

USFWS Copper River Watershed Habitat Enhancement Project

CORDOVA EVOS SITES COP 43, 44, and 45
65% Submittal Review Comments on

Drawings and Specification

DRAFT MEETING MINUTES

DATE: September 25, 2019

TIME: 1:30 p.m.

LOCATION: Teleconference

CONFERENCE CALLING NO.: 1-877-20-0608

CODE: 12345654321#

These are the remaining comments to be discussed, as identified by CRWP project staff. The comments and responses are broken down by reviewer. Each reviewer's comment is numbered for ease in navigation as they are discussed or referenced. Response to comments for the specifications are in a separate document.

Summary of topics to be discussed:

- *Weir and habitat conditions (including streambank restoration strategy/vegetation type)*
- *Stable material for stream substrate*
- *Riprap on foreslopes*
- *Safety design for 55mph roadway*

PARTICIPANTS:

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Roll Call and Re-Cap

Kate Morse welcomed everyone and had them state their name. The main purpose of the meeting today is to continue the 65% design review from the September 17th meeting, with a focus on comments that we did not discuss. CRWP sent out the draft meeting minutes from the September 17th meeting as a reminder of what we did discuss to help with today's discussion.

PLANS

Sheet C-400 to C-402(See also red-lined Sheet)

1. Consider adding layer of 631(2) Geotextile, Erosion Control, Class I under riprap. -(R)

RESPONSE: We'll consider.

Non-recoverable slopes 2:1. Had the RSAP analysis been done for roadside safety (culvert ends)? Possible modification may include "barn roof design" would be combined 6:1 and 2:1 slope; or 6:1, 3:1 and 2:1 on RT & LT to ensure "clear zone" is met for certain MPH road design and road type. -(R)

RESPONSE: This work is performed on the existing road with the existing culvert. The culvert construction is being improved and the road design is not being changed much. This project involves stream restoration work, therefore additional information is not considered critical.

Consider adding layer of 631(2) Geotextile, Erosion Control, Class I under riprap. -(R)

RESPONSE: *We'll consider.*

Bill didn't see any issue with having the riprap filled. We prefer to see the riprap filled and planted with grass as part of the habitat.

Jeff Stutzke stated that ADOT would like to see it on the embankment.

Heather added that 12' of riprap filled with soil should be okay. One of the project goals is restoration. So, we want to have stuff growing. Also, our experience has been that vegetation helps prevent erosion, which is another benefit.

We will defer to ADOT's request for soil and planting over the top of fabric underneath as extra insurance. We will take a look to see if there are any issues with reveg in the future.

ACTION ITEM:

- ☐ Show geo-textile under riprap on the embankment only, not in the stream. We will still be filling the riprap with fine and covering with topsoil and reveg in accordance with standard practice for restoration.

Design Criteria for 55 mph speed limit

Heather stated that one of the action items from the September 17th meeting was to confirm a design speed of 55 mph. Has anyone had a chance to do that?

Bill commented that he thought that the posted speed was 35 or 40 mph. During his site visit, he thought he took some photos of the posted speed. He'll look in his files to see if he can locate those photos. (NOTE: He was not able to locate said photos)

Artem Ruppert with ADOT stated that he was able to confirm that the design speed for the road within the project area is 55 mph according to the construction manual used at DOT. He also spoke to a traffic engineer for confirmation.

Heather asked if it was posted at 55 mph as well?

Kate commented that the last posted speed is 55 mph for a paved road. Then it becomes a gravel road. No speed limits are posted on the gravel road.

Dan Adamczak stated that their records show that it's posted at 55 mph. He went on to state that regardless of what's posted, per Alaska statute, ADOT is required to set certain design standards for roads. Those design standards can be met in various ways. These are detailed in the pre-construction manual, which is online. ADOT defers to AASHTO guidance for a lot of the design criteria.

While they've done other pipe projects, they didn't always do this barn roof design with the 6 to 1. There are a few different things going on at this site that we need to pay attention to.

The difference here is that we're raising the grade a decent amount. If we were just changing the pipe and not touching the surface at all, that would be a different scenario.

There are things that when you start changing the overall geometry of the road like that, you've got to take these things into account. We have to keep things safe and not make them worse.

Some real important things to pay attention to are:

- a) What was the existing side slope of the road prism. In its existing condition, if we're at a 2 to 1, for example, and we raise the grade, and we keep it at a 2 to 1, which means the tail of the slope goes out, we're not making the condition worse. It's remaining at a 2 to 1. And, if we're not making the condition worse, that's something that we take into account when we look at these design conditions.
- b) This is a fish passage project not a reconstruction. Because it is not a reconstruction, that may allow us some mitigating factors to doing this full-blown clear zone.
- c) Traffic safety. Artem is working with traffic staff to pull accident history for this part of the road. If there's an accident history, then what are the volumes on this road. Is it a dirt road, low volume, rural, all of these things act together in deciding what the design requirements are going to be? Again, all of these are detailed in the pre-construction manual and further in some of the AASHTO guidance that ADOT has established for state roads.
- d) Is the road maintained in the wintertime or is it closed?
- e) This road is a straight line, so the pipes aren't on a corner nor are they super elevated. And the list goes on and on for justifications for the design.

