LARIMER COUNTY | ENGINEERING DEPARTMENT

P.O. Box 1190, Fort Collins, Colorado 80522-1190, 970.498.5700, Larimer.org

FLOOD REVIEW BOARD

Date: November 21, 2022

Time: 8:30 AM, MST

Location: Arrowhead Lake Conference Room, 4th Floor, 200 W Oak St., Fort Collins, and Zoom meeting

Contact: Tina Kurtz, Larimer County Engineering Department

MEETING MINUTES

Staff Present: Tina Kurtz, Caryn Nezat, Amy White

Staff On Line: Hannah Suppes

Board Members Present: John Hunt, Mike Oberlander, Chad Morris, Chris Carlson

Board Members On Line: None

Call to Order: Mr. Carlson opened the meeting at 8:38 a.m., MST

Introductions

Item #1:
Shannon Colgan – Proposed new culvert at Parcel 8905200001 - Floodplain Project Review

Applicants Present: Alex and Shannon Colgan, applicant; Aaron Cvar, Front Range Stormwater and Floodplain Consulting, LLC

Ms. Kurtz introduced the project to the Flood Review Board (FRB) and stated that this is a Floodplain Project Review for a proposed new culvert on Parcel 8905200001 on Boxelder Creek in a FEMA Zone A Floodplain. The applicable Larimer County Land Use Code (LCLUC) for the Floodplain Special Review is LCLUC 12.1.6.H. The purpose of this new culvert is for a new access road. In addition to the new culvert there will be fill for the access road. This will be a triple box culvert. The study found that the changes to the base flood elevation (BFE) due to the project will vary between 0.01' to -0.17'.

Mr. Cvar reviewed the report for the proposed crossing of Boxelder pointing out there is established flow rates but no floodway in the approximate Zone A. There is not a FEMA model for this area. The discharge used is 1,080 cubic feet per second (cfs) from the Flood Insurance Study 2021 revised preliminary study which is the best available. Mr. Cvar stated that the applicant has already obtained US Army Corps of Engineers approval. The channel in this area is fairly trapezoidal and meanders a little in the vicinity of the proposed crossing.

Topography was obtained by using LiDAR provided by the Colorado Water Conservation Board. The LiDAR data was used to build the model and multiple cross-sections were based on channel stationing in this reach. Two models were created with pre-project existing and proposed conditions. In the vicinity of the box culvert there is a decrease in the water surface elevation due to opening up the capacity. There is a rise as a result upstream of 0.01'. No adverse impacts are expected.

Mr. Morris asked about the ability of the LiDAR to pick up the low flow channel. Mr. Cvar said that it showed it as a flat bottom channel. Mr. Cvar recommended the applicant at the design phase use a larger box in the middle location to maintain the low flow channel. Mr. Oberlander asked about the tie-in for the road and if grading will cause any changes in the hydraulics. We could add conditions to address the as-built conditions and verify the post construction condition is not changing the hydraulics.

Mr. Hunt asked about the velocities in the area. Mr. Cvar said that it is lower velocities in the area. Mr. Carlson asked about the scour calculations. Ms. Colgan clarified there are no plans to fill-in the wash area or overflow channel to the north of the crossing. Mr. Oberlander asked for the construction plans to show grading and plan and profile. Mr. Cvar said that he will continue to be involved in iterations of the design once a civil engineer is hired. Mr. Cvar showed more detail on the west overbank, station 803 and upstream. He also showed the topographic map. Mr. Morris asked for an additional cross section to determine whether the flow can make it into the overbank channel. Mr. Cvar said the bridge span is 32 feet. Mr. Morris said if all the flow stays in Boxelder Creek it is necessary to see the final model with ineffective flow at the high ground and force the flow to stay in the channel, so it shows no rise above 0.3'.

Mr. Oberlander pointed out that the fill on the profile was confusing. Mr. Cvar said that with the headwalls, the culvert is 15' long.

Mr. Hunt pointed out that the access road elevation will need to be around 5,392' which will require significant fill over the culvert. Mr. Cvar said the final design could have a final grade of 8% on the road, so it may only have a couple feet of fill over the culvert, but that will be determined during the final design.

