for prioritizing necessary repairs for deficiencies identified on inspections;	✓		
B)	Implement procedures to ensure that necessary repairs are completed in a timely manner;	✓		
C)	Include priority rankings and repair deadlines for each applicable bridge deficiency in the master tracking sheets (MTS);	✓		
D)	Procure contracts to ensure necessary bridge repairs are completed in a timely manner; and,	✓		
E)	Implement periodic management reviews of all outstanding repairs to ensure structural repairs are timely completed.	✓		
3.	Roads and Drainage should:			
A)	Ensure bridge maintenance issues are tracked on a single MTS;	✓		
B)	Develop and implement additional procedures to ensure that Master Tracking Sheet data is recorded accurately; and,	✓		
C)	Periodically review MTS data to ensure data is complete and accurate.	✓		
4.	The Roads and Drainage Division should regularly perform routine maintenance on the bridges of Orange County.	✓		
5.	The appropriate Orange County Departments should:			
A)	Review and address pedestrian bridge deficiencies noted on Florida Department of Transportation inspections;	✓		



ACTION PLAN

NO.	RECOMMENDATIONS	MANAGEMENT'S RESPONSE		
		CONCUR	PARTIALLY CONCUR	DO NOT CONCUR
B)	Develop a comprehensive pedestrian bridge management program; and,	✓		
C)	Ensure all pedestrian bridges are regularly inspected.	✓		
6.	Public Works should enhance written procedures for inspecting major drainage structures to include inspection documentation and record retention requirements.	✓		
7.	The Roads and Drainage Division should establish written procedures for the inspection, repair, and maintenance of County bridges	✓		



Bridges of Orange County Inspected by FDOT in 2021			
Roadway	Year Built	Sufficiency Rating	Designation
Buck Road	1932	36.7	Functionally Obsolete
Bates Road	1962	41.9	Functionally Obsolete
Wallington Drive	1961	53.7	
Harrell Road	1968	56.2	
Sun Vista Way	1988	59.1	Functionally Obsolete
Alafaya Trail	1988	61.4	
Narcoossee Road	1989	70	
Narcoossee Road	1989	70	
Boggy Creek Road	2019	70	
Moss Park Road	2002	74.1	
Egret Way	1961	75	
Elba Way	1961	75	
Moss Park Road	1988	75.4	
John Young Pkwy SB	1993	75.5	
So Econ Trail	2000	75.6	Functionally Obsolete
John Young Pkwy NB	1993	76.5	
Kelvington Drive	1962	76.6	Functionally Obsolete
University Blvd	1987	76.6	
Dean Road	1989	76.6	
Hiawassee Road	1996	77.2	
Oak Ridge Road WB	1972	77.5	
4th Street	2006	78.4	
Oak Ridge Road EB	1998	78.6	Functionally Obsolete
Sawgrass Pl. Blvd.	2006	78.9	
Horatio Ave	1971	79	
CR-545 / Avalon Rd	1978	79	
Hoffner Avenue	1981	79.3	Functionally Obsolete
John Young Pkwy SB	1989	80.2	
Forsyth Road	1975	80.8	
Landstreet Road	1971	81	
Chase Road	1985	81.3	
Destination Pkwy	2009	81.4	
Town Ctr. Blvd. EB	1999	81.6	



Bridges of Orange County Inspected by FDOT in 2021			
Roadway	Year Built	Sufficiency Rating	Designation
Town Ctr. Blvd. WB	1999	81.6	
Town Center Blv EB	1999	81.6	
Town Center Blv WB	1999	81.6	
Skyview Drive	2003	81.8	Functionally Obsolete
Boggy Creek Rd NB	2020	83	
Boggy Creek Road	2012	83	
Taft-Vineland Road	1971	84.2	
Curry Ford Road	1980	85.5	
Clapp Simms Duda	1961	87.5	
Constantine Street	1974	88.8	
L. B. McLeod Road	1960	88.8	
Fort Christmas Rd	1982	90.4	
OLD WINTER GARDEN	1990	91.2	
Landstar Blvd.	1984	91.4	
Daryl Carter Pkwy	2013	91.9	
Dean Service Road	1989	92	
John Young Pkwy NB	1989	92.2	
Old Cheney Hwy	1987	92.7	
J. Lawson Blvd.	2004	93.1	
John Young Pkwy NB	1989	93.2	
Chickasaw Trail	1997	93.3	
University Blvd EB	1987	94.3	
Apopka-Vineland Rd	2004	94.8	
Calloway Drive	2004	94.9	
Curry Ford Road	1980	95	
Howell Branch Road	1983	95	
John Young Pkwy SB	2019	95	
John Young Pkwy NB	2019	95	
Hiawassee Rd	2002	95.1	
University Blvd WB	1987	95.3	
Town Center Blvd.	1991	95.3	
Town Center Blvd.	1991	95.3	
WB Wetherbee Road	1991	95.4	
CR-527 SB	2000	95.6	