Dan added that this is more than what we're going to solve on this phone call. It's the things that we should start looking at to further this discussion. It's not a clear-cut answer that you have to design it this way vs. another way. Ultimately, BCE is going to have to come to us stating, "we did this because..." and then show us how or why they made their decisions.

ADOT needs to have it on record as to why we are or are not doing a design. For example, what things is the project team taking into account that say we don't have to do that. Such as,

- crash history;
- the fact that we're not making it worse;
- the fact that it's a low volume road.

All these things are going to be returned back to ADOT so we can say, "yes, it's in keeping with our design standards". The design team needs to apply an engineer's judgement. Step back and ask what's going on here. Am I creating a hazard, or would I be creating a hazard by doing it in a different way? With a change like this, ADOT is just going to have to look at it a little bit closer.

That's where we're coming from. We understand that the purpose and the funding source of this project is to re-establish fish passage, and we're in support of that. But the byproduct can't be that we make our roads less safe. Unfortunately, the size of the pipe is changing the road grade, so we have to look at road safety issues.

Bill asked if the side slopes stay the same as the original road, does ADOT consider just the additional height of the embankment to be increased risk.

Dan responded not necessarily. If you look through the design criteria, there's some gray area. Ultimately, it's not a cookie cutter design situation. We need to make sure that the assumptions that are being made follow the way we have set up design standards for roads.

Heather thanked Adam for his explanation and stated that it makes our path forward much clearer.

Adam again referred the design team to the pre-construction manual and stated that he would be happy to answer specific questions on it where he can. While it's not his area of expertise, he can at least point the team in right direction to help us get the information that we need to start pursuing this.

Bill commented that one of the bigger factors there is the footprint of the project. It goes directly into the wetlands and the habitat that we're trying to preserve with the new culverts. So, there's some trade-off there. Heather stated that we also discussed the potential to put in a guardrail in.

Dan stated that guardrails are a hazard by themselves and DOT would fight the installation of a guardrail. It is also a maintenance nightmare. Running some of the programs like RSAP, you'll find that guardrail isn't a good solution for situations such as this.

Heather responded that that is good to know and that we understand no guardrails, and we'll work with you on side slopes.

Artem asked if you use 6 to 1 barn roof and 2 to 1 slope, how much will the pipe increase at each location. He did a rough calculation, and it increases by 20 feet--10 feet each side. How much does that cost? Heather responded that it's about \$1,000 per foot, so it's not going to break the bank.

Bill commented that the bigger cost would be the increased fill that you would need to re-build the roadside ditches. Because you would fill the roadside ditches and the connection wouldn't happen anymore. You would lose 10' of roadside backwater habitat. So, there's a bunch of considerations there. We talked a little bit about shifting the whole alignment to the south so the upstream side would stay in the same location and the road would shift south 10'. That would keep you from impacting the upstream habitat.

It sounds like there's enough wiggle room to keep the existing design and justify it based on the fact that we're not creating a condition that is worse than what's already there.

ACTION ITEM:

- ✓ ADOT to provide the crash history for the roadway within the project area.

Project review August 2019 by Steve McGroarty**PLANS****2. Typical Collar Riprap Detail-**

- a. Geotextile, Erosion Control should be placed between embankment fill and riprap and also between the waterway bank and riprap.

RESPONSE: This may need further discussion

- b. 3 feet of riprap seems significantly less than is typically included in projects; recommend the designer work with the Hydraulics Section on this issue.

DISCUSSION: Per Heather, we discussed the geotextile and riprap earlier.

On the width of the riprap, Luke mentioned at the September 17th meeting that DOT typically sees 2 times the culvert width on the upstream side and 1 times the culvert width on the downstream side. Bill, need your input on that.

Bill stated that because the upstream is ponded, that the velocities around the entrance to the culvert, even at flood flows, are probably going to be less and not extend out as far what might be found in a normal situation. That seems like a pretty good distance for riprap. I would defer to DOT folks, if they think that's warranted in this situation. It does sound like a really large collar because the pipe is pretty good sized.

Luke stated that it was his comment. He does agree with Bill and suggested that we meet in the middle on this one. There are some specific details about this project that would merit bringing it down to somewhere in the area of, for example, 15' on each side or something like that. However, DOT would prefer more than 3', as stated in the plans.

Heather stated that we agree that 3' is too short. She asked if everybody is okay with 15' on both sides -- upstream and downstream. Jeff stated that he's okay with that -- a span width on each side.

Luke commented that we could skinny it up on downstream side. DOT typically has a bit more on the upstream because we feel that there's more rip there with that in ponded water trying to make its way to that entrance. There is some expansion on the downstream side, but we typically have grade on our side and it's falling away -- the water's going downhill. Maybe 10' each side on the outlet would be appropriate there.