Motion:

Mr. Hunt motioned to recommend approval of the Floodplain Project Review for a new culvert on Parcel number 8905200001 on Boxelder Creek to the County Engineer, with the condition that an engineering design be submitted to the County to verify that the design matches this analysis. Also, an updated hydraulic model be submitted that confines the flow to the main channel for review by County staff to verify that the rise does not exceed the 0.3' criteria. Also, the applicant needs to have the cross sections surveyed in the vicinity, at least upstream and downstream face of the culvert, to verify the geometry.

Mr. Oberlander seconded the motion.

Further Discussion:

The Board wondered if they should have as-built drawings as a condition. Staff responded that it will be a condition on the floodplain permit as it is a county condition of approval.

Vote:
Mr. Hunt - Yes
Dr. Thornton - Absent
Mr. Morris – Yes
Ms. Ervin-Blankenheim – Absent
Mr. Oberlander – Yes
Mr. Carlson – Yes

Motion passed 4-0.

Item #2:
Barleen proposed streambank stabilization and proposed deck - Variance

Applicants Present: Ed Ellingson, Zerrecon

Ms. Kurtz introduced the project to the Flood Review Board (FRB) and stated that this is Variance request for proposed streambank stabilization and a proposed deck. This project is located within the Big Thompson FEMA Floodway. The applicable Larimer County Land Use Code (LCLUC) for the Floodplain Special Review is LCLUC 12.1.6.E.

The foundation of the house was damaged in the 2013 flood and was subsequently repaired. Now erosion control measures are needed to protect the foundation. In addition, the applicant would like a replacement deck. The project engineer used the CDOT (Jacobs) discharges which are higher than the FEMA discharges for design of the riprap. The CDOT 25-yr event vs. the CDOT 100-yr event is being used due to realistic sizing of riprap.

The variance is for the work in the channel and a second to allow the deck replacement in the floodway.

Mr. Ellingson opened with his presentation. He shared images of the original deck and after the damage from the 2013 flood. The stone wall on the downstream end of the house is protection for a historic water storage tank. He went through the code compliance case and the need to install bank stabilization. Over the last year there has still been erosion. In 2017, Van Horn Engineering proposed to install a retaining wall with a deck above it. They established the allowable square footage encroachment that would maintain a no-rise condition. Mr. Ellingson went through the detailed plan for the deck and bank stabilization. He went through the layout of the stabilization and showed that the area constrains the size of the rip rap that can be used and therefore the largest size that is possible in the area was used.

The submitted report has updated cost estimates and there is a new contractor that will be available to keep the timeline of completion before March when the US Army Corps of Engineers permit expires.

A section view of the bank protection was provided, and the plan view is available in the large drawings submitted with the report. The Board noted that from previous projects they have been involved in, it is challenging to use loose rip rap. They said that it may be better to try to find a more vertical solution when space is limited. The counterforts are new and maybe filling between them would be a possible solution. All agreed that something needs to be done to protect the dwelling.

Mr. Oberlander said that he does not see the grading plan working out. Mr. Carlson points out that the stream stability may be at risk if the rip rap becomes a pinch point in the river and where does the flow move to in that case. The plan view of the site shows that the location of the structure is at the end of a river bend. Mr. Hunt reviewed the rip rap calculations and shows the bank angle is 1.5 to 1. Mr. Hunt wanted clarification on the progression of the code compliance case. Ms. White reviewed the case notes which have the requirement of needing a no-rise certification and a technical justification for the no rise certification. After the flood a retaining wall was built that was removed because it was not designed by an engineer.

The Board noted that this is an unsafe condition that remains, and something needs to be done to resolve the problem. Counterforts are a good start to the solutions. Mr. Ellingson noted that the footings for the counterforts are fairly stable, and they are the main supports for the deck. The Board said that a vertical wall would be the ideal solution. They noted that the squared top of the counterfort may cause instability with the rip rap design. The slope of the rip rap is only 1.5:1. Mr. Morris states there could be impacts to the surrounding properties that are not quantified. There is also questions as to whether this would result in a no-rise condition. They agreed that the protection level is inadequate for the 100-year flood which would be a similar event to what took out the deck and foundation. There was discussion on potential ways to protect the foundation.

The Board was okay with the 25-yr protection for the rip-rap given this is not a new structure and that it would provide some protection.