Bridges of Orange County Inspected by FDOT in 2021			
Roadway	Year Built	Sufficiency Rating	Designation
Central FI Pkwy EB	1989	96	
Chickasaw Trail	1981	96.2	
Lake Pickett Road	1983	96.2	
W. Entrance Dr.	2003	96.3	
John Young Pkwy SB	1989	96.4	
Drake Drive	2004	96.4	
EB Wetherbee Road	2010	96.4	
Dean Road	1989	96.5	
CR-527 NB	2000	96.6	
CR-527 NB	2003	96.6	
CR-527 SB	1981	96.6	
Central FI Pkwy WB	1987	96.9	
Conroy Winderm. Rd	1992	97.1	
Wetherbee Road	2008	97.1	
Taft-Vineland Road	2018	97.3	
CR-527 SB	2018	97.4	
CR-527 NB	2020	97.4	
CR-532 (Nova Road)	2003	97.5	
Taft-Vineland WB	2020	97.7	
Overland Road	1984	97.9	
Econlockhatchee Tr	2003	98	
Riverside Park Rd	2002	98	
Dean Road NB	1995	98.1	
Dean Road SB	1995	98.1	
Conroy Winderm. Rd	1992	98.2	
Bridgeway Blvd.	1999	98.7	
Thorpe Road	2011	99	
Fort Christmas Rd	1979	99.3	
Taylor Creek Road	2011	99.8	
W. Entrance Dr.	2003	99.9	
Campo Way	2010	100	
Pembroke Drive	1999	100	
Destination Pkwy	2019	100	
Destination Pkwy	2019	100	



Bridges of Orange County Inspected by FDOT in 2021			
Roadway	Year Built	Sufficiency Rating	Designation
Destination Pkwy WB	2013	100	
Destination Pkwy EB	2013	100	
Taft-Vineland Road	2011	100	



Interoffice Memorandum

September 27, 2021

TO: Wendy Kittleson, Deputy Director of County Audit

FROM: Joseph C. Kunkel, P.E., Director, Public Works Department *Jose C. Kunkel*

SUBJ: **Response Memorandum - Report on Audit of
Public Works Department's Bridge Maintenance and Repair Program**

In response to the audit conducted by the Orange County Comptroller's Office of the Maintenance of the Bridges of Orange County for the period of January 2017 to December 2019, the Roads & Drainage Division (R&D) concurs with all seven recommendations provided.

Throughout the audit process, as well as prior to 2017 and since completion of the audit, the safety of our bridge structures for vehicular and pedestrian traffic has been paramount. We at Public Works believe it is important to clearly provide this reassurance to our citizens. We also believe that the additional information and clarifications provided by this Response Memorandum allow us to show our commitment to bridge safety.

We have delineated our comments to address items in the Background Section and the Recommendations for Improvements.

BACKGROUND SECTION

In the Background section of this report, there is no mention of the County's Bridge Maintenance and Repair Program history before 2017. Therefore, it is important to consider the following points in the "Background Section" of this report:

- *The bridge program first came to R&D in late 2017, where 72-Comprehensive Inventory Data Reports (CIDR) were provided to R&D by the PW-Engineering Division (Engineering). At that time, R&D started to develop a monitoring program and initiated repairs to the identified deficiencies on the 72-CIDR's.*
- *Prior to late 2017, all bridge reports were reviewed by staff engineers in Engineering. Operation and maintenance activities or repairs were sent to R&D or Traffic Engineering (TE) for completion.*
- *Prior to 2017, R&D carried out routine, non-structural bridge repair items. These non-structural repair items include cleaning, pressure washing, caulking, vegetation removal, crack repairs, graffiti removal, painting, and small concrete work using an in-house pipe crew/bridge crew. As such, a separate budget account line was not designated. These operation and maintenance activities were charged to the appropriate maintenance unit and/or crew.*
- *In view of the extent of structural and non-structural bridge repair items presented in the 72-CIDR's, R&D requested in 2018 a "Bridge Maintenance and Repairs" account line to be included in the budget. This "Bridge Maintenance and Repairs" account line*