Bill suggested 10' on outlet and 15' on the upstream side. Luke stated that yes, that would be reasonable considering the span of these structures. We have a bit less risk because we have a larger opening than standard for hydrology than what's on a non-fish passage.

Heather stated that it sounds like we solved that problem. It will be 15' on upstream and 10' on the downstream on each culvert.

ACTION ITEM

- ☐ Design riprap to be 15' on the upstream side of the culvert and 10' on the downstream side.

**Project review August 2019 by Gillian Dougherty and Megan Marie,
Alaska Department of Fish & Game**

PLANS

General Design Comments:

3. The 3-ft wide low flow channel is shown on the drawings but bankfull/OHW is unclear on plan view drawings. What is the channel expected to look like at normal and high flows? What is the relationship between the typical flows (4-5 cfs?) and the existing conditions outside of the road influence?

RESPONSE: We'll provide bankfull lines. H&H consultant (HDR) will address the relationship between flows and the existing conditions outside of the road influence.

DISCUSSION: Gillian stated that there didn't seem to be consistency on what the streamside was. An area that we thought was inside the channel and it had a short vegmat. Their main question is that they didn't know what this 3' wide low flow channel actually represented in drawing when you're showing 20' in other documents. She understands there's some backwatering here. The physical flow is 4-5 cfs in a channel that's described between 13' to 20' wide, depending on how you look. And then seeing outside the culvert on the plans, it showed vegmat within channel or what?

We're basically very confused about what the design was here. Was it just how it was represented in the drawings or what? And keep in mind that we're not very familiar with these sites. She couldn't really discern what the design here was, what the flows were expected, what the range of flows was, what the originally high design channel was; what was supposed to be bank and what was supposed to be terraced and what was supposed to be ponded. It's just not clear.

Franklin commented that they measured flows between 1-2 cfs during fall rainstorms so far at 43 and 44. Kirstie has seen higher flows in July. Kirstie added that it's closer to 7 or 8 in July during peak glacier melt is usually when the water table comes up in that area. They don't really respond to precept events.

Bill asked that these are not actual events where you get overlanded flow, but the groundwater table in that area comes up and, therefore, the flows come up. Kirstie responded yes.

Gillian stated that her question is about the channel within the culvert. She understands that we're trying to design for two states--one is flooded and backwatered and one is not flooded and backwatered.

Bill stated that he could walk through what we found out there at the site. It's an unusual situation. It's a set of old remnant channels that were probably scoured into the big alluvial feature of the Saddlebag River's outfall plain. These old remnant channels that are pretty good sized, have picked up groundwater and convey it down to these three crossings. So, the channels themselves are wide flood channels scoured into the alluvial feature of the outfall plain. The stormwater that you find in them right now is a pretty small amount of water and we had to make some sort of estimate as to the area that contributed to these basins and came up with regression flows and that's probably where that 4-5 cfs comes from. When Franklin went out there and gaged the flows, they're quite a bit smaller than that the regression flows.

Since they built the embankment for the original railroad, it has backwatered a very significant area on the upstream side of the embankment. Originally there were small trestles in here. They've been replaced with culverts and then over the years, the beavers have plugged those up. And the beavers have also created large dam structures downstream of these culverts and backwatered the whole system. So, we have backwatered ponds, small culverts, a low road grade, the culverts routinely get plugged up by the beavers, water runs over the road, and that's what probably causes most of the flooding.

When we look upstream, there is a chance that the Saddlebag River will, at some point, re-occupy these channels. We decided to ignore that volume of flow, although that volume of flow is probably what created the channels originally. So, we have small streams in big channels coming down hitting these backwatered ponds, going through the culverts, then being backwatered further by good-sized beaver dams downstream.

The design team got together before he left on vacation and talked through some modifications to the design drawings. It was agreed that for the channel rebuilding upstream, there really is nothing there to rebuild. Most of the culverts, or at least two of them, are ponded on the upstream side. There are no banks to revegetate or anything. So, we're probably going to delete that out of the drawings.

It's the same on the downstream too. If we can construct these weirs from fairly close proximity to the road grade, we'd rather do that so we don't disturb the existing banks and vegetation downstream. We'd just reach downstream, place some of this heavy material into the stream channel to create these backwater weirs and leave the banks as they are.

There's a very good chance that the banks that you find downstream are artificial and that the channels are artificial. They just happen to be about the same width as a blade on a D8, which sort of makes me think it was cut with that. So, we would create those

weirs and not disturb the bank or the channels between the weirs and the outfall of the culverts.

The design team came up with that solution as a modification of the design before he left. George was going to make those changes. Bill also offered to send some pictures around, or post on the project website, if that would help.

Heather added that because we do have railroad channels, one analysis that HDR did was to look at a bankfull width of 16' and what the velocities were. So, we assumed the culvert is the bankfull width to make sure those velocities were in the range of fish velocities, which are below 4' per second. They looked at bankfull flows that were predicted by the gage data that was collected by Franklin. So, we consider this synthetic width method approach because the existing channels are relic channels.

