



Claybrooke Engineering Associates, Inc.

**DRAINAGE INVESTIGATION AND ROADWAY REVIEW OF COWPEN LANE  
FOR THE BERN CREEK RANCHES IMPROVEMENT ASSOCIATION**

**Located in Rural Sarasota County, FL**

**January 2017**



# **DRAINAGE INVESTIGATION AND ROADWAY REVIEW OF COWPEN LANE FOR THE BERN CREEK RANCHES IMPROVEMENT ASSOCIATION IN SARASOTA, FLORIDA**

## **INTRODUCTION**

Claybrooke Engineering Associates, Inc. (CEA) has prepared the following report of the drainage and roadway condition of the existing Cowpen Lane roadway in Sarasota County, Florida. Cowpen Lane is located north of Fruitville Road just east of Gum Slough in Rural Sarasota County. Sarasota County Parcel Identification Number 0225002020. The parcel on which Cowpen Lane sits is approximately 2.95 acres and the roadway has been continuously operated in its present state since the mid 1980's.

Cowpen Lane is the main (only) road giving ingress and egress to the Bern Creek Ranches and is used by both the resident of Bern Creek Ranches and several non-affiliated property owners on the north side of Fruitville Road. In addition to this residential traffic, various delivery, garbage and trade vehicles (mainly medium to heavy trucks) use the roadway. Cowpen Lane and the various drives and associated roadways do not comprise a thru roadway and all traffic that enters must also exit on Cowpen Lane.

The purpose of this investigation, analysis and report was to assess the condition of the drainage on and around Cowpen Lane and relate that to the flooding problems recently experienced. CEA has made multiple site visits and visual inspections of the roadway and the adjacent drainage features on September 20, 2016, November 16, 2016 and December 15, 2016. Photos and notes taken during those site visits can be found in Appendix A.

## **BACKGROUND**

Cowpen Lane was constructed/paved by the developer of the Bern Creek Ranches in the mid 1980's. It is believed that the road existed prior to this but was an unimproved shell road. The Bern Creek Improvement Association was created in conjunction with the Bern Creek Ranches Residential development to oversee the maintenance of Cowpen Lane.

During the September 2, 2016 storm event associated with Hurricane Hermine, the flood waters of Gum Slough and Cowpen Slough in Eastern Sarasota County overtopped the roadway at the southern end of Cowpen Lane. This flooding event caused major damage to the roadway in the form of erosion on the western side of the road and the roadway shoulder. This was the first time that flooding like this has occurred and in so much the homeowners in the Ranches at Bern Creek were greatly concerned with the causes of this flooding and damage. The problem of flooding seemed to be aggravated by the clogged/semi-clogged condition of the culverts under both Cowpen Lane and Fruitville Road.

To prevent further occurrences of this flooding and damage the residents and homeowners of The Ranches at Bern Creek are looking for first an understanding of what happened and secondly what can be done in association with the roadway repair to keep this problem from reoccurring. In that regard, members of the association met with representatives of Sarasota County Roadways and Drainage on September 20, 2016 and discussed the problems that had occurred and their concerns. Representing Sarasota County at that meeting were, Larry Mau P.E., Gregg Young and Ben Quartermaine P.E.

## **EXISTING DRAINAGE**

As discussed with representatives of the Bern Creek Improvement Association and Sarasota County Staff, the drainage around Cowpen Lane and this section of Fruitville road is handled by the roadside ditches and culverts but the two main drainage features in the area are Gum Slough and Cowpen Slough. Drainage to the system along Cowpen Lane comes mainly from the north and travels down several agricultural type ditches south to the wooded wetland area adjacent to the northeast end of Cowpen Lane. From here it flows south along the eastern side ditch of Cowpen and then west under two main culverts under the roadway to the ditch on the west side of Cowpen. A portion of the drainage also continues to flow south in the east ditch down toward Fruitville Road towards two (2) sets of double 30" concrete culverts; one in the right of way of Fruitville road and the other just north of this in Cowpen Lane. The majority of water that comes from and flows down this east side of Cowpen Lane flows under the road through these culverts and then westward along the ditch on the north side of Fruitville Road to the Bridge at Gum Slough. Visual investigations of these features revealed that the ditches had moderate to minor obstructions but were still operating and that the culverts under Cowpen Lane and Fruitville Road (700 ft. +/- east of Cowpen Lane) had significant blockage. An additional significant blockage of the ditches was the shell impromptu parking area on the northwest corner of Cowpen and Fruitville. It is unclear whether this area was always in this condition, but comparing the grades and cross section of the ditch to the immediate north of this area indicate that drainage coming down the west side of Cowpen lane backs up in this area.