September 27, 2021

TO: Wendy Kittleson, Deputy Director of County Audit
FROM: Joseph C. Kunkel, P.E., Director, Public Works Department
SUBJ: Response Memorandum - Report on Audit of
Public Works Department's Bridge Maintenance and Repair Program

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was first introduced into the FY 2019/2020 budget (1004-072-2912), with one (1) million dollars allocated into it. The "Bridge Maintenance and Repairs" account line budget was subsequently increased to two (2) million dollars for FY 2020/2021. It was requested to be increased to three (3) million dollars for FY 2021/2022, which confirms R&D's commitment and continued efforts once this standalone Bridge Maintenance and Repair program was implemented.

- In addition to the FDOT CIDR's, R&D staff performs in-house bridge inspections to identify any additional maintenance needs and put these on schedule for repairs.
- In the Sufficiency Rating section of the background section on Page 7, the report states: "Structurally Deficient means that the Inspector has identified a deficiency in the deck, substructure, or superstructure with an NBI rating of 4 or less. Structurally deficient bridges may affect public safety or require a reduction in load capacity. The Buck Road Bridge was structurally deficient from 2015 to 2020 when repairs were completed so that it was no longer considered structurally deficient." For clarification purposes, it should be noted that FDOT defines that these bridges should undergo a series of repairs or replacements **within the next six years**. The Buck Road Bridge repairs were completed in 2020 and was no longer considered structurally deficient. Hence, Orange County Public Works completed the repairs within the time frame recommended by FDOT. Also, the NBI rating improved from poor (4) to fair (5). Additionally, Orange County Public Works is at 60% on the construction documents to replace this bridge.
- In the Overall Evaluation section, Page 10, we believe the following statement provides clarity: **Currently, more than 90% of all Orange County bridges (104-vehicular bridges and 3-Parks & Recreation pedestrian bridges) inspected by FDOT are in a good (NBI rating of 6 or 7) or better NBI rating condition meeting FDOT bridge performance standards. FDOT bridge performance standard target is to have at least 90 percent of bridges maintained by the owner achieve an overall NBI rating of 6 or higher.**
- Also, in the Overall Evaluation section, Page 10, it is prudent to separately identify the obligations and responsibilities of each Department/Division's, as shown below:

Bridge Type	Responsible Department/Division
Vehicular Bridges	PW-R&D
Three (3) Park Pedestrian Bridges that cross State highways	Combined OC-Parks & Recreation and PW-R&D
Non-FDOT inspected Convention Center Pedestrian bridges	OC-Convention Center
Non-FDOT inspected Other Pedestrian Bridges	OC-Parks & Recreation
Major Structures (non-bridge items)	PW-R&D



September 27, 2021

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Public Works Department's Bridge Maintenance and Repair Program

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RECOMMENDATIONS FOR IMPROVEMENTS:

Recommendation No. 1

Roads & Drainage concurs

Please note PW-Engineering always had CIDR files stored in the common share drive (R:) even before this program was transferred to the R&D Division. PW-Engineering always maintained the entire bridge inventory electronically, and routine maintenance was performed by R&D and TE on bridges throughout the County.

Moreover, a structural engineer joined R&D in April 2020. R&D's structural engineer reviews each FDOT Inspection, prioritizes bridge repairs based on the severity of issues, and establishes repair timelines. He maintains the Master Tracking Sheet (MTS), and enters all repair and maintenance records into the MTS.

Recommendation No. 2

Roads & Drainage concurs

As mentioned above, a structural engineer is now part of the R&D bridge team and he has implemented most of these recommendations.

The Roads and Drainage Division is committed to the following:

- A) Continue to enhance and develop a system for prioritizing necessary repairs for deficiencies identified on inspections;*
- B) Continue to enhance and implement procedures to ensure that necessary repairs are completed in a timely manner;*
- C) Continue to enhance priority rankings and repair deadlines for each applicable bridge deficiency in the master tracking sheets (MTS);*
- D) Procure specific contract(s) for bridge repairs to ensure necessary bridge repairs are completed in a timely manner; and,*
- E) Enhance periodic management reviews through quarterly meetings to discuss all outstanding repairs and ensure structural repairs are timely completed.*

Moreover, for clarity, the content of the report should add the following statement: "R&D schedules repairs on time using judgment based on the engineering practices, principles, resources availability, budget, and safety. All bridges in the County are safe for travelers as PW-Engineering provides evaluation and guidance on each CIDR received by the County."

