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June 6, 2014

Mr. Nick Hether
Lazy TH Estates Subdivision Homeowner's Association
373 Sir Arthur Dr.
Bozeman, MT 59718

RE: Pavement Inspection & Report- Lazy TH Estates Subdivision Roadways, Bozeman, MT (14313)

Per your request, a member of C&H Engineering and Surveying, Inc. (C&H Engineering) made a site visit to the above referenced location on May 15th, 2014. The purpose of this visit was to visually inspect the pavement on all roadways within the Lazy TH Estates Subdivision to help determine the best possible solutions for maintaining the integrity of the pavement. From these observations, C&H Engineering is able to provide professional recommendations as to the best course of action.

Terrance Loop Road:

The existing pavement on this roadway appears to be in relatively good condition with some roadway fissures and cracking both perpendicular and parallel with the road. These cracks range in size from 1/16th to 1 inch in width. Many of these cracks have been filled within the past 1 to 2 years (Photo 1). The roadway also has isolated small patches of asphalt that have been replaced ranging in size from a few square feet to approximately 50 square feet (Photos 2 and 3). Generally, the pavement surface is smooth with minor exceptions along the southerly 'east-west' section of the road, where weathering, possibly due to melting and freezing, has occurred.

Sir Arthur Drive, Rodeo Ct, Legend Ct. Hofer Lane:

The existing pavement on these roadways appears to be in relatively good condition with minor cracking ranging from 1/16th to 1 inch. The pavement is generally very smooth with good drainage from the center towards the pavements edge. Minor depressions in the asphalt are isolated. Overall the roadway appears to still have a good crown sloping from the center towards the pavements edge.

Conclusions:

The roadway and asphalt appear to be in relatively good shape considering the only maintenance performed over the past 20 years has been isolated replacement of asphalt and regular sealing of cracks. Two options of repairs have been proposed to the home owners of Lazy TH Estates; removal of 1-2 inches of asphalt and repaving, or chip sealing the existing surface.

Chip sealing can help retain pavement condition by sealing out water and providing a better wear course on the surface, but provides no structural strength and will repair only minor cracks. Minor cracks would be defined as cracks less than or equal to ¼" wide. During the inspection it was observed that the general structural integrity of the roadways base was in good condition.

Since there appears to be no major areas of sub-base failure, repairing isolated areas, crack sealing, and chip sealing the roads is recommended. It is recommended that the roads be inspected yearly in the spring when the frost has thawed. The Montana Department of Transportation recommends that crack sealing be performed every two to three years or when significant cracking has occurred. Crack sealing is also recommended after patching work is completed. Chip sealing is recommended to be completed after patching and crack sealing to provide a uniform, weather resistant pavement surface.

In general, rutting indicates a structural pavement or sub-base failure and should be repaired by removing and patching the problem areas and ensuring the sub-base is compacted to 95% of the proctor density. Cracks wider than ¼" should be crack sealed. Any cracks less than ¼" wide can be repaired with a chip seal.

Based on these observations, the following items should be completed:

1. Inspect the pavement annually in the spring when the frost has thawed.
2. Determine if significant cracking (wider than ¼") or rutting (deeper than ½") has occurred.
3. Repair any damaged and or rutted asphalt by saw cutting around the problem areas and installing new asphalt pavement patches that are at least 3" thick. Ensure sub base is compacted to 95% of the proctor density prior to patching.
4. Fill all visible cracks (wider than ¼") with a good quality asphalt crack sealant. Crack seal joints between existing pavement and patches.
5. Once all repairs have been made, chip-seal the roads according to MDT specifications to provide a uniform, weather resistant pavement surface.

It should be understood that this inspection was limited to a walk-through of the existing pavement on roadways and that no plans were reviewed. C&H Engineering only provided observations of areas noted within this report. No other areas of the subject property have been reviewed at this time. C&H Engineering cannot accept responsibility for any deficiencies obstructed from view at the time of inspection. This letter is not meant to be a warranty or guarantee of any kind.

If you have any questions or comments, please contact the undersigned.

Sincerely,



Richard Cooper

Reviewed by,



Mark A. Chandler, P.E., P.L.S.

Enclosure



Picture 1 - typical patched crack



Picture 2



Picture 3