4. Based on C-2xx and C-5xx the proposed bankfull width is 13 ft. Was the surveyed bank full width the active channel or an older uplifted relic channel? The H&H lists OHW widths of 14, 18, and 20 feet and bankfull of 18, 19, and 25 feet for the proposed structures but bankfull on the plan set is 13 feet for all three crossings and OHW is not referenced. The reference reaches appear fairly close to the road and may be affected by the roadway and undersized culverts. Difficult to determine what the reference reach dimensions are from the field notes in the H&H. Additional clarification on channel width measurements and reference reach dimensions is needed.

RESPONSE: Because of the flooded and backwatered situation with all the three (3) pipes, it is difficult sometimes to identify the bankfull and OHW as continues lines. Obviously, they will be wider for pools (up to 30 ft) and narrower for riffle (9-16 ft) sections. Also, Beaver dams create wider pools and backwater sections, which were not considered in sizing the pipes.

DISCUSSION: One thing that Heather had an issue with is that the bankfull width is not 13'. It's 16'. And the way this is drawn, it really is 16' because your bankfull width should be your top of banks and not your bottom of banks. So, she made that note in her comments as well. And we agree that these culverts are synthetic bankfull width. It should be 16' once you account for the side slopes for the culvert.

ACTION ITEM:

- ☐ Change the bankfull width to 16' on all sites.

5. C-2xx and C-5xx show veg mat within the bankfull channel all the way up to the low flow channels. Please clarify why this was proposed. Seems like an odd application and downstream it is sandwiched between the culvert inlet/outlet aprons and the grade control weirs. Why are no banks constructed on COP-44 and-45 outside of the culvert?

RESPONSE: Vegetative mat is now proposed will be deleted. Bank construction doesn't appear feasible in backwatered and/or flooded channels/streams.

DISCUSSION: Heather asked if Gillian and Megan intended to put vegmat inside the channels with their comment. Gillian responded that it's a typo.

Bill asked where it's shown, and Gillian stated it's on the downstream channel. And she asked what the intent of the channel is.

Bill commented that the modified design will have a low flow channel to culvert and across the splash pad at the outfall and then there will be a blank spot where the channel will be existing and then the weir with this small channel will pick up and tie back in. But there won't be anything between weir and splash pad. That will be blank. Heather commented that we'll use existing substrate

Bill confirmed that the idea is that it will be ponded up. To which Gillian responded that it makes much more sense.

6. The H&H proposes a low flow channel depth of 12in. and the plans indicate a 6-inch depth. We have significant concerns about the constructability and stability of the proposed shallow and poorly defined low-flow channel, especially given the flat profile of the remainder of the channel out to bankfull width. These types of channels are prone to filling in with gravel and fine sediment over time, even in low bedload systems. Given the plans to backwater the pipes, this increases the concern for low flow channels filling in and we would prefer to see more defined banks to maintain the low flow channel on a receding hydrograph after higher flows.

RESPONSE: The low flow depth in final H&H report of 6" is shown in Table 6 and design sketches. The calculated low flow (Q2) design flows for in these channels are very low, but still is higher than what was measured by Franklin (FWS). These are small streams in wide channels with very low velocities; they are going through marshy terrain. Possibility of high bedload is unlikely unless the Saddlebag river drops large amount of flood waters. Then the ADOT&PF road maintenance staff would have to clean the pipes.

7. Surveyed long profiles seem to be too short to capture enough information for properly constructed upper and lower VAP lines. Given how undersized the culverts are, significant impacts could be expected close to the road. Difficult to review the profiles in C-400/401/402 without a longer view.

RESPONSE: Longer view of the upper and lower VAP lines has been provided on the H&H design sketches. Existing small pipe culverts (36" dia. and 48" arch) haven't caused road closures or flooding. Proposed 16 ft. box culverts are believed to be able to handle the expected flows summarized in the H&H report. Moreover, if flooding occurs, flood flows can also go to the existing pipes at COP 42 & COP 46, which should help handle flood waters.

DISCUSSION: Gillian stated that she couldn't tell from the profile on the drawings that it's pretty short. If you remove the weir, would it still essentially be backwatered or not by the other structures and the channel downstream. It wouldn't be, right? The culvert would not be backwatered if the weir wasn't there? Unless the beavers moved in?

She and Megan thought that the way the weirs were designed and the way the banks were designed that it would maintain any type of low-flow channel through a significant period of ponding.

Bill responded that some of them are backwatered and some of them aren't. He thinks that 43 is the least backwatered. And that 44 and 45 have the potential to be substantially backwatered by the beaver dams.

8. Still have some remaining concerns about the stability of the proposed weirs and concerns that they will trap sediment in the wide and shallow channels upstream.

RESPONSE: BCE team expects to see very little sediment; will be discussed further.

DISCUSSION: Gillian stated that if the idea is that the weir will permanently backwater the culvert, then that makes more sense. She's not sure why we have a low-flow channel that way, but if that's the idea that the weir will permanently backwater the culvert so it's a permanently ponded thing with riffle at the outlet, that makes a lot more sense to her than simultaneously building a low-flow channel and a ponded structure and expecting both to stay stable over time. She doesn't think that will happen. She thinks the team needs to pick one and go with it.