In addition, it should be pointed out that R&D has been actively developing comprehensive scopes to procure a bridge repair term contract and a bridge inspection services contract to support our Bridge Maintenance Program. This effort has proven to be very challenging in order to incorporate all needed technical aspects of bridge maintenance. In the meantime, bridge repairs are actively accomplished through other available procurement means, such as three (3) quotes process, P-Card purchases, individual bids and available services through existing term contracts.



September 27, 2021

TO: Wendy Kittleson, Deputy Director of County Audit
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Recommendation No. 3
Roads & Drainage concurs

As described in the exit meeting, R&D now has a structural engineer on board, and he has been and will continue to complete these recommendation items. He is actively following established procedures to consistently comply with these recommendations.

Recommendation No. 4
Roads & Drainage concurs

R&D concurs with the recommendation, but wishes to clarify that even prior to 2017, R&D carried out routine, non-structural bridge repair items, such as cleaning, pressure washing, caulking, vegetation removal, crack repairs, graffiti removal, painting, and small concrete work using an in-house pipe crew/bridge crew.

*Despite existing manpower constraints, R&D is timely using available in-house staff and crews to perform bridge maintenance work and minor non-structural repairs. All other maintenance work that cannot be achieved through in-house crews is outsourced to ensure that the deficiencies and pro-active measures are completed as soon as planned. Our commitment under recommendation No. 4 is: **The Roads and Drainage Division will continue to regularly perform routine maintenance on the bridges of Orange County.***

Recommendation No. 5
Roads & Drainage concurs

Recommendation No. 6
Roads & Drainage concurs

Along with the NPDES MS4 requirement, R&D is developing an evaluation component to meet the recommendations of this section.

Recommendation No. 7
Roads & Drainage concurs

R&D now has a structural engineer on board, and he is instructed to follow the guidelines outlined in these recommendation items.

In closing, we agree that the maintenance work-related procedures for bridges that were developed during the audit period needed to include additional details to adequately document our maintenance activities. We believe that through our experiences during the audit period, the addition of dedicated staff, and the input and assistance of the audit team, we now have a sound comprehensive bridge program.

JCK/jo

cc: Eduardo Avellaneda, P.E., Manager, Roads & Drainage Division
Maricela Torres, P.E., Assistant Manager, Roads & Drainage Division
Hitesh Barde, P.G., PMP, GISP, CESCO, Project Manager, Roads & Drainage Division
Johnny Rosario, P.E., Engineer III, Roads & Drainage Division



ORANGE COUNTY CONVENTION CENTER

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Website: www.OrangeCountyFL.net

September 28, 2021

To: Phil Diamond, County Comptroller
Orange County Government

From: Mark Tester, Executive Director
Convention Center

Subject: Response to Audit of the Maintenance of Bridges of Orange County

The Orange County Comptroller's Office recently concluded an audit of Orange County's bridge inspection and maintenance programs. The audit covered the period of January 2017 through December 2019.

Only Recommendation #5 applies to the Orange County Convention Center. County Departments should develop bridge maintenance programs that include inspection by a qualified engineer.

Recommendation #5

The appropriate Orange County Departments should:

- A. Review and address pedestrian bridge deficiencies noted on the Florida Department of Transportation Inspection;
- B. Develop a comprehensive pedestrian bridge management program; and
- C. Ensure all pedestrian bridges are regularly inspected

Response:

OCCC Concurs with recommendation #5 Parts B and C

None of the four (4) bridges that are on Convention Center property is inspected by the Florida Department of Transportation. As such, recommendation 5A does not apply.

The Orange County Convention Center (OCCC) now conducts monthly safety inspections on all four (4) pedestrian bridges and uses a Computerized Maintenance Management System (CMMS) to create work orders with an inspection job plan. The CMMS automatically generates these work orders to maintain the defined schedule.

Since this audit was conducted, three (3) of the four (4) bridges were inspected by a professional engineering firm qualified to perform such inspections in May of 2021. The fourth bridge did not require inspection from an engineering firm, since that bridge was completed in 2018, and is not due for professional



September 28, 2021

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inspection until 2023 and biennial after that. The OCCC will have all four (4) bridges professionally inspected in 2023, which will also be tracked using the CMMS software to ensure compliance.