The drainage patterns that were observed the day the floodwater overtopped the roadway included significant flooding of all roadway ditches, flooding on adjacent agricultural properties (the hay field to the east of Cowpen Lane) and the roadway ditches along Fruitville road at or above capacity. In the immediate area of the overtopping of the road, there was an apparent head (elevation) difference between the flooded east side of the road and the west side of the road, where there was some back up, but overall the stormwater system (ditches) were handling the drainage flows once the floodwater got past the roadway. Based upon this it was surmised that the capacity of the drainage system to the east of Cowpen Lane, including the drainage culverts of Cowpen Slough that go under Fruitville Road, approximately 700' east of Cowpen Lane, were exceeded. Predictably, Fruitville Road with an average elevation several feet above the exist elevations of the surrounding area acted as a dam and forced drainage flows from the north and east of Cowpen Lane westward along the roadside ditch and overland to

Cowpen Lane, were the partially blocked culverts could not handle the volume and intensity of the runoff.

The outcome of this situation was that floodwaters trapped to the north of Fruitville Road overtopped Cowpen Lane at its lowest point, and the increased stormwater flows and velocity caused significant erosion along the west side of the roadway where the overtopping occurred. Had the backup in the system been to the west of Cowpen lane, the differential in water elevations would have been insignificant and therefore velocities of the flows overtopping the road would most likely not caused the type and extend of erosion damage seen.

Visual investigations of the Cowpen Slough Channel and the four culverts under Fruitville road revealed extensive to partial blockage within all four culverts, vegetation and sediments choking the channel north of Fruitville Road, and grading activities south of Fruitville Road that almost completely blocked the drainage channel of Cowpen Slough. It appears that the property owner to the south of Fruitville Road has attempted to put in a crossing approximately 100 feet south of the roadway, but did not install culverts or any conveyance means for stormwater down the channel of Cowpen slough. Pictures of the area in question appear in Appendix A. Whether the clearing and filling of the channel were done in consideration of the stormwater flows of Cowpen Slough or the flooding that restriction of these flows causes is not known, however, these actions will continually cause flooding to the north of Fruitville Road extending up into the Bern Creek Ranches property.

## **CONDITION OF EXISTING ROADWAY**

CEA performed a site visit to determine the condition of the existing Cowpen Lane Roadway in reference to repairs and maintenance to be done in conjunction with the repair of the erosion caused by Floodwater described in this report. During the November 16, 2016 site visit, CEA found several areas in the roadway pavement showing cracking in need of repair. Overall the interior roadways were in decent condition for their age; however, there is a need of maintenance and general repair to the pavement throughout the length of the Cowpen Lane. Pavement problems encountered included; longitudinal, traverse and thermal cracking, alligator and block cracking, weathering, subsidence and pavement failure. Though these problems were widespread, the roadways themselves appeared stable and overall the lay and grade of the road was acceptable.

In addition to the condition of the pavement, CEA observed some degree of lane rutting on the outside edges of the paved surface. This would generally indicate that in addition to the asphalt being old and in need of repair, which would be expected with age, the shell base of the roadway is starting to subside toward the sharp or non-existent shoulders. The existing roadway base is shell, which is one of the more desirable roadway bases available since its strength modulus remains fairly constant over time and because it is a very stable material that does not readily deteriorate due to exposure to water. The fact that we do see deformation and rutting of the roadway indicates that this

base material is being pushed out towards the sides of the paved surface. It is suspected that the absence or lack of a roadway shoulder would allow the roadway base on these edges to be pushed outward by the heavier than normal traffic that the roadway now sees. Roadway shoulders, or an extension of compacted fill along the edge of the roadway will push back against the downward forces to the roadway base and prevent it from being “squished” out from under the pavement. It appears that in several locations along the roadway, this fill or shoulder is not present, so there is nothing to push back against the downward force of the traffic and hold the base in place. The roadway is not in a condition of failure yet, but it is CEA’s opinion that unless this condition is addressed, there is a high likelihood of roadway base failures along the edge of the road in several places. Those places now show signs of rutting and pavement cracking along the outside wheel edge.