Bill stated that the low-flow channel is there in case the culverts start to collect sediment and we decide to take out the weirs. Then we have low-flow channels inside the box culverts. Most of the sediment that comes down will be fine and it will wash out in the first large event and we'll be back to a low-flow channel in a defined culvert. If we didn't put that in at all, we'd go back to a flat bottomed, 16' wide channel.

Gillian responded that we're seeing where it makes sense, except that she's not really seeing enough relief and enough structure inside the culvert so that it wouldn't necessarily washout with that low a flow. She thinks it can be easily addressed. If we want to have a structure in there that we do expect sediment, it just needs to be better defined or have some larger structures, so it does re-form. She's thinking of a little Campbell Creek or something like that with a well-defined low flow channel.

Bill responded our structures and the stream sediment are designed to be stable in a 100-year event. His thought was that a 6" small channel would stay there through most of the events that this area would see. It can be made deeper. But the stuff that it's constructed out of should stay stable in a 100-year event.

Gillian commented that making it a little bit deeper would be helpful in having it re-form after high floods. They did a similar design in Tyonek, and it did fill in. Someone would have to maintain it for 15 years down the road.

Heather responded that what she sees happening to the super low flows is that the high flow scours it out, but when the flows drop after the flood, they fill back in. Gillian commented that maybe the solution is to make the weir, but then you have to always maintain the weir.

Heather stated that we do need to pick a way and go with it. We're not going to get both ways here.

Gillian stated that she sees weirs that have not been maintained. They're currently looking at a structure from the 90's that needs fixing. It's taken them 10 years to get to the point where they can fix it so it's functioning again.

Bill commented that this design has substrate material built for 100-year event. He asked Gillian if making the channel narrower and deeper would help? Gillian responded that it would help a lot. Bill stated that it would be easy to make that change.

Heather stated that we show that we're reconstructing banks on downstream side and on the upstream side, if there's anything to tie into in the disturbed area. Understand, we don't want to construct banks where we're not disturbing anything. Her concern is if there is disturbance, that it gets reconstructed. That would be a unit price item, so if the contractor doesn't need to do that, then we don't pay for it.

Bill responded that if we stake it beforehand for the contractor, he's not allowed to clear and grub and make a mess in that area. Any re-veg is on him. Then he or she would keep it to a minimum.

Heather commented that generally the contractor doesn't want to do extra work. So, usually they disturb less than what she anticipates. Just want to make sure we're not leaving a non-reconstructed flat outfall.

Bill suggested that we add a detail for bank reconstruction, and we can use it as required. Heather agreed.

ACTION ITEM:

- ☐ add a detail for bank reconstruction

9. Streambanks in the culvert seem un-constructible and unstable as shown in C-500/501/502.

RESPONSE: Stream cross section in the culvert will be modified, as redlined by Heather H.

Gillian stated that the banks seem narrow at 1' wide. Heather responded that we don't want stream banks in the culvert at all. Her suggestion is to get rid of the streambanks and slope the low flow channel out towards the culvert wall. It would be a 10% slope up instead making that flat.

Gillian responded that makes sense to her.

NOTE: In a later phone conversation with Heather this was modified to include a 12" deep low flow channel and 5% sloping banks out to the culvert walls.

10. The upper VAP line should have accounted for the grade control weir, i.e., it should be at the elevation of the low flow notch. It's not clear that it is.

RESPONSE: We'll adjust to account for the grade control.

11. The upstream banks should definitely be at a higher elevation than the grade control weir to prevent aggradation and splitting of the flow over time.

RESPONSE: These weirs are already very low. They are intended to backwater the culverts to reduce beaver activity. Lowering them will create riffles in the culverts that will attract the beavers.

DISCUSSION: Gillian commented that the way the weir was tacked on, it seemed as an afterthought. The elevation of the weir was higher than the bottom of the low flow channel and it's higher than the banks inside the culvert. And that's just going to generate a situation where you have a pond that will fill with sediment. The notch on the weir that's set off to one side. She thinks that the engineers may not think there will be sediment in the system. The reality is that some sediment will come down and she believes that it will settle behind that weir. And then if the beaver dam should be blown out or if the beavers get trapped out, it would be 5 or 10 years before they come back.

Gillian went on that at Goose Meadows they put that in. They did a bunch of channel work and then the beavers backwatered 3'. Their concern would be that we do something that we see fairly often at existing culverts where the beavers get trapped or they're gone for some reason and then we end up with very, very low flow situation.

They're also concerned that we would provide passage through this very, very wide low-flow channel in the years after an event like that happens. She spoke to Aaron at DOT about having DOT clean the pipes and maintain. Realistically, is that going to happen or are we better off having structures that are going to force a low-flow channel to re-form even at lower flow rates.

The scenario we're talking about is, it's ponded up for however long, it fills with sediment, low-flow channels are 6" deep, there's not a release. Then the beavers get trapped out or whatever happens, and that weir is still there, it's just a featureless, flat 16' wide gravel bar above it. And you're forcing passage through the gravel rather than over the top.

Heather stated that she didn't think 16' wide would be a concern. The existing channels are that wide. This isn't even going to be 16' wide. It has no width.

Gillian responded that you're building an interim channel that may not have enough flow. Most structures, or weirs, are designed so there's enough flow to scour it out or pool in between the weirs. They don't fill in with sediment, so fish have a place to hang out. This is one weir in a very flat system. That's really our concern. Has that scenario been considered because it's pretty likely, as it happens often. If the beaver dam blows out five years from now, is this structure going to be passable to fish?

What's going to be immediately upstream of the weir? She didn't think the low-flow channel is going to be there anymore. She thinks it's going to fill in and there won't be the power to re-form that low flow channel.

Heather stated that we're not relying on the beaver here. We're relying on the weir to backwater the culvert. However, she agrees with Gillian's concern. It was discussed in the last call if sedimentation was an issue here. The consensus was that it wouldn't be. But she thinks that it very well may be. We've seen these low-flow channels in similar situations that eventually fill-in.

Gillian commented that if there's an agreement to maintain it, it needs to be codified into the permit or other document. Heather responded that there isn't an agreement to maintain the low-flow channel.

Bill commented that we thought we would try this design to mitigate some of the beaver activity. And the thought was that if it doesn't work, that it fills in with sediment like Gillian suggests, that people who monitor the fish passage would know to remove the weir. Without the weir, it would go back to be the system that it is now.

Currently, there are beaver dams downstream and they are collecting that sediment. We walked to the dams and some are pretty far downstream. The bottom has a lot of muck, but you can walk it and not go up to your neck in it.

Heather stated that we discussed that if the weir doesn't work and we do need to take it out, now we have a very over widened channel, but we don't know what the width will be.

C-300/301/302

12. Depending on proposed construction timing & duration, the plan to divert flow between sites could be an issue. Additional detail is needed on how the stream is expected to flow between the sites during construction.

RESPONSE: The construction is expected to be performed during low flows; stream diversion appears fairly straightforward.

13. Water may need to be pumped to the downstream side of the project to ensure sufficient flow for supporting fish in existing stream channels at each site during construction.

RESPONSE: To be discussed.

Megan stated that we covered the permits pretty well last week in the September 17th meeting.

Gillian stated that's all the comments from Fish & Game.

Project review August 2019 by Heather Hanson, US Fish & Wildlife Service**PLANS**Sheet C-200, Sheet C-201, Sheet C-202

14. See Heather's comments on redline plans

RESPONSE: 4 ft vegetation mat upstream is not proposed anymore due to the flooded/marsh situation. The banks will be difficult to construct or revegetate due to the typically flooded conditions in the opinion of the BCE team. Will be discussed further.

Heather stated that most of her comments are in line with Fish & Game and they have been discussed and resolved.

15. See Heather's comments on redline plans

RESPONSE: Rootwads may be problematic to install due to absence of existing banks, multiple existing trees/habitat and backwatered channel. Will be discussed further.

Heather had suggested rootwads. Bill responded that we would not reconstruct that channel between the splash pad and the weir and just leave as it is.

Heather responded that if we're confident that it's not going to be disturbed then she's fine with it. It's something to be consider. Slope not getting any longer. Bill stated that we can add a comment on the drawing not to disturb existing channel and repairing vegetation outside. Draw a line across the stream at some point and then have a comment that in the event that there is disturbance, then go to the detail for reconstruction of the banks.

Heather thought that would be great.

ACTION ITEM

- ☐ Bill will help George put together bank reconstruction detail.

Kate asked what the weir is made out of and what maintenance or reconstruction is needed.

Bill stated that the weir is constructed out of the same material as substrate inside the culvert--larger rock, a mixture of fines and large rocks combined. We didn't intend for them to extend outside the existing channel, and we didn't think it would be necessary to put a substantial foundation under them other than to push down into the grass and muck that's there to place this material. Really don't want to make a mess putting them in. So, if we can reach out with the bucket of the excavator with this material and shape it up so that it created a backwater flow, that would be enough without damaging the banks or the rest of the structure of the stream channel.

Heather commented that she's seen crane mats used for this sort of thing. Maybe we should require that, so they don't disturb the banks in the wetland area. That would need to be on drawings and in the specs to make sure contractor sees that. Bill stated that they would have to excavate downstream a certain distance to put in a splash pad.

Heather stated that to put the weir in, you'd have to get into the wetlands with equipment.

Bill commented that we should determine what the reach of the excavator is, place it on the edge of the splash pad and we'd probably be happy with however far it can reach. What's there now is a pond, so if you drive out into the pond, there's no vegetation there now. Not a lot to damage by driving the excavator into the muck. Not sure what type of substrate may be there. We can put a note on the drawings to use crane mats if substrate is too soft to drive down the channel to place the weir.

Heather stated that it's not ponded on the downstream side. I thought it was well vegetated down there. Bill responded that 43 is not ponded, 44 and 45 are ponded.