The professional inspections in May 2021 resulted in minor corrective recommendations, with no threats to pedestrian safety. The work related to those recommendations is either complete or in process.

Going forward, the OCCC is committed to performing biennial inspections by qualified professional engineering firms, as well as monthly safety inspections performed by internal staff. The OCCC will continue using the CMMS to track and generate work orders to perform any preventive and/or corrective maintenance because of these inspections.

Cc: David Ingram, Acting General Manager, Convention Center
Terry Devitt, Acting Deputy Director, Convention Center
Ray Walls, CFO, Convention Center



PARKS AND RECREATION DIVISION

Matt Suedmeyer, Division Manager

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September 27, 2021

TO: Wendy Kittleson, Deputy Director of County Audit

FROM: Matt Suedmeyer, Manager, Parks and Recreation Division *MS*

SUBJECT: Response to Audit of the Maintenance of Bridges of Orange County - Parks and Recreation Division

The Parks and Recreation Division reviewed the Orange County Comptroller's Audit of the Maintenance of Bridges of Orange County. Some portions of the audit reference pedestrian bridges maintained by the Division.

Management's Response: The following are observations and comments regarding declarations contained in the Audit.

➤ *Audit Objective (excerpt)*

The objectives of the audit were to:

- *Determine whether pedestrian bridges maintained by the Orange County Convention Center and Parks Departments are inspected, and repairs are timely performed and,*

RESPONSE: Monthly visual inspections by the Parks and Recreation Division staff have prompted remediation or repair work prior to the audit determinations and funds are budgeted each year for repairs. Capital replacement projects are underway for three of the structures. However, the Division concurs that an inspection program conducted by a structural engineer does not exist for non-FDOT pedestrian bridges, as there is no standard requiring such. Based upon the recommendation of the Audit, the Division has engaged an engineering firm to both inspect the structures, and identify any applicable industry standards and recommendations regarding frequency of future inspections.

➤ *Item 5. (excerpt)*

Routine inspection of pedestrian bridges by a qualified structural engineer is critical for public safety and to protect County taxpayers from increased repair costs.

RESPONSE: Currently, Parks and Recreation Division staff are tasked with documented visual inspections of their park site on a monthly basis. While not conducted by structural engineers, it is these ongoing inspections which have identified and prompted repairs in the past. The Parks and Recreation Division is currently developing bridge inspection guidelines to incorporate recommendations of our contracted engineering firm into our existing Park inspection program.



➤ *Recommendation No. 5:*

The appropriate Orange County Departments should:

- a) *Review and address pedestrian bridge deficiencies noted on Florida Department of Transportation inspections*
- b) *Develop a comprehensive pedestrian bridge management program*
- c) *Ensure all pedestrian bridges are regularly inspected.*

RESPONSE:

- a) The Parks Division provides funding necessary to address deficiencies identified on the FDOT inspected pedestrian bridges. These improvements are then coordinated through the Public Works Department.
- b) Parks Division has contracted an engineering firm to perform structural assessment on 10 bridges and recommend an appropriate comprehensive pedestrian bridge inspection program which builds upon the staff inspections that are currently performed.
- c) The Division will coordinate with Facilities Management and use Maximo asset management tools to inventory and ensure regular inspections and maintenance is recorded.

Summary:

The Parks and Recreation Division concurs with Recommendation No. 5 and that a regular inspection by structural engineers would be a best practice to pursue. The Division will continue to work closely with the Public Works Department to address any bridge deficiencies noted on the Florida Department of Transportation inspections.

The Parks and Recreation Division has procured the services of Avcon Inc., an engineering firm, to evaluate 10 bridges identified in the audit to include inspection of the structures, and identification of the most appropriate industry standards and frequency of future inspections.

Staff will continue to conduct and document visual inspections of bridges on a monthly basis. The Division understands it is these inspections which have identified and prompted repairs on all park bridges.

The Parks and Recreation Division is developing an inspection program which will incorporate our existing Park inspection standards and those recommended by our contracted engineering firm and Public Works.

- C: Darren Gray, Deputy County Administrator
Carla Bell Johnson, AICP, Assistant County Administrator
Lonnie C. Bell Jr., Director, Community and Family Services Department
Kyle Kent, Assistant Manager, Parks and Recreation Division