Motion:

Mr. Morris motioned to recommend tabling for up to 120 days, the streambank stabilization project at 2402 West Highway 34 to request either: (a) submission of a vertical based stabilization design, if vertical stabilization is within the footprint of the existing counterforts, no modeling would be required; if it extends beyond, modeling is required to show a no-rise condition is met; or (b) resubmittal of the riprap based design that includes a model to substantiate a no-rise condition, a more streamlined upstream tie-in of the riprap, a revised toe down of the riprap to maintain the slope, and that the riprap sizing include corrections for the channel alignment.

Mr. Oberlander seconded the motion.

Vote:
Mr. Hunt - Yes
Dr. Thornton - Absent
Mr. Morris – Yes

Ms. Ervin-Blankenheim – Absent
Mr. Oberlander – Yes
Mr. Carlson – Yes

Motion passed 4-0.

Discussion on proposed deck.

Motion:

Mr. Hunt motioned to recommend tabling of the deck proposal for 120 days. If deck extends beyond the footprint of the counterforts it would also have to be included in a no-rise analysis. Mr. Morris seconded the motion.

Vote:
Mr. Hunt - Yes
Dr. Thornton - Absent
Mr. Morris – Yes
Ms. Ervin-Blankenheim – Absent
Mr. Oberlander – Yes
Mr. Carlson – Yes

Motion passed 4-0.

Item #3:
Wildsong Road replacement culvert - Floodplain Project Review

Ms. Kurtz introduced the project to the Flood Review Board (FRB) and stated that this is a Floodplain Project Review request for replacement of a culvert on Buckhorn Creek in a Best Available Zone A Floodplain. The applicable Land Use Code Section for the variance request is LCLUC Section 12.1.6.H.

This project is to replace a culvert due to the burn scar and repeated flooding in 2021 and 2022 which washed out roadway. There was flood damage to CR 44H due to the undersized culvert and close proximity of CR 44H to Buckhorn Creek. The new culvert will increase resiliency, provide reliable access, and reduce frequency of flood damage to CR 44H.

Mr. Turner shared his presentation for the project. Much of the repair work is due to the damage from the 2013 flood and the 2020 Cameron peak fire. It is a private crossing which is currently undersized and causing sediment backup and encroachment on CR 44H. The post fire flows are significantly higher, and sizing of the culvert would not allow for the no overtopping requirement in the 100-year flood event. The structure is a depressed armored crossing with a 6’ height and 23’ span box culvert. The Colorado Hazard Mapping Program (CHAMP) study is out of date now but is the best available for the area. The improvements from the crossing showed no-rise for the pre- and post-fire runoff rates with respect to existing conditions.

Mr. Hunt clarified that the culvert is a 23' span aluminum arch culvert. There were questions on where the streambed would be in relation to the culvert and the bottom of the footers. Mr. Turner noted that the bedrock is generally shallow within the canyon. He said they did not do a scour analysis for this project. The footings are at 4-feet depth. Mr. Hunt noted that if the state is responsible for doing inspections on the bridge, there are some regulations that may need to be addressed to ensure this will not be a scour critical bridge. Due to sedimentation issues, it was decided not to go with a wider culvert so that the sediment can be transported through the structure.

The new culvert shows drops in the water surface elevation. The variance for the 10-year and overtopping of the road will be handled by the County Engineer. The footings and anchoring need to be addressed to ensure this is a stable culvert. Due to the potential that the bedrock is shallow, the foundation may be in the bedrock.

Motion:
Mr. Hunt made a motion to recommend approval of the Floodplain Project Review for the replacement of the Wildsong Road culvert on Buckhorn Creek to the County Engineer with the condition that the design be accompanied by a scour assessment showing footers would withstand scour up to an incipient flooding event overtopping Wildsong Drive.

Mr. Oberlander seconded the motion.

Vote:
Mr. Hunt - Yes
Dr. Thornton - Absent
Mr. Morris – Yes
Ms. Ervin-Blankenheim – Absent
Mr. Oberlander – Yes
Mr. Carlson – Yes

Motion passed 4-0.

Item #4:
Approve Minutes from the Board meeting on October 27, 2022.

Motion:
Mr. Hunt motioned to approve the October 27, 2022, Board minutes.

Mr. Morris seconded the motion.

Vote:
Mr. Hunt - Yes
Dr. Thornton - Absent
Mr. Morris – Yes

Mr. Oberlander – Yes
Ms. Ervin-Blankenheim – Absent
Mr. Carlson – Abstain

Motion passed 3-0 with 1 abstention.

Other items:

- Discussed upcoming agendas

Meeting adjourned at 12:00 p.m., MST.