Heather stated that it's a good idea to have on the drawings so the vegetation isn't disturbed, and we need to get equipment down it. There's a 20 to 1 slope on the downstream side of the weirs that will extend some distance from the face of the culverts.

Bill stated they're all pretty tiny and don't extend more than 1-1/2" off the bottom. They're small structures. He looked at a picture of COP 44 grasses growing intermittent on side of the stream, it meanders down through that. The grass is flooded, the banks are quite low. It's on both sides. He'll send pictures around so everyone can see them again.

ACTION ITEM

- ☐ Add a note to the drawings that vegetation is not to be disturbed downstream.
- ☐ Add to drawings and specs that contractor is required to use crane mats in the wetland areas so the banks in the wetland areas are not disturbed.

16. See Heather's comments on redline plans

RESPONSE: The current plan is to eliminate any vegetation shown and use the existing substrate.

Sheet C-400, C-401 & C-402

17. See Heather's comments on redline plans

RESPONSE: Same response to Sheet C-200 to Sheet C-202 re-to streambanks.

18. See Heather's comments on redline plans

RESPONSE: The upper VAP lines will be adjusted to account for the weir notch. However, the recommendation of our H&H consultant is not to show VAP lines on the construction drawings. This will be discussed further.

Sheet C-101

19. See Heather's comments on redline plans

RESPONSE: BCE team will modify the stream cross section within the pipe to what was redlined or even flatter option.

20. See Heather's comments on redline plans

RESPONSE: BCE will correct the plans per red lined.

Sheet C-500-to Sheet C-502

21. See Heather's comments on redline plans

RESPONSE: BCE team intends to delete cross section B with the reason cited in Sheet C-200 to Sheet C-202.

Project review September 2019 by ADOT&PF Hydraulics (Jeff Stutzke and Luke Boles)

Adding these comments here to continue the review and discussion from the September 17th meeting.

22. General Comment: Was a roadside safety analysis performed on the proposed installation? Proposed changes include: embankment foreslopes, road profile and the addition of roadside hazards in the clear zone (culvert ends). A roadside safety analysis is recommended to ensure that the final road configuration meets applicable standards.

DISCUSSION: we discussed roadside safety analysis earlier in the meeting.

Plan Sheet C-100:

23. Recommend adding additional riprap to foreslopes. The 3ft wide collar is substantially less than DOT&PF typical installation. We typically place 2 x diameter/span (D/S) each side of the culvert on the inlet and 1D/S each side of the outlet, to armor against elevated flow velocities from contraction/expansion. Recommend placing Erosion Control Geotextile, Class II, under all riprap & stream substrate.

DISCUSSION: Earlier in the meeting we discussed diversion control fabric that we would not want it underneath stream substrate, but we do the banks.

24. Generally, we specify materials already in the contract to blend into the stream/culvert substrate, when possible. It generally achieves an adequate result with much less cost/effort by the contractor to produce a small quantity of specialized material. In this

case a mix of riprap (coarse) and E-1 surface (fine) could be used, as these materials are already specified in the contract.

DISCUSSION: Earlier in the meeting we discussed substrate. We preferred to use the Fuller Thompson equation and have mid-size material in the riprap for a better dense substrate material.

Plan Sheets C-200, C201 & C-202:

25. See General Comment above RE: H&H Tables.

26. See comment Re: riprap collar on Sheet C-100.

DISCUSSION: Comment was already been discussed earlier in the meeting.

Plan Sheets C-400, C401 & C-402:

27. Recommend placing Erosion Control Geotextile, Class II, under all riprap & stream substrate.

DISCUSSION: Comment was already been discussed earlier in the meeting.

28. Will stream substrate be placed in the excavated portion of the channel bottom downstream of the outlet? What if existing material is too fine to be stable at design flow? Recommend adding note to ensure material placed is similar to specified stream substrate (stable at design flow) or to place specified stream substrate.

DISCUSSION: Comment was already been discussed earlier in the meeting.

29. (Only C-400) There appears to be 0.5ft drop in the upstream pond elevation from the proposed installation. Has the effect on the habitat been considered?

DISCUSSION: The H&H report has the stability analysis in it. Heather confirmed that we do stability analysis in the H&H for a 100-year flood. We talked about stream substrate; we did consider the effect of dropping the upstream elevation by .5 feet on the previous call. On the Specs, we strongly prefer to re-vegetate entire area due to this being a fish passage project.

Plan Sheets C-500, C501 & C-502:

30. Section B: Will stream substrate be placed in the excavated portion of the channel bottom downstream of the outlet? What if existing material is too fine to be stable at design flow? Recommend adding note to ensure material placed is similar to specified stream substrate (stable at design flow) or to place specified stream substrate.

DISCUSSION: Jeff stated that in their design they run a substrate stabilization analysis. He doesn't know if that's been done. Some of the other questions regarding the extent of the riprap was discussed.

Specifications:**Section 611 Riprap:**

31. Does the project include a revetment? If not, delete reference to revetment. Is the plan to place borrow/organics in the riprap voids? DOT&PF has specified this type of bank protection in special cases; however, it can create maintenance issues clearing embankment foreslopes and is not recommended at this location.

DISCUSSION: Comment was already been discussed earlier in the meeting.

Section 690 Waterway:

32. Does the revegetation plan include live willow staking and/or live siltation? Willows are referenced in 690-3 sections, but are not defined in material section. Nor are harvesting, storage and planting techniques covered in this or other sections. This has been a successful technique for streambank revegetation. Recommend adding willow revegetation techniques into the plans/specs.

Section 690-2.01 Materials:

33. Will Spruce Trees be utilized for planting? If not, recommend removing from the section.
34. Channel Armor Substrate is not defined in 204.
35. See comment above Re: willow revegetation.

Section 690-3.04 through 3.07:

36. Many references to willows without description of harvesting, storage, planting, etc. Recommend adding additional detail Re: willow revegetation.

Additional General Comments:

37. Sheet G-002 ESCP Note No.2, Seems as though contractor is directed to use supersacks, is this in-lieu of the detailed Cofferdams then?

DISCUSSION: Comment was already been discussed earlier in the meeting.

38. Suggest requiring contractor to submit a water handling plan that can be reviewed/approved 10 days prior to work.

DISCUSSION: Concerning the water handling plan, it's usually required 10 days before the work starts. In addition to DOT, the other stakeholders have a chance to review and comment on the water handling plan before construction begins.

39. Note 7, have potential stockpile or staging areas been identified?

DISCUSSION: If Jeff recalls correctly, there's a road not too far from the project area that can be used as a staging area where they put the pipe together.

40. Sheet G-003, Cofferdam: require culvert to be installed in the dry or foundation approval by engineer prior to culvert placement.

DISCUSSION: From the contractor's standpoint, will he be allowed to use supersacks or will we stick with the Cofferdam? Is there some flexibility there?

Kate stated the some of Jeff's and Luke's comments were covered in the September 17th meeting. She asked Jeff and Luke if they had any additional comments or questions to follow-up from last week. Such as Sheets C-500; C-501; C-502

Luke had to leave the meeting. Jeff stated that he's in agreement with what he's heard from today's discussion.

Concerning the cover over the pipe, when M&O maintains the road, they'll blade it. We did discuss before if we can we maintain the cover over the culvert. Did we discuss if the grade raise transitions, if that will that be adjusted or not? Heather responded that we did talk about the grade raise and decided to lengthen those.

Jeff looked at Goose Meadows for the clear zone issue. It had a pretty good skew on it. So, just by default the pipe was required to be longer. We had to widen embankment, which eliminated the clear zones on that one.

He mentioned that DOT won't maintain the weirs, so his advice would be to have something as maintenance free as possible. Heather responded that maintenance of the weir would be by this program. Which is why if it doesn't work, we can take it out and go back to sloping, non-backwatered system.

RIGHT-OF-WAY PERMIT

Jeff added that as part of the right-of-way permit process, the application is sent to DOT traffic folks, someone in design, someone in M and O; somebody in right-of-way; and Jeff will get a copy of it too. So, you could see some additional comments from someone else that might show up. Utilities is also part of the process, but it shouldn't be an issue in the project area. Kate added that CRWP is waiting for the discussion at the 65% point to settle and they can use it for the permit application. Chantel will work that.

Jeff stated that he doesn't have anything else to add at this point. If there are any questions, please email Dan Adamczak or Jeff for additional information.

Heather stated that she appreciates the effort by DOT that went into the comments.

Kate asked BCE if they had any additional comments, questions or if they will just start updating the plans and specs. BCE responded that they'll just start updating the plans and specs.

SCHEDULE

Kate asked about the project schedule. Heather responded that BCE needs more time to get the 95% done. So, we'll have to reschedule the next review meeting. It will be after the 95% submittal is done.

BCE wants to combine all the comments to determine how long it will take to make the updates.

Per Kate, the October review meeting is cancelled. Once we have the 95% drawings, we'll get those distributed and schedule the next review meeting three weeks after that submittal.

H&H REPORT

Egor with BCE asked if we need to revise the H&H report. Jeff doesn't think the H&H report needs to be revised. He'll take another look.

Bill agreed with that. It's been issued as final. But let him know if there are any changes.

QUESTION ON CULVERT LENGTH

George with BCE asked if the length of the culvert will be extended.

Per Heather, the length of the culvert will depend on if we can stay with the embankment slopes as proposed. So that was the discussion about the traffic safety and coming up with the justification that DOT's okay with. BCE needs to write something up explaining the thought process and run that through Dan Adamczak to distribute. The traffic accident data can be part of that as well. The other requirements would be in the pre-construction manual.

ADJOURNMENT

Kate called on the other meeting participants by name to see if they had any questions or comments. No one did.

Bill stated that he will put together a word document that has an upstream/downstream shot so folks can see the backwatered condition as it exists. He will send it to Kate for distribution.

Since no one had any other questions or comments, the meeting was adjourned.