Another item that was observed in the roadway was the condition of the existing culverts that run under Cowpen Lane north of the intersection of Cowpen and Fruitville. With the exception of the culverts in or near to this intersection, there are two (2) existing culverts that do not extent much beyond the roadway edge and are not mitered or sloped. This creates a situation where there is a significant and hazardous drop-off of 3 to 4 feet within 2 linear feet of the roadway edge. An unprotected drop this close to the drive lane could cause a major hazard to vehicles and should be replaced with culverts that extend at least 8 feet beyond the roadway edge and have a mitered end section installed.

## **RECOMMENDATIONS**

Based upon what was observed during the on-site field visit, survey and review of the drainage conditions experienced on during the September 2, 2016 storm event associated with Hurricane Hermine, it is CEA’s recommendation that the Bern Creek Improvement Association take the following steps to prevent re-occurrence of the overtopping of the road and subsequent damage to the roadway.

**Sarasota County** – CEA strongly suggest that the Association work with Sarasota County to ensure that all culverts and roadway ditches along Fruitville road in the vicinity of Cowpen Lane be cleared and maintained. This maintenance plan should include cleaning of all ditches on both sides of the road and cleaning all roadway culverts including the four culverts that allow Cowpen Slough to flow under Fruitville road approximately 900’ east of Cowpen Lane.

**Cowpen Lane** -CEA suggests that the Bern Creek Improvement Association have the ditches on both sides of Cowpen Lane be cleaned and maintained. This operation may require coordination with the Southwest Florida Water Management District, but would be allowed under repair and maintenance of the roadway. CEA also suggest the cleaning of the two existing 30” culvert that run under the south end of Cowpen Lane and repair of the Mitered End Sections of these pipes. This operation should be done in conjunction with the cleaning of the ditches on either side of the road. CEA further suggest that the shell parking area on the northwest corner of the intersection of Cowpen Lane and Fruitville road be removed and either the ditch be re-established or a new culvert pipe

under this area be installed. After the shell has been removed, CEA recommend sodding this area and vegetation be maintained to prevent further erosion. Lastly, CEA recommends repair to the roadway shoulder to be done in conjunction with a resurfacing program for the roadway. When this resurfacing is done, the shoulders on both sides of Cowpen lane along its entire length should be re-established and the roadway cross section should be modified (including culvert ends and drainage features) to make the roadway safer and more consistent with the minimum standards of roadways in Sarasota County. CEA also recommends replacement or extension of the two culverts north of the intersection and installing mitered end sections to remove the current hazardous situation.

**Cowpen Slough** – CEA recommends that the Bern Creek Improvement Association contact the Southwest Florida Water Management District and Sarasota County and notify them of the property owner's actions in filling in the channel of Cowpen Slough to the south of Fruitville Road. This property owner does have certain rights under their agricultural operation to work in and around this channel, however filling in the channel and blocking historical drainage flows would not be allowed by either SWFWMD or the County. It is imperative that the Cowpen Slough channel be cleared and the historical channel be restored and or improved. It is CEA's opinion that even with the cleaning of the ditches along Fruitville road, that a serious flood hazard exists as long as the channel of Cowpen Slough is obstructed.

## **CONCLUSION**

With the information above, it is now up to the Bern Creek Ranches Improvement Association to determine the actions desired to both re-establish the drainage patterns in the area of Cowpen Lane and Fruitville Road and commence repair and maintenance of Cowpen Lane in consideration of pavement life, repair cost, disruption and inconvenience caused by